



Maritime and Coastguard Agency

An executive agency of the Department for Transport, (DfT)

Code of Safe Working Practices for Merchant Seamen

Consolidated Edition, 2010



information & publishing solutions

www.tso.co.uk

ISBN 978-0-11-553170-5



9 780115 531705

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ISBN-978-0-11-553170-5

Incorporating amendments 1 to 10



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Published by TSO (The Stationery Office) and available from:

Online

www.tsoshop.co.uk

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Each page is numbered on the inside bottom edge and contains:-

- the MCA identifier for this Code - i.e. MSCP01
- the number of the chapter - e.g. Ch 1
- the revision status of that chapter and page e.g. - Rev1.01
- the page number within the chapter e.g. - Page 2

The first page of each chapter indicates the total number of pages within it e.g. - Page 1 of 12. This enables the user to check that all the pages within that chapter are intact. Where pages need to be added to or subtracted from a chapter, the first page of that chapter will also be revised to show the new number of pages within it.

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The Code contains an amendment sheet which provides the current revision status of amendments, chapters and pages (an example appears below) against which the revision status may be checked

Page revisions are indicated by a change in the number **after** the decimal point:- e.g. Rev1.02, Rev1.03, etc., while chapter revisions are indicated by a change in the number **before** the decimal point:- e.g. Rev2.01, Rev3.01, etc. (page revision reverts to 01)



SAMPLE AMENDMENT SHEET (FIRST ISSUE)

Amendment 00

July 1998

Chapters	Pages	Revision Status
1	All	1.01
2	All	1.01
3	All	1.01
4	All	1.01
5	All	1.01
6	All	1.01

SAMPLE AMENDMENT SHEET (SECOND ISSUE)

(The following is an example of an amendment sheet where pages 4-10 of Chapter 1 and the whole of Chapter 5 have been revised)

Amendment 01

July 1998

Chapters	Pages	Revision Status
1	1-3	1.01
	4-10	1.02
	11-16	1.01
2	All	1.01
3	All	1.01
4	All	1.01
5	All	2.01
6	All	1.01



CODE OF SAFE WORKING PRACTICES FOR MERCHANT SEAMEN

MSCP01

AMENDMENT 10

2010

Chapters	Pages	Revision Status
0 (Preface etc)	1	2.05
0	7-9	2.04
0	10	2.05
0	11	2.04
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0	13-14	2.04
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Chapters	Pages	Revision Status
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15	1-16	3.01
17	1-18	2.01
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18	5	1.05
18	6-7	1.03
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21	5-26	2.02
23	2	1.02
23	7	1.02
23	17	1.02
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29	3	1.02
30	1	1.02
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32	1	1.02
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33	1-3	1.02
35 (Appendix 1)	1-4	3.01
36 (Appendix 2)	3	2.02
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PREFACE

This Code of Safe Working Practices is intended primarily for merchant seamen on United Kingdom registered vessels.

*MS (Code of
Safe Working
Practices for
Merchant
Seamen)
Regs 1998
S.I. 1998
No. 1838*

Copies of the current printed edition of the Code must be carried on all United Kingdom ships other than fishing vessels and pleasure craft, and a copy must be made available to any seaman in the ship who requests it, in accordance with the Merchant Shipping (Code of Safe Working Practices for Merchant Seamen) Regulations 1998. There should always be an adequate number of copies to allow the Master, Safety Officer and any members of the Safety Committee to have their own, leaving at least one available for general reference.

Provided that the requirements of the Merchant Shipping (Code of Safe Working Practices) Regulations 1998 are met, including the requirement for copies of the code to be easily accessible, MCA accepts that some copies may be electronic. In all cases at least one printed copy of the Code shall be available.

This Code is addressed to everyone on a ship regardless of rank or rating because the recommendations can be effective only if they are understood by all and if all cooperate in their implementation. Those not themselves actually engaged in a job in hand should be aware of what is being done, so that they may avoid putting themselves at risk or those concerned at risk by impeding or needlessly interfering with the conduct of the work.

The Code is arranged in sections which deal with broad areas of concern.

The introduction gives the regulatory framework for health and safety on board ships and overall safety responsibilities under that framework.

Section I is largely concerned with safety management and the statutory duties underlying the advice in the remainder of the Code. All working on



board should be aware of these duties and of the principles governing the guidance on safe practice which they are required to follow.

Section 2 begins with a chapter setting out the areas that should be covered in introducing a new recruit to the safety procedures on board. It goes on to explain what individuals can do to improve their personal health and safety.

Section 3 is concerned with various working practices common to all ships.

Section 4 covers safety for specialist ship operations.

The Maritime and Coastguard Agency wishes to acknowledge the support and expert contributions from many working in the shipping industry, but in particular from the members of the Industry Steering Group for the revision of the Code:

Mr G Colclough Ex. Master;

LLB (London), FNI	- Liverpool John Moores University
Captain J Davies	- NUMAST
Captain G Hicks	- NUMAST
Captain N Matthews	- The Chamber of Shipping
Mr M Ranson	- The Chamber of Shipping
Mr R Rayner	- RMT
Mr M Stubbings	- The Chamber of Shipping
Mr M Williams	- The Chamber of Shipping

Maritime and Coastguard Agency
Southampton

May 1998



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- 2. Maritime and Coastguard Agency free publications
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INTRODUCTION AND REGULATORY FRAMEWORK

General

1. This Code is concerned with improving health and safety on board ship. In the United Kingdom, the Merchant Shipping Act allows the Secretary of State to make regulations, sometimes implementing international standards, to secure the safety of ships and those on them. Much of the Code relates to matters which are the subject of such regulations. In such cases the Code is intended to give guidance as to how the statutory obligations should be fulfilled. However, the guidance should never be regarded as superseding or amending regulations.
2. Many regulations lay down specific requirements for standards of safety, equipment or operations. Some of these regulations require that a relevant part of the Code should be consulted and the principles and guidance applied. In these areas, the Maritime and Coastguard Agency would generally accept compliance with the guidance in the Code as demonstrating that the Company, employer or worker had done what was reasonable to comply with the regulations. More details about these regulations are contained in the relevant chapters in Section I of this Code.
3. References to British Standards (BS) where there is no corresponding European Norm (EN) contained in this Code are made with the understanding that “an alternative Standard which provides, in use, equivalent levels of safety, suitability and fitness for purpose” is equally acceptable.
4. The following regulations also relate to particular aspects of health and safety at work:

MS (Personal Protective Equipment) Regulations 1999 S.I. 1999 No. 2205 - see MSN 1731 (M+F)

MS (Means of Access) Regulations S.I. 1988 No. 1637 - see Chapter 6



MS (Entry into Dangerous Spaces) Regulations 1988 No. 1638 - see Chapter 6

MS (Safe Movement Aboard Ship) Regulations S.I. 1988 No. 1641 - see Chapter 6

MS (Hatches and Lifting Plant) Regulations S.I. 1988 No. 1639 - see Chapter 7

MS (Guarding of Machinery and Electrical Equipment) Regulations S.I. 1988 No. 1636 - see Chapter 7

MS and FV (Health and Safety at Work) (Employment of Young Persons) Regulations S.I. 1998 No. 2411 - see MGN 88

MS and FV (Manual Handling Operations) Regulations S.I. 1998 No. 2857 - see MGN 90 and Chapter 19

5. The Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997, set basic requirements for the management of occupational health and safety on board. Employers are required to identify and assess the risks to the health and safety of workers and anyone else affected by their activities, and to adopt appropriate measures to improve health and safety, in accordance with their findings. Because of the broad scope of these regulations, further advice is given in paragraphs 11-25 below.

6. The Code provides guidance on safe working practices for many situations that commonly arise on ships, and the basic principles can be applied to many other work situations that are not specifically covered. However, it should not be considered a comprehensive guide to safety, and the advice it contains should always be considered in conjunction with the findings of the employer's assessment of risks, and any information or working instructions provided by the manufacturer, supplier, or any other source, should be followed.

7. It is a statutory requirement for copies of the Code to be carried on board UK ships. It should be supplemented by safety manuals, work instructions and other guidance issued by shipping companies for their particular ships, as appropriate.

8. Non-UK ships are not subject to all UK safety regulations, although failure to meet international standards of safety enshrined in those regulations may result in enforcement action while the ship is in UK waters.



International Management Code for the Safe Operation of Ships and for Pollution Prevention (International Safety Management (ISM) Code)

9. All ships over 500GRT are required to operate a Safety Management System complying with the ISM Code.

10. Compliance with the ISM Code complements compliance with existing health and safety regulations and use of the guidance in this Code. For example,

- The ISM Code requires that the Company's Safety Management System should *"ensure that applicable codes, guidelines and standards recommended by the ..Administration"* are taken into account. This Code is one such "applicable code", and an ISM audit may consider how the guidance it contains has been implemented.
- The ISM Code requires that the *"safety management objectives of the Company should, inter alia,... establish safeguards against all identified risks..."* This Code will assist the Company in identifying risks and establishing safe practices to safeguard against them.
- The ISM Code requires the Company to *"define and document the responsibility, authority and interrelation of all personnel who manage, perform and verify work relating to and affecting safety and pollution prevention"*. This Code gives advice on the roles of those with particular safety responsibilities, and highlights work areas where specific responsibilities should be allocated to a competent person.

Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations

11. *It is the duty of employers to protect the health and safety of workers and others so far as is reasonably practicable. The principles which employers must follow to effect this, contained in the regulations, are:*

- (a) the avoidance of risks, which among other things includes the combating of risks at source and the replacement of dangerous practices, substances or equipment by non-dangerous or less dangerous practices, substances or equipment;*
- (b) the evaluation of unavoidable risks and the taking of action to reduce them;*

MS and FV
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Safety at Work)
Regs 1997 SI
No.2962 Reg 5



- (c) *adoption of work patterns and procedures which take account of the capacity of the individual, especially in respect of the design of the workplace and the choice of work equipment, with a view in particular to alleviating monotonous work and to reducing any consequent adverse effect on workers' health and safety;*
- (d) *adaptation of procedures to take account of new technology and other changes in working practices, equipment, the working environment and any other factors which may affect health and safety;*
- (e) *adoption of a coherent approach to management of the vessel or undertaking, taking account of health and safety at every level of the organisation;*
- (f) *giving collective protective measures priority over individual protective measures;*
- (g) *the provision of appropriate and relevant information and instruction for workers.*

12. Risks inherent in the working environment, must be identified, evaluated and in consequence measures must be taken such as to remove or minimise those risks, and so to protect workers and others from those which are unavoidable.

Duty holders under the Health and Safety at Work Regulations

13. It is important that those on whom duties are placed are in a position to carry them out. Employment relationships on board ship can be complex - for example the master may not be employed by the owner or operator of the ship, or by the same employer as the crew. There may also be people working on board such as contractors and sub-contractors, stevedoring companies and those under franchising arrangements (eg in retail or service outlets) whose employer has no direct responsibility for the safety of the ship. There is therefore no single "person" on whom it is appropriate to place the entire "employment" responsibility for health and safety on board.



14. The regulations therefore recognise two levels of “employment” responsibility. The regulations and this Code use the terms “Company” and “employer”. The “Company” may of course also be an “employer”.

Reg 2(2)

“Company” means the owner of a ship or any other organisation or person such as the manager, or bareboat charterer, who has assumed the responsibility for operation of the ship from the owner.

“employer” means a person by whom a worker is employed under a contract of employment;

“contract of employment” means a contract of employment, whether express or implied, and if express, whether oral or in writing;

15. Many aspects of the safety of the ship as a workplace (eg the structural soundness of the vessel, the provision of adequate lighting and ventilation, provision of life-saving appliances, and fire-fighting equipment) are under the control of the Company, either directly, or through their contractual arrangements with the owner.

16. Each employer, which may include franchise companies operating catering facilities or retail outlets, has control over the occupational health and safety training of the staff employed, and over everyday working practices.

17. The duties for each are explained below.

Duties of employers

Reg 5

18. *All employers have a duty to ensure the health and safety of workers and others in accordance with the principles set out in paragraph 10 above.*

The measures required include:

- safe working places and environment;*
- safe plant, machinery and equipment;*
- health and safety training, instruction, supervision and information;*
- any necessary protective clothing and equipment where risks cannot be removed by other means;*



- Reg 6 • a health and safety policy;
- Reg 7 • assessment of the risks to the health and safety of workers;
- Reg 7 • information for workers about the significant findings of their risk assessment;
- Reg 11 • health surveillance of workers as appropriate;
- Reg 13 • information about their activities and staff to the Company;
- Reg 14 • appointment of a competent person to assist with the implementation of the Regulations;
- Reg 20 • consultation with their workers or elected representatives on health and safety matters.

Duties of the Company

19. In so far as the Company is an employer on board ship, it has a duty to assess the risks to workers and others affected by its activities. The Company's activity is the operation of the ship, and so it is responsible for co-ordinating the control measures identified in the risk assessments of all other relevant employers on board, as appropriate.

20. “The Company”, in addition to its duties as an employer, is required to:

- Reg 12 • provide information on the special occupational qualifications required to any employment business supplying them with temporary workers;
- Reg 13 • consult other employers on board about the health and safety of workers;
- co-ordinate health and safety measures between all the employers on board;
- provide information to workers about the ship safety systems;
- Reg 15 • appoint a safety officer (where applicable);
- Reg 17 • organise the election of safety representatives and safety committee (where applicable).

21. The Company is also responsible, under other merchant shipping legislation, for ensuring that emergency equipment is provided and emergency procedures are in place, including training all personnel in their emergency duties. Recommendations for basic shipboard health and safety training for workers new to a ship are given in Chapter 10.



22. As a general rule the master will be the representative of the Company on board ship.

Duties of Workers

Reg 21

23. Workers are required to:

- *take reasonable care for their own health and safety and that of others on board who may be affected by their acts or omissions;*
- *co-operate with anyone else carrying out health and safety duties - including compliance with control measures identified during the employer's or Company's evaluation of risk;*
- *report any identified serious hazards or deficiencies immediately to the appropriate officer or other authorised person;*
- *make proper use of plant and machinery, and treat any hazard to health or safety (such as a dangerous substance) with due caution.*

Reg 23

24. *Under the Regulations, it is also an offence for any person intentionally or recklessly to interfere with or misuse anything provided in the interests of health and safety.*

25. In sections 2 and 3 of this Code, the term "personnel" is used to refer to all workers on board, whether or not they are signed on as members of the crew. Where passengers are also covered, this will be specifically stated.



SECTION I

I

SAFETY RESPONSIBILITIES/ SHIPBOARD MANAGEMENT



CHAPTER I

RISK ASSESSMENT

1.1 Introduction

*MS and FV
(Health and
Safety at Work)
Regs 1997 SI No.
2962 Reg 5(1)(b)*

1.1.1 *Employers are required to ensure the health and safety of workers and other persons so far as possible, by the application of certain principles, including the evaluation of unavoidable risks and the taking of action to reduce them.*

Reg 7

1.1.2 *Specifically, employers are required to make a suitable and sufficient assessment of the risks to health and safety of workers arising in the normal course of their activities or duties, for the purpose of identifying:*

- (a) groups of workers at particular risk in the performance of their duties; and*
- (b) the measures to be taken to comply with the employer's duties under the Regulations;*

The assessment should extend to others on board ship who may be affected by the acts or omissions of the employer.

1.1.3 *Every employer and every self-employed person on board ship is required to inform the Company of any relevant risks to health and safety arising from the conduct of their business.*

Reg 7(5)

1.1.4 *Employers must ensure that measures are taken to ensure an improvement in the safety and health of workers and other persons in respect of those risks identified by the assessment.*

Reg 7(3)

1.1.5 *Employers must review the assessment when there is reason to believe that it is no longer valid, and make any necessary changes.*

Reg 7(1) and (6)

1.1.6 *Workers must be informed of any significant findings of the assessment and measures for their protection, and of any subsequent revisions made.*



1.1.7 *The Company is also required to ensure that anyone working on the ship, whether or not they are directly employed by the Company, is aware of the findings of the Company's risk assessment and of the measures taken for their protection.*

1.1.8 This chapter explains the principles of risk assessment in relation to occupational health and safety and provides some guidance on how the assessment and control of risks may be approached.

1.1.9 Regulation of occupational health and safety on board ship is of course not new. Existing safety measures may already provide a high level of safety for workers. For example, well-established procedures, inspections by safety officers and the use of "permits to work" which control safety conditions, will contribute to the identification of hazards and measures for safe working.

1.1.10 However, what is new is the explicit requirement in regulation for employers to adopt the risk assessment approach to occupational health and safety. This means that all work activities should be considered from a risk assessment standpoint.

1.1.11 Employers may adapt existing safety management systems to meet the risk assessment principles set out in section 1.3 and the main elements described in 1.10 taking into account the nature of their operations and the type and extent of the hazards and risks to workers.

1.2 Key terms

1.2.1 Key terms, used frequently in this chapter, are defined below.

- a) A **hazard** is a source of potential harm or damage or a situation with potential for harm or damage;
- b) **risk** has two elements:
 - the likelihood that a hazard may occur;
 - the consequences of the hazardous event.



1.3 Principles of risk assessment

1.3.1 A “risk assessment” is intended to be a careful examination of what, in the nature of operations, could cause harm, so that decisions can be made as to whether enough precautions have been taken or whether more should be done to prevent harm. The aim is to minimise accidents and ill health on board ship.

1.3.2 The assessment should first establish the hazards that are present at the place of work and then identify the significant risks arising out of the work activity. The assessment should include consideration of the existing precautions to control the risk, such as permits to work, restricted access and use of warning signs or personal protective equipment.

1.3.3 Any risk assessment must address risks to the health and safety of workers. Advice on assessment in relation to the use of personal protective equipment, the use of equipment and manual handling operations are given in Chapters 4, 19 and 20. In addition, specific areas of work involving significant risk, and recommended measures to address that risk, are covered in more detail in Sections 3 and 4 of the Code.

1.4 Risk assessment in practice

1.4.1 There are no fixed rules about how risk assessment should be undertaken, although section 1.10 gives the main elements. The assessment will depend on the type of ship, the nature of operations and the type and extent of the hazards and risks. The intention is that the process should be simple, but meaningful. The following sections give advice on good practice.

1.5 What should be assessed?

1.5.1 The assessment should cover the risks arising from the work activities of workers on the ship. The assessment is not expected to cover risks which are not reasonably foreseeable.

1.5.2 Employers are advised to record the significant findings of their risk assessment. Risks which are found to be trivial, and where no further precautions are required, need not be recorded.

1.6 Who has to carry out the assessment?

1.6.1 In all cases, individual employers have responsibility for assessing the risks to their workers and other persons who may be affected by their activities. The Company will be responsible for co-ordinating the risk assessments covering everyone on the ship, including workers directly employed by itself, taking account of the other employers' assessments.

1.6.2 The process of risk assessment should be carried out by suitably experienced personnel, using specialist advice if appropriate.

1.7 How thorough should the assessment be?

1.7.1 Regulation 7(1) requires that a suitable and sufficient assessment be made of the risks to the health and safety of workers arising in the normal course of their duties. This requirement to assess risk relates only to risks which arise directly from the work activity being undertaken and which have the potential to harm the person(s) actually undertaking that work, or those who may be directly affected by that work. The requirement to assess risk does not extend to any consequential peril to the ship resulting from the particular work activity, nor to any external hazards which may imperil the ship, either of which may cause harm to those on board or to others. These aspects are covered by other regulations.

1.7.2 The assessment of risks must be 'suitable and sufficient'. The process need not be overcomplicated. This means that the amount of effort that is put into an assessment should depend on the level of risks identified and whether those risks are already controlled by satisfactory precautions or procedures to ensure that they are as low as reasonably practicable.

1.8 When to assess?

1.8.1 Risk assessment should be seen as a continuous process. In practice, the risks in the workplace should be assessed before work begins on any task for which no valid risk assessment exists. An assessment must be reviewed



and updated as necessary, to ensure that it reflects any significant changes of equipment or procedure.

1.9 Elements of risk assessment

1.9.1 The main elements of the risk assessment process are:

- (a) classify work activities;
- (b) identify hazards and personnel at risk;
- (c) identify risk controls;
- (d) estimate the risk;
- (e) decide the tolerability of the risks;
- (f) prepare risk control action plan (if necessary);
- (g) review adequacy of action plan;
- (h) ensure risk assessment and controls are effective and up to date.

1.9.2 Further guidance on how each element of risk assessment may be accomplished is in Annex 1.1, which is based on British Standard 8800: 2004.

1.10 Risk assessment pro-forma

1.10.1 Employers may wish to use a simple pro-forma to record the findings of an assessment, covering, for example:

- (a) work activity;
- (b) hazard(s);
- (c) controls in place;
- (d) personnel at risk;
- (e) likelihood of harm;
- (f) severity of harm;
- (g) risk levels (sometimes called “risk factor”);
- (h) action to be taken following the assessment;
- (i) administrative details, e.g. name of assessor; date, etc.

The examples at Annex 1.2 and Annex 1.3 illustrate a two stage approach, the first stage being to identify those risks which require further consideration and the second recording the assessment of those significant risks. This is a suggestion only, and is not intended to be prescriptive.



GUIDANCE ON MAIN ELEMENTS OF RISK ASSESSMENT

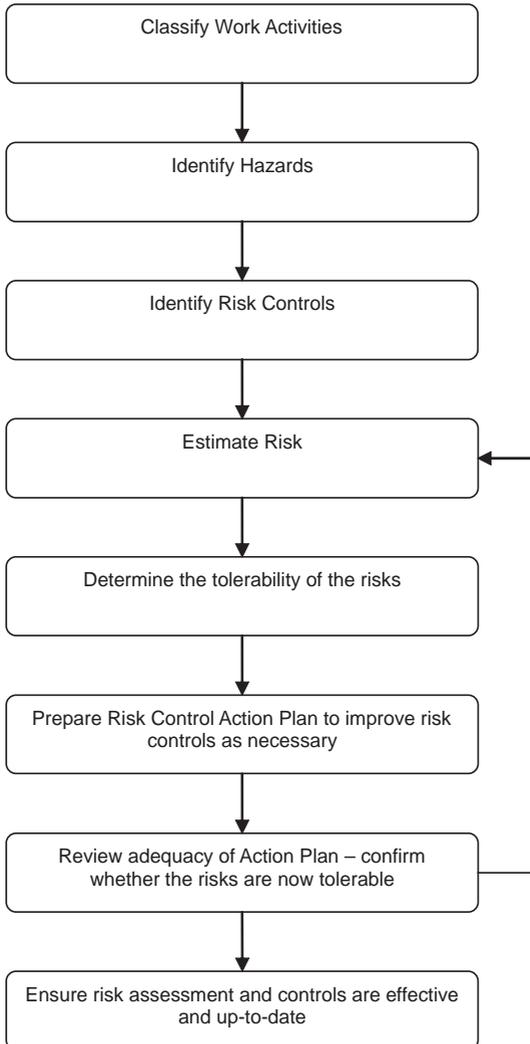


Fig.1: The process of risk assessment and control

Source: British Standard 8800:2004 Pg. 41



1. Classify work activities

1.1 A useful preliminary to risk assessment is to identify separate work activities, to group them in a rational and manageable way, and to gather necessary information (or collate existing information) about them. Infrequent maintenance tasks, as well as day-to-day operations, should be included. Possible ways of classifying work activities include:

- (a) department/location on board ship;
- (b) stages of an operation or work routine;
- (c) planned and unscheduled maintenance;
- (d) defined tasks (e.g. loading/unloading cargo).

1.2 Information required for each work activity might include:

- (a) tasks being carried out: their duration and frequency;
- (b) location(s) where the work is carried out;
- (c) who normally/occasionally carries out the tasks;
- (d) others who may be affected by the work (e.g. contractors, passengers);
- (e) training that personnel have received for the task.

2. Identify hazards

2.1 Asking these three questions should help to identify where there is a hazard:

- Is there a source of harm?
- Who (or what) could be harmed?
- How could harm occur?

Hazards that clearly possess negligible potential for harm should not be documented or given further consideration, provided that appropriate control measures remain in place.

2.2 To help with the process of identifying hazards it may be useful to categorise hazards in different ways, for example by topic, e.g.:

- (a) mechanical;



- (b) electrical;
- (c) physical;
- (d) radiation;
- (e) substances;
- (f) fire and explosion;
- (g) chemical;
- (h) biological;
- (i) psychological.

2.3 A complementary approach may be to develop a prompt list such as:
During work activities could the following hazards exist?

- (a) slips/falls on the level;
- (b) falls of persons from a height;
- (c) falls of tools, materials, etc, from a height;
- (d) inadequate headroom;
- (e) inadequate ventilation;
- (f) hazards from plant and machinery associated with assembly, commissioning, operation, maintenance, modification, repair and dismantling;
- (g) hazards to plant and machinery, which may result in their destruction or the loss of availability of essential equipment;
- (h) hazards from manual handling;
- (i) hazards from long term physiological effects e.g. exposure to substances above the Threshold Limit Value (TLV).

The above list is not exhaustive, and employers could develop their own 'prompt list' taking into account the particular circumstances.

The most effective way of reducing risk is to eliminate the hazard completely, however in many cases this will be impossible and risk controls will need to be used.



3. Identify Risk Controls

3.1 Risk and hazard identification are essential elements of the risk assessment process and inherently only the application of appropriate control measures reduces risks. In many instances following established good practice will provide the necessary controls.

3.2 A risk assessment should be comprehensive enough to identify hazards and the required control measures to reduce the risk of harm, including those planned or already in place. Separate controls may be applicable to reduce likelihood, e.g. Risk Control Systems and to reduce severity, e.g. improved PPE.

3.3 As well as identifying the necessary control measures for particular risks, the risk assessment process should also consider the arrangements to ensure that these control measures are implemented and kept in place.

3.4 Risk Control Systems provide the method of management control for individual control measures or types of control measure. Using a Permit-to-Work (PTW) system as an example, this would include defining aspects such as:

- (a) the scope (range of activities) for which the PTW is needed;
- (b) responsibility for the design of the PTW system and the responsibilities of those involved in its operation;
- (c) training and competency of those who design or operate the PTW system;
- (d) communication and consultation needed in the design and operation of the system;
- (e) arrangement for inspection and audits of the system and its implementation;
- (f) arrangements to review the performance of the PTW system and determine whether improvements are needed.

3.5 When evaluating existing risk control systems, consideration should be given to measures that reduce the likelihood of and / or the severity of harm. The following hierarchy can be applied:



- (a) If practicable eliminate hazards altogether or try to combat risks at the source;
- (b) If elimination is not possible, try to reduce risk at the source;
- (c) Reduce risk via procedures and safe systems of work, adopting PPE only as the last resort after all other control measures have been considered.

4. Estimate risk

4.1 The risk from the hazard may be determined by estimating:

- (a) the potential severity of harm;
- (b) the likelihood that harm will occur.

These two components should be judged independently.

4.2 When seeking to establish potential severity of harm, the following should be considered:

- (a) part(s) of the body likely to be affected;
- (b) nature of the harm, ranging from slight to extreme.

Care should be taken to ensure that harm category definitions reflect both the short and long term health and safety consequences. A possible categorisation of severity harm levels based on the three bands of slight, moderate and extreme is shown in table 1:

Table 1: Examples of categories for severity of harm

Category	Slight harm	Moderate harm	Extreme harm
Health	Nuisance and irritation (e.g. headaches); temporary ill health leading to discomfort (e.g. diarrhoea).	Deafness; dermatitis; asthma; work related upper limb disorders; ill-health leading to permanent minor disability.	Occupational cancer; severe life shortening diseases; acute fatal diseases; permanent substantial disability.
Safety	Superficial injuries; Minor cuts and bruises; Eye irritation from dust.	Lacerations; burns; concussion; serious sprains; minor fractures; musculo-skeletal disorders.	Amputations; major fractures; poisonings; multiple injuries; fatal injuries.

The health and safety harm categories are effectively defined by quoted examples and these lists are not exhaustive

Source: British Standard 8800:2004 Pg. 47



4.3 Individuals can adapt the structure of table 1 to reflect their objectives. For example the structure described could be expanded from three “harm” bands (slight, moderate and extreme) to four bands by dividing the extreme harm band into two categories such as “severe harm” (e.g. major fractures) and “extreme harm” (e.g. fatal).

4.4 In order to establish the likelihood of harm the adequacy of control measures already in place should be considered. Legal requirements and guidance in this Code and other safety publications are good guides to adequate control of specific hazards.

The following issues should then typically be assessed:

- (a) number of personnel exposed;
- (b) frequency and duration of exposure to the hazard;
- (c) effects of failure of power or water supply;
- (d) effects of failure of plant and machinery components and safety devices;
- (e) exposure to the elements;
- (f) protection afforded by personal protective equipment and its limitations;
- (g) possibility of unsafe acts by persons for example, who:
 - (i) may not know what the hazards are;
 - (ii) may not have the knowledge, physical capacity, or skills to do the work;
 - (iii) underestimate risks to which they are exposed;
 - (iv) underestimate the practicality and utility of safe working methods.

A possible categorisation of severity harm levels based on the four bands, of very likely; likely; unlikely or very unlikely, is shown in table 2:



Table 2: Examples of categories for likelihood of harm

Categories for the likelihood of harm	Very Likely	Likely	Unlikely	Very Unlikely
Type of occurrence	Typically experienced at least once every six months by an individual.	Typically experienced once every five years by an individual.	Typically experienced once during the working lifetime of an individual.	Less than 1% chance of being experienced by an individual during their working lifetime.

Source: British Standard 8800:2004 Pg. 48

4.5 Any given hazard is more serious if it affects a greater number of people. But some of the more serious hazards may be associated with an occasional task carried out by just one person, for example maintenance of inaccessible parts of lifting equipment. Table 3 shows a simple method for estimating risks according to the potential severity of harm and the likelihood, as described above.

Table 3: A simple risk estimator

Likelihood of Harm	Severity of Harm		
	Slight Harm	Moderate Harm	Extreme Harm
Very unlikely	VERY LOW RISK	VERY LOW RISK	HIGH RISK
Unlikely	VERY LOW RISK	MEDIUM RISK	VERY HIGH RISK
Likely	LOW RISK	HIGH RISK	VERY HIGH RISK
Very Likely	LOW RISK	VERY HIGH RISK	VERY HIGH RISK

Note: Very Low risk here means that the risk has been reduced to the lowest level that is reasonably practicable

Source: British Standard 8800:2004 Pg. 49



5. Determine the tolerability of the risks

5.1 The next step is to decide which risks are acceptable, tolerable or unacceptable. In making decisions as to whether the risk is tolerable the work force should be consulted. To do this the organisation should first establish tolerability criteria to provide a basis for consistency in all its risk assessments. This should involve consultation with workers representatives, other stakeholders and should take account of legislation and regulatory agency guidance, where applicable. A simple evaluation of risk tolerability, based on a five band structure is shown in table 4:

Table 4: A simple risk categorization

Category of risk	Evaluation of tolerability
Very low	Acceptable
Low	Tolerable
Medium	Risks that should be reduced
High	so that they are tolerable or acceptable
Very high	Unacceptable

Source: British Standard 8800:2004 Pg. 50

6. Prepare risk control action plan

6.1 Having determined the significant risks, the next step is to decide what action should be taken to improve safety, taking account of precautions and controls already in place.

6.2 Risk categories form the basis for deciding whether improved controls are required and the timescale for action. Table 5 suggests a possible simple approach. This shows that the effort made to control risk should reflect the seriousness of that risk.



Table 5: A simple risk – based control plan

ACTION AND TIMESCALE	
VERY LOW	These risks are considered acceptable. No further action is necessary other than to ensure that the controls are maintained.
LOW	No additional controls are required unless they can be implemented at a very low cost (in terms of time, money and effort). Actions to further reduce these risks are assigned low priority. Arrangements should be made to ensure that controls are maintained.
MEDIUM	Consideration should be given as to whether the risks can be lowered, where applicable, to a tolerable level, and preferably to an acceptable level, but the costs of additional risk should be taken into account. The risk reduction measures should be implemented within a defined time period. Arrangements should be made to ensure that the control measures are maintained, particularly if the risk levels are associated with harmful consequences.
HIGH	Substantial efforts should be made to reduce the risk. Risk reduction measures should be implemented urgently within a defined time period and it might be necessary to consider suspending or restricting activity, or to apply interim risk control measures, until this has been completed. Considerable resources might have to be allocated to additional control measures. Arrangements should be made to ensure that the control measures are maintained, particularly if the risk levels are associated with extremely harmful consequences and very harmful consequences.
VERY HIGH	These risks are unacceptable. Substantial improvements in risk controls are necessary, so that the risk is reduced to a tolerable or acceptable level. The work activity should be halted until the risk controls that are implemented reduce the risk so that it is no longer very high. If it is not possible to reduce the risk the work should remain prohibited.

Note: Also where the risk is associated with extremely harmful consequences, further assessment is necessary to increase confidence in the actual likelihood of harm.

Source: British Standard 8800:2004 Pg. 50

6.3 The outcome of a risk assessment should be an inventory of actions, in priority order; to devise, maintain or improve controls.



6.4 Controls should be chosen taking into account the following, which are in order of effectiveness:

1. Elimination;
2. Substitution by something less hazardous and risky;
3. Enclosure (enclose the hazard in a way that eliminates or controls the risk);
4. Guarding/Segregation of people;
5. Safe system of work that reduces the risk to an acceptable level;
6. Written procedures that are known and understood by those affected;
7. Review the blend of technical and procedural control;
8. Adequate supervision;
9. Identification of training needs;
10. Information/Instruction (signs, hand-outs);
11. Personal Protective Equipment (last resort) – cannot be controlled by any other means.

6.5 In addition to emergency and evacuation plans (see Chapter 10), it may be necessary to provide emergency equipment relevant to the specific hazards.

7. Review adequacy of action plan

7.1 Any action plan should be reviewed before implementation, typically by asking:

- (a) Will the revised controls lead to tolerable risk levels?
- (b) Are new hazards created?
- (c) What do people affected think about the need for, and practicality of, the revised preventive measures?
- (d) Will the revised controls be used in practice, and not ignored in the face of, for example, pressures to get the job done?

8. Ensure risk assessment and controls are effective and up-to-date

8.1 Risk Assessment and control is a continual process. Hence, written risk assessments should be subject to periodic formal reviews to confirm the validity of the assessment and whether the risk controls are still effective and adequate.



8.2 The regulations require that risk assessments are carried out before any work is commenced but these do not have to be written. Where a written risk assessment already exists, the implicit assumptions upon which it was based should be checked to ensure that they remain true. The risks arising from any new hazards identified should be assessed before work commences, either by sending details of the new hazard to the person responsible for the assessment, or by the person in charge of the work.

8.3 Irrespective of the schedule for formal review, if conditions are changing to the extent that hazards and risks are significantly affected then risk assessments should be reviewed. Such changes can include:

- (a) expansion, contraction or restructuring of activities;
- (b) relocation of responsibilities;
- (c) changes to methods of working or patterns of behaviour;
- (d) occurrence of a hazardous event.

8.4 The review of risk assessments and in particular, the scrutiny of risk assessments during audits is a useful tool to help maintain the validity and effectiveness of the risk assessments and controls. The review can also help ensure consistency across risk assessments carried out by different people or at different times.

8.5 Since risk assessment is intended to reduce the occurrence of hazardous events, such occurrences might indicate weakness in the way risks have been assessed or in the way controls have been designed, implemented or monitored.

8.6 Having completed a detailed risk assessment and put control measures in place to reduce the risk to an acceptable or tolerable level, a **Safe Work Procedure** should be written. A Safe Work Procedure should be understandable to all, and made available prior to any work being carried out.



DETAILED RISK ASSESSMENT

Ship name _____

Record Number _____

Current assessment date:

Last assessment date:

Work activity being assessed:

Section 1

Hazard Analysis of the Intended Work Activity

Hazard no.	Description of Identified Hazards	Existing Control Measures to Protect Personnel from Harm
1		(a) (b) (c)
2		(a) (b) (c)
3		(a) (b) (c)
4		(a) (b) (c)
5		(a) (b) (c)
6		(a) (b) (c)
7		(a) (b) (c)
8		(a) (b) (c)
9		(a) (b) (c)
10		(a) (b) (c)

Section 2

Assessment of Risk Factor

Likelihood of Harm	Severity of Harm			Hazard no.	Likelihood of Harm	Severity of Harm	Risk Factor
	Slight Harm	Moderate Harm	Extreme Harm				
Very Unlikely	VERY LOW RISK	VERY LOW RISK	HIGH RISK	1			
				2			
Unlikely	VERY LOW RISK	MEDIUM RISK	VERY HIGH RISK	3			
				4			
Likely	LOW RISK	HIGH RISK	VERY HIGH RISK	5			
				6			
Very Likely	LOW RISK	VERY HIGH RISK	VERY HIGH RISK	7			
				8			
				9			
				10			

To assess the risk factor arising from the hazard:

1. Select the expression for likelihood which most applies to the hazard;
2. Select the expression for severity of harm which most applies to the hazard;
3. Cross reference using the Risk Estimator table (above left) to determine the level of risk;
4. If the Risk Factor is MEDIUM or above (Yellow, Orange or Red) additional control measures should be implemented and recorded in Section 3.

Section 3

Additional Control Measures to Reduce the Risk of Harm

Hazard no.	Further Risk Control Measures	Remedial Action Date	Review Date
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Additional comments:

Assessment review date _____



DETAILED RISK ASSESSMENT - SPECIMEN

Ship name MV Example

Record Number Example / Risk Assessment / File 01-0001

Current assessment date: December 05 Last assessment date: December 04

Work activity being assessed:
Working aloft on the Main Mast

Section 1

Hazard Analysis of the Intended Work Activity

Hazard no.	Description of Identified Hazards	Existing Control Measures to Protect Personnel from Harm
1	Working aloft	(a) Permit-to-Work issued for work while aloft (b) Permit-to-Work procedure followed
2	Falling off ladder while climbing	(a) Use appropriate safety harness (b) Supply appropriate PPE (c) Obey guidance from local safety sign (d) Endorsement of working aloft procedures and training
3	Falling from heights whilst working	(a) Safety harness secured (b) Endorsement of working aloft procedures and training
4	Ships whistle being sounded whilst aloft	(a) Isolate whistle (b) Place "Man Aloft" signs on all whistle controls
5	Being hit by a rotating radar aerial	(a) Isolate radar to stop rotation (b) Place "Man Aloft" sign on radars
6	Radiation hazard from radar and radio aerials	(a) Isolate radar (b) Isolate all aerials (c) Place appropriate safety notices on mast
7	Electrocution hazard	(a) Isolate electrical equipment as appropriate (b) Place appropriate safety notices on isolators
8	Object falling from aloft/above	(a) Adequate training of support staff below (b) Supply appropriate PPE
9	Weather and Sea hazard	(a) Arrange work in daylight conditions (b) Arrange work in dry conditions (c) Arrange work in calm weather (d) Arrange work to be carried out in port or calm seas

Section 2

Assessment of Risk Factor

Likelihood of Harm	Severity of Harm			Hazard no.	Likelihood of Harm	Severity of Harm	Risk Factor
	Slight Harm	Moderate Harm	Extreme Harm				
Very Unlikely	VERY LOW RISK	VERY LOW RISK	HIGH RISK	1	Very Unlikely	Moderate	Very Low
	VERY LOW RISK	MEDIUM RISK	VERY HIGH RISK	2	Unlikely	Moderate	Medium
	VERY LOW RISK	MEDIUM RISK	VERY HIGH RISK	3	Unlikely	Moderate	Medium
Unlikely	VERY LOW RISK	MEDIUM RISK	VERY HIGH RISK	4	Very Unlikely	Slight	Very Low
	VERY LOW RISK	MEDIUM RISK	VERY HIGH RISK	5	Very Unlikely	Slight	Very Low
	VERY LOW RISK	MEDIUM RISK	VERY HIGH RISK	6	Very Unlikely	Slight	Very Low
Likely	LOW RISK	HIGH RISK	VERY HIGH RISK	7	Very Unlikely	Slight	Very Low
	LOW RISK	HIGH RISK	VERY HIGH RISK	8	Likely	Moderate	High
	LOW RISK	HIGH RISK	VERY HIGH RISK	9	Very Unlikely	Moderate	Very Low
Very Likely	LOW RISK	VERY HIGH RISK	VERY HIGH RISK	10			

To assess the risk factor arising from the hazard:

- Select the expression for likelihood which most applies to the hazard;
- Select the expression for severity of harm which most applies to the hazard;
- Cross reference using the Risk Estimator table (above left) to determine the level of risk;
- If the Risk Factor is MEDIUM or above (Yellow, Orange or Red) additional control measures should be implemented and recorded in Section 3.

Section 3

Additional Control Measures to Reduce the Risk of Harm

Hazard no.	Further Risk Control Measures	Remedial Action Date	Review Date
1			
2	Can work be delayed to enable other means of access	As of job date	Next annual review
3	Can work be delayed to enable other means of access	As of job date	Next annual review
4			
5			
6			
7			
8	Secure all tools appropriately	As of job date	Immediate
9	Monitor local conditions	As of job date	Next annual review
10			

Additional comments:

Remedial action will be addressed at the next assessment review date

Assessment review date December 2006



CHAPTER 2

HEALTH SURVEILLANCE

2.1 Duty of employers

MS and FV (Health and Safety at Work) Regs 1997 SI No. 2962 Reg 11

2.1.1 *Employers must provide workers with such health surveillance as is appropriate taking into account the risks to their health and safety which are identified by the assessment undertaken in accordance with the regulations.*

2.2 Purpose of health surveillance

2.2.1 Health surveillance is a means of identifying early signs of ill health caused by occupational hazards so that action can be taken to protect individuals at an early stage from further harm. For example:

- where a worker's exposure to a hazardous substance is approaching the agreed limit, the worker should be removed from exposure before any harm is done;
- if symptoms of minor ailments (eg skin rash) are detected, action should be taken to prevent them becoming major health problems.

2.2.2 In addition, the results of health surveillance can provide a means of:

- (a) checking the effectiveness of health control measures;
- (b) providing feedback on the accuracy of health risk assessment;
- (c) identifying and protecting individuals at increased risk.

2.2.3 Health surveillance is not a substitute for measures to control risks to health and safety. Control measures should always be the first consideration to reduce risk. Nor is it the same as medical examinations which are intended to assess fitness for work (for example pre-employment, sickness resumption or periodic examinations). However, where relevant, health surveillance should be conducted, for example at pre-employment assessment, where a base-line reference can usefully be established.



2.3 Application

MS (Health and Safety at Work) (Biological Agents) Regs SI 2010/330 and MGN409(M+F) Annex 3 and MS (Health and Safety at Work) (Carcinogens and Mutagens) Regs SI 2007/3100 and MGN356(M+F) and MGN408 (M+F) Annex 2

2.3.1 Health surveillance should be introduced where risk assessment (see Chapter 1) identifies that:

- (a) a particular work activity may cause ill health;
- (b) an identifiable disease or adverse health condition is related to the work;
- (c) recognised testing methods are available for early detection of an occupational disease or condition - eg audiometry, skin inspection where dermatitis is a hazard;
- (d) there is a reasonable likelihood that a disease or condition may occur in relation to particular working conditions;
- (e) surveillance is likely to further the protection of workers' health.

MGN 409(M+F) Annex 3

2.3.2 All workers should be subject to whatever health surveillance is appropriate for the work activities they are involved in. Examples of circumstances in which it may be useful include:

- exposure to hazardous substances such as chemicals or biological agents carcinogens and mutagens;
- working with vibrating tools;
- exposure to high levels of noise;
- use of substances known to cause dermatitis (eg solvents); and
- exposure to certain dusts (eg asbestos);

MS (Health and Safety at Work) (Biological Agents) Regs SI 2010/323 and MGN408(M+F)

2.3.3 In cases where a worker has been exposed to biological agents identified in group 3 or higher a record must be kept (see MS (Health and Safety at Work) (Biological Agents) Regulations SI 2010 No 323).

2.4 What to do

2.4.1 Once it is decided that health surveillance is appropriate, it should be maintained whilst the worker remains exposed to the hazard(s) in question. A worker's health surveillance records should where possible be retained, even when the worker changes employment.



2.4.2 Health surveillance may involve one or more of the following, as applicable:

- (a) inspection of readily detectable conditions (e.g. skin damage) by a person acting within the limits of their training and experience;
- (b) enquiries about symptoms;
- (c) hearing checks (audiometry);
- (d) medical examinations or company health checks;
- (e) testing blood or urine samples.

2.4.3 The frequency of such checks should be determined either on the basis of suitable general guidance (eg skin inspection for skin damage) or on the advice of a qualified occupational health practitioner. The workers concerned could be given an explanation of the purpose of health surveillance and an opportunity to comment on the proposed frequency of such health surveillance procedures, either directly or through their safety representatives.

2.4.4 Where medical surveillance is required, and it is necessary to take samples or record other personal information, it is essential that confidentiality is maintained in respect of individual health records containing clinical information.



CHAPTER 3

SAFETY OFFICIALS

3.1 Introduction

3.1.1 Every person on board has a responsibility for safety.

- The Company is responsible for ensuring the overall safety of the ship and that safety on board is properly organised and co-ordinated.
- The master has the day to day responsibility for the safe operation of the ship and the safety of those on board.
- Each employer is responsible for the health and safety of his workers.
- Heads of department are responsible for health and safety in their own department.
- Each officer/manager is responsible for health and safety for those they supervise and others affected.
- Each individual worker is responsible for his own health and safety and that of anyone affected by what he does or fails to do.

Under Merchant Shipping legislation, specific responsibilities are also laid on those with designated roles in ensuring the safety of those on the ship. In this chapter, those with a designated safety role on board are referred to as "safety officials", and this term includes safety officers, safety representatives and other members of safety committees.

3.1.2 The development of a "safety culture" and the achievement of high standards of safety depend on good organisation and the whole-hearted support of management and all personnel. Those with specific safety responsibilities are more likely to perform well when management is clearly committed to health and safety. It is also important that procedures are in place so that all personnel can co-operate and participate in establishing and maintaining safe working conditions and practices.

3.1.3 Sections 3.2, 3.8.5 and 3.13 of this chapter apply equally on all ships, whether or not safety officials are appointed or elected by law.



3.1.4 Sections 3.3 - 3.12 however apply only where safety officials are appointed or elected as required by law. The information and guidance here is designed to assist them in their primary objective of reducing the number of deaths and injuries, and to advise Companies and masters how to fulfil their duty to assist them.

3.2 Employer duties

*MS and FV
(Health and
Safety at Work)
Regs SI 1997 No.
2962 Reg 14. (1)*

3.2.1 *Every employer is required to appoint one or more competent persons to promote health and safety in their undertaking.* On board some large ships, where there are personnel working who are employed by several different employers, each employer must appoint (a) competent person(s). They do not have to work on the ship themselves, but to be "competent" for the task they should have a knowledge of the duties undertaken by those for whom they are responsible, and should ensure that any specific risks encountered as a result of that particular working environment are dealt with appropriately - eg by checking that the company has adequate safety procedures for all on board, and by co-ordinating risk assessments with the company.

3.2.2 The employer may "appoint" himself where, in a small organisation, there is no one else available to take on this responsibility. Alternatively, he may employ someone from outside his own undertaking to advise on health and safety, provided that person is competent. This requirement applies whether or not a safety officer is appointed for the ship by the Company.

Reg 19.-(1)

3.2.3 *The employer must provide the competent person(s) with all relevant information they need to do their job.* This would include a copy of the employer's safety policy and risk assessments, information about the duties of personnel, and any information provided by other employers about risks and safety procedures in shared work-places.

Reg 20.-(1)

3.2.4 *The employer is required to consult workers or their elected representatives on health and safety matters, in particular.*



- (a) *arrangements for the appointment of a competent person;*
- (b) *the findings of the risk assessment;*
- (c) *arrangements for health and safety training; and*
- (d) *the introduction of new technology.*

The matters to be discussed might also include selection of work equipment and/or protective clothing and equipment, installation of safety signs and follow-up to accidents and other incidents.

3.2.5 *Workers or their elected representatives must be allowed to make representations to their employer about health and safety matters without disadvantage to themselves. Such representations should be given adequate consideration, perhaps in conjunction with the safety committee, and any agreed measures to improve safety implemented as soon as reasonably practicable.*

Reg 20-(3)

3.2.6 *It is also the employer's responsibility to ensure that workers or their elected representatives have access to relevant information and advice about health and safety matters from inspection agencies and health and safety authorities, and, from their own records, about accidents, serious injuries and dangerous occurrences.*

Reg 20-(4)

3.2.7 *Employers must provide elected representatives adequate time off normal duties, without loss of pay, to enable them to exercise their rights and carry out their function effectively. Workers' safety representatives must not suffer any disadvantage for undertaking this function.*

Reg 15

Company duties

3.3 The Regulations

Regs 15 - 18

3.3.1 The regulations dealing with safety officials lay duties on the Company for the appointment of ships' safety officers (see sections 3.4 and 3.10 of this Code), the appointment of a safety committee (section 3.6) and the election of safety representatives with specified powers (section 3.5).



3.3.2 Regulations 15-18 apply only to ships (other than fishing vessels) on which more than five workers are employed.

3.3.3 The Secretary of State may grant ad hoc exemptions to specific ships or classes of ships subject to any relevant special conditions. This is to allow different arrangements to be made in cases where the requirements of the Regulations would be difficult to apply. An example might be a multi-crew ship with alternate crews working on a regular ship basis. In considering a request for exemption, the Maritime and Coastguard Agency would require to be satisfied that alternative arrangements existed, and would make it a condition of the exemption that these were continued.

Reg 17

3.3.4 Regulation 17, governing arrangements for the election of safety representatives, does not apply where there are existing agreed arrangements under land-based legislation (The Safety Representatives and Safety Committee Regulations 1977).

3.3.5 Even where there is no statutory requirement for the election of safety representatives and safety committees, the employer is required to consult workers on health and safety issues - see paragraph 18 of the Regulatory Framework.

3.4 Appointment of Safety Officers

Reg 15

3.4.1 *On every sea-going ship on which more than five workers are employed, the Company is required to appoint a safety officer.* The master must record the appointment of a safety officer - this should be in the official logbook.

3.4.2 The safety officer is the safety adviser aboard the ship and can provide valuable assistance to the Company and to individual employers in meeting the statutory responsibilities for health and safety. He should have attended a suitable Safety Officer's training course. He should be familiar with the principles and practice of risk assessment, and should be available to advise



those preparing and reviewing risk assessments. It is recognised that, where the safety officer also has other responsibilities (eg chief officer) he may well conduct risk assessments himself. However, the general principle is that the safety officer takes an independent view of safety on behalf of the Company.

3.4.3 Although not prohibited by the Regulations the appointment of the master as the safety officer is not generally advisable. This is because the safety officer is required amongst his other duties to make representations and recommendations on health and safety to the master.

3.4.4 If possible, the Company should avoid appointing as safety officer anyone to whom the master has delegated the task of giving medical treatment. This is because one of the duties of the safety officer is to investigate incidents, and he would not be able to give proper attention to this function while providing medical treatment for any casualties.

3.5 Election of Safety Representatives

Reg 17

3.5.1 *On every ship on which more than five workers are employed, the Company must make arrangements for the election of safety representatives. The regulations specify that no safety representative may have less than 2 years consecutive sea service since attaining the age of 18, which in the case of a safety representative on board a tanker shall include at least 6 months service on such a ship.*

3.5.2 The Company must make rules for the election of safety representatives by the workers on board and cannot disqualify particular persons. It is recommended that the employer should consult with any seafarers' organisation representing his employees when making these rules. The master should organise the election of a safety representative within 3 days of being requested to do so by any two persons entitled to vote.

3.5.3 The number of safety representatives who should be elected will vary according to the size of a crew. The following ratios are recommended:



6 - 15 crew	1 elected by officers and ratings together.
16 + crew	1 elected by the officers and one elected by the ratings.
Over 30 ratings	1 elected by the officers and 3 by the ratings (i.e. one each from the deck, engine-room and catering departments, general purpose ratings being included in the deck department).

3.5.4 The master must record the election or appointment of every safety representative in writing - this should be either in the official logbook or in the minutes of safety committee meetings (see below).

3.5.5 When there is a substantial change in those working on board, the master should remind personnel of their right to elect new safety representatives.

3.6 Safety Committees

Reg 17-(4)

3.6.1 *Once safety representatives have been elected, the Company must appoint a safety committee.* The committee must be chaired by the master, and members will include, as a minimum, the safety officer and all elected safety representatives. If practical, any competent person appointed by employers other than the Company, should be invited to attend.

3.6.2 It is desirable that there should be a safety committee on every ship with more than five workers, although the statutory requirement only exists on those ships where safety representatives are elected.

Reg 17-(5)

3.6.3 *The master must record the appointment of a safety committee in writing - this should normally be in the official logbook or minutes of the committee's meetings.*

3.6.4 The composition of a safety committee recommended above does not preclude the appointment of other temporary members. However, the



committee should be kept compact enough to maintain the interest of members and enable it to function efficiently. Where possible, the relevant shore managers with responsibility for safety on board may attend safety committee meetings on board ship and should in any event see the committee's minutes. On short-haul ferries on which different crews work a shift system a scheme of alternate committee members may be adopted to secure proper representation.

3.6.5 Where large numbers of personnel work in separate departments (eg passenger ship galleys and restaurants), departmental sub-committees should be formed on lines similar to those of the main committee and under the chairmanship of a senior member of the department who should serve as a member of the main safety committee in order to report the views of the sub-committee.

3.6.6 It is preferable to appoint as secretary someone other than a safety official, as officials need to concentrate on the discussion rather than on recording it.

3.7 Termination of Appointments

3.7.1 A **safety officer's** appointment terminates as soon as he ceases to be employed in the particular ship or the employer terminates the particular appointment.

3.7.2 A **safety representative** cannot have his appointment terminated by the employer or master. He can resign or the crew can elect another in his place. Otherwise he remains a safety representative for as long as he serves on the ship.

3.7.3 A **safety committee** may be disbanded only when there is no longer an elected safety representative on board. A safety committee can, however, operate whether or not there is an elected safety representative.



3.8 Support for Safety Officials

Reg 19.-(1)

3.8.1 *The Company and master have a duty to facilitate the work of any person appointed as a safety official, providing them with access to a copy of this Code and any relevant legislation, merchant shipping notices and other information, including:*

- (a) findings of the risk assessment and measures for protection in place;*
- (b) any other factors affecting the health and safety of those working on the ship;*
- (c) details of fire-fighting, first aid and other emergency procedures.*

3.8.2 Relevant information might include that concerning dangerous cargoes, maintenance work, the hazards of machinery, plant, equipment, processes and substances in use, and appropriate precautions. This will require co-ordination with all employers to obtain information about the findings of their risk assessment.

3.8.3 *The Company and master, in co-operation with the employer, must also ensure that safety officials have the necessary resources and means, and allow them sufficient time off from their duties without loss of pay, to enable them to fulfil their functions or undertake any necessary health and safety training. This will include providing any necessary accommodation and office supplies.*

3.8.4 Some training may be arranged on board, but to fulfil their function as shipboard safety adviser properly, safety officers should undertake a proper training course for the appointment.

Reg 19.-(2)

3.8.5 *On a ship where no safety officer is appointed under the regulations, the Company must ensure that a record is kept of all incidents resulting in death, major or serious injury and every dangerous occurrence. This record must be available on request to any elected representative, and any person duly authorised by the Secretary of State.*



3.8.6 Employers must enable workers or their elected representatives to make representations about health and safety, and should also accept representations or recommendations from the safety officer. The Company and master will also receive representations from competent persons appointed under Regulation 15, safety officers and safety committees. These should be carefully considered and any agreed measures should be implemented as soon as reasonably practicable.

3.8.7 The reaction to such representations will be seen as a measure of commitment to health and safety on board. All representations received, from whichever source, should be considered carefully. If there is likely to be a delay in giving an answer, then whoever has made the representations should be informed as soon as possible. Safety suggestions should be implemented, when it is feasible and reasonable to do so, as soon as reasonably practicable. If suggestions for health and safety measures are rejected, reasons should be given in writing. It is a good practice to acknowledge all suggestions put forward, whether or not a written response is needed.

3.8.8 It is most important that the master takes a close interest in the work of the safety officials on board. He should check that the safety officer is fulfilling his duties effectively, but should also give encouragement and support. The master is in much the best position to ensure that the committee works successfully, by encouraging participation and co-operation from all members.

3.8.9 The Accident Reporting regulations govern when an incident should be reported to the Marine Accident Investigation Branch of the Department of the Environment, Transport and the Regions (MAIB). It may sometimes be appropriate for companies to inform other ships in the fleet of an incident, and give appropriate recommendations on action to be taken, in accordance with the Company's safety management system.

*MS
(Accident
and
Investigation)
Regulations
2005,
SI 2005
No. 881
MGN 289
(M+F)*



Duties of Safety Officers

3.9 General advice to safety officers

3.9.1 It is very important that the safety officer maintains a good working relationship with safety representatives - for example, inviting the relevant safety representatives to join him for the regular inspection of each part of the ship, or while carrying out an investigation, consulting them on safety matters and arrangements, and in particular on any follow-up action proposed.

3.9.2 The safety officer's relationship with the safety committee is rather different since he is both a member of the committee and also to some extent subject to its direction. A committee has the right to inspect any of the records which a safety officer is required by law to keep, and has the power to require the safety officer to carry out any health or safety inspections considered necessary.

3.10 Advice on compliance with safety requirements

*MS and FV (Health and Safety at Work) Regs 1997
SI No. 2962 Reg
16 (1)(a)*

3.10.1 *The safety officer is required by the Regulations to try to ensure compliance with the provisions of this Code and any health and safety guidance and instructions for the ship.*

3.10.2 The safety officer's role should be a positive one, seeking to initiate or develop safety measures before an incident occurs rather than afterwards. He should:

- be on the lookout for any potential hazards and the means of preventing incidents;
- try to develop and sustain a high level of safety consciousness among the crew so that individuals work and react instinctively in a safe manner and have full regard to the safety not only of themselves but also of others.

The objective is to become the ship's adviser on safety to whom the master, officers and all personnel will naturally turn for advice or help on safe working procedures.



- where unsafe practice is observed, approach the individual or responsible officer concerned to suggest improvements in his method of working or use the safety committee to discuss examples of dangerous or unsafe practices in a particular area. If this brings no improvement, the safety officer should consider approaching the head of department or, as a last resort, the master to use his influence.
- ensure that each worker joining the ship is instructed in all relevant health and safety arrangements, and of the importance attached to them before starting work. A suggested outline for this induction is given in Chapter 8.
- where possible, ensure that arrangements are made for each new entrant to work with a crew member who is himself thoroughly safety conscious.
- remind experienced seamen joining the ship for the first time of the importance of a high level of safety consciousness and of setting a good example to less experienced personnel.

3.10.3 He should also promote safety on board, subject to the agreement of the master; by:

- (a) arranging the distribution of booklets, leaflets and other advisory material on safety matters.
- (b) supervising the display of posters and notices, replacing and renewing them regularly.
- (c) arranging for the showing of films of safety publicity and, where appropriate, organise subsequent discussions on the subjects depicted.
- (d) encouraging members of the crew to submit ideas and suggestions for improving safety and enlist their support for any proposed safety measures which may affect them (the person making a suggestion should always be informed of decisions reached and any action taken).
- (e) effective communication of new requirements or advice in relevant shipping legislation, Marine Notices and Company and ship's rules and instructions relating to safety at work about the ship.



Investigation of accidents and dangerous occurrences

Reg 16.-(1)(b)

3.10.4 *The safety officer has a duty to investigate notifiable accidents or dangerous occurrences affecting persons on board ship or during access, as well as potential hazards to health and safety and any reasonable complaints made by any personnel, and to make recommendations to the master. It is good practice to record and investigate as appropriate all incidents reported by personnel or passengers.*

3.10.5 Additional health or safety investigations or inspections may be commissioned by the safety committee.

Safety Inspections

Reg 16.-(1)(c)

3.10.6 *The Regulations require the safety officer to carry out health and safety inspections of each accessible part of the ship at least once every three months, or more frequently if there have been substantial changes in the conditions of work.*

3.10.7 “Accessible” should be taken as meaning all those parts of the ship to which any member of the crew has access without prior authority.

3.10.8 Deciding whether “substantial changes in the conditions of work” have taken place is a matter of judgement. Changes are not limited to physical matters such as new machinery but can also include changes in working practices or the presence of possible new hazards. A record should be kept of all inspections.

3.10.9 It is not necessary to complete an inspection of the whole ship at one time, as long as each accessible part of the ship is inspected every 3 months. It may be easier to get quick and effective action on recommendations arising out of an inspection, if one section is dealt with at a time. When inspecting a section the safety officer should be accompanied by the officer or petty officer responsible for it.



3.10.10 Before beginning any inspection, previous reports of inspections of the particular section should be read, together with the recommendations made and the subsequent action taken. The control measures identified in any relevant risk assessment should also be read, and compliance with them checked during the inspection. Any recurring problems should be noted and, in particular, recommendations for action which have not been put into place. It is important, however, not to allow the findings of previous inspections to prejudice any new recommendations.

3.10.11 It is not possible to give a definitive checklist of everything to look for but safe access, the environment and working conditions are major items. Suggestions for consideration on these particular issues are given in Annex 3.1.

Reg 16. (1)(d)

3.10.12 *The safety officer is required to make representations and, where appropriate, recommendations to the master and through him to the Company about any deficiency in the ship in respect of statutory requirements relating to health and safety, relevant Merchant Shipping Notices and the provisions of this Code.*

3.10.13 In order to fulfil this function properly, the safety officer needs to be conversant with the appropriate regulations. The introduction of new regulations or of amendments to existing regulations will be announced in Merchant Shipping Notices issued by the Maritime and Coastguard Agency.

Record of accidents and dangerous occurrences

*Reg 16.-(1)(e)
and 19.-(2)*

3.10.14 *The safety officer must maintain a record of all accidents and dangerous occurrences (see 3.14.10-12). On a ship where no safety officer is appointed, this duty falls to the Company. These records must be made available on request to any safety representative, the master or to any person duly authorised by the Secretary of State.*



Duty to stop dangerous work

Reg 16-(1)(f).

3.10.15 *The Safety Officer has a duty to stop any work which he reasonably believes may cause a serious accident and immediately to inform the master (or his deputy) who is responsible for deciding when work can safely be resumed.*

3.10.16 This does not apply to an emergency action to safeguard life even though that action itself may involve a risk of life. The safety officer is not required by these Regulations to take any of the actions described in 3.10.1, 3.10.4, 3.10.5, 3.10.6, 3.10.12, 3.10.14 and 3.10.15 at a time when emergency action to safeguard life or the ship is being taken.

3.11 Powers of Safety Representatives

3.11.1 Unlike the safety officer, the safety representative has powers not duties, although membership of the safety committee imposes certain obligations.

3.11.2 *Safety representatives may, with the agreement of the safety officer, participate in investigations and inspections carried out by the safety officer, or, after notifying the master or his deputy, may carry out their own investigation or inspection.*

3.11.3 *They may also make representations to the employer on potential hazards and dangerous occurrences, and to the master or employer on general health and safety matters, including the appointment of a competent person under regulation 15, the findings of the risk assessment, health and safety training, and the introduction of new technology.*

3.11.4 *They may request, through the safety committee, that the Safety Officer undertakes an investigation and reports back to them, and may inspect any of the records the Safety Officer is required to keep under the Regulations. They should ensure that they see all incident reports submitted to the MAIB under the Accident Reporting regulations (see above).*



3.12 Advice to Safety Representatives

3.12.1 Safety representatives should be familiar with all the safety regulations listed in the Regulatory Framework at the beginning of this Code.

3.12.2 The effectiveness of safety representatives will depend to a large extent on good co-operation between them, the Company, other employers, the master; heads of department and safety officer:

3.12.3 Safety representatives should:

- put forward their views and recommendations in a firm but reasonable and helpful manner;
- be sure of the facts;
- be aware of the legal position;
- be conscious of what is reasonably practicable.

3.12.4 Having made recommendations, they should request to be kept informed of any follow-up actions taken, or the reasons why such action was not possible.

3.12.5 If a safety representative finds that his efforts are being obstructed, or he is denied facilities, he should bring the matter to the attention of the safety officer or of the master through the safety committee. It should be the aim to settle any difficulties on board ship or through the employer. If this proves impossible the problem should be referred to the trade union or to the Maritime and Coastguard Agency.

3.13 Advice to Safety Committees

3.13.1 The safety committee is a forum for consultation between the master; safety officials and others of matters relating to health and safety. It may be used by employers for consultation with the company and employees. Its effectiveness will depend on the commitment of its members, in particular that of the master. Because of its broad membership, and with



the master as its chairman, the committee has the means to take effective action in all matters which it discusses other than those requiring the authorisation of the Company and employer:

3.13.2 The frequency of meetings will be determined by circumstances but as a general guideline, the committee should meet about every 4-6 weeks.

3.13.3 An agenda (together with any associated documents and papers, and the minutes of the previous meeting) should be circulated to all committee members in sufficient time to enable them to digest the contents and to prepare for the meeting.

3.13.4 If there is a particularly long agenda, it may be better to hold two meetings in fairly quick succession rather than one long one. If two meetings are held, priority at the first meeting should, of course, be given to the more urgent matters.

3.13.5 The first item on the agenda should always be the minutes of the previous meeting. This allows any correction to the minutes to be recorded and gives the opportunity to report any follow-up action taken.

3.13.6 The last item but one should be "any other business". This enables last minute items to be introduced, and prevents the written agenda being a stop on discussion.

3.13.7 The last item on the agenda should be the date, time and place of the next meeting.

3.13.8 Minutes of each meeting should record concisely the business discussed and conclusions reached. A copy should be provided to each committee member. They should be agreed as soon after the meeting as possible, or amended if necessary, and then agreed under the first agenda item of the following meeting (see 3.13.5).



3.13.9 A minutes file or book should be maintained, together with summary of recommendations recording conclusions reached, in order to provide a permanent source of reference and so ensuring continuity should there be changes in personnel serving on the committee.

3.13.10 All personnel should be kept informed on matters of interest which have been discussed, for example by posting summaries or extracts from the minutes on the ship's notice boards. Suggestions may be stimulated by similarly posting the agenda in advance of meetings.

3.13.11 Relevant extracts of agreed minutes should be forwarded through the master to the Company and, where appropriate, individual employers, even when the matters referred to have already been taken up with them.

3.14 Accident Investigation

3.14.1 The investigation of accidents and incidents plays a very important part in safety. It is by the identification and study of accidents principally through the MAIB's accident reporting system that similar events may be prevented in future.

3.14.2 The statutory requirements regarding accident reporting are set out in the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005, SI 2005 No 881 and MGN 289 (M+F) provides guidance on how to comply with them.

3.14.3 The master is responsible for the statutory reporting of accidents and dangerous occurrences covered by the Regulations. Where a safety officer is on board, however, it is his statutory duty to investigate every such incident and it is expected that the master will rely extensively on the results and record of the safety officer's investigation when completing his report. The various stages of the typical investigation might proceed as follows.

- (a) When an incident occurs priority must be given to the safety of the injured and of those assisting them, and to the immediate safety of the

*MS (Accident
and Investigation)
Regulations
2005, SI 2005
No 881*



area. When sufficient help is available, however, the safety officer should, if possible, avoid involvement with the rescue operation and concentrate on establishing the immediate facts concerning the incident.

- (b) First he should record the names - and addresses in case of non-crew personnel - of all those present in the vicinity of the incident. Not all are likely to be witnesses to the actual incident but this can be ascertained later. He should then note and mark the position of the injured, and the use and condition of any protective clothing or equipment or of any tools etc likely to have been in use. Possession should be taken of any portable items which might have some relevance to the investigation. Sketches and photographs are often useful.
- (c) When the injured have been removed, the safety officer should carry out a more detailed examination at the scene of the incident, watching out for any changes which might have occurred since the incident and any remaining hazards.

3.14.4 The points to look out for will depend on the circumstances. For example after an incident during boarding, the following should be noted:

- compliance with control measures identified by the risk assessment;
- the type of access equipment in use;
- the origin of the access equipment, eg ship's own, provided from shore etc;
- the condition of the access equipment itself, noting particularly any damage such as a broken guard-rail or rung. The position and extent of any damage should be examined so that it may be compared with witnesses' statements, and it should be noted whether the damage was present before, or occurred during or as a result of the incident (if the damage was present before the incident it might have been potentially dangerous but it may not necessarily have been a factor in the particular incident);
- any effect of external factors on the condition of the equipment, eg ice, water or oil on the surface;
- the deployment of the equipment, i.e. the location of the quayside and



shipboard ends of the equipment;

- the rigging of the equipment, the method of securing, the approximate angle of inclination;
- the use of ancillary equipment (safety net, lifebuoy and lifeline, lighting);
- the safety of shipboard and quayside approaches to the equipment, eg adequate guard-rails, obstructions and obstacles etc;
- any indication of how the incident might have happened, but remember that subsequent interviews with witnesses must be approached with an open mind;
- weather conditions;
- distances where these are likely to be helpful or relevant.

3.14.5 Interviews of witnesses should take place as soon as possible after the incident when memories are still fresh. There may be people who were not actually witnesses but who may nevertheless have valuable contributions to make, for example a crewman who was present when an order was given. These persons should not be overlooked. If it is not possible for some reason to interview a particular person, he should be asked to send the safety officer his own account of the incident.

3.14.6 The actual interview should be carried out in an informal atmosphere designed to put the witness at his ease. To start with, the safety officer should explain the purpose of the interview and obtain some details of the witness's background. It is important to keep any personal bias out of the interview. The witness should be asked to relate the event in his own way with as few interruptions as possible. The accuracy of what is said should be tested. There may, for example, be discrepancies between the account of one witness and those of other witnesses, between different parts of a statement, or with the safety officer's own observations, which he may want to query. Leading questions implying an answer should be avoided, as should simple questions requiring only a yes/no answer which save the witness from thinking about what he is saying. Finally, the safety officer should go over the statement with the witness to ensure that it has been accurately recorded.



3.14.7 Statements for signature by the witness should be prepared as quickly as possible but, if the witness changes his mind about signing a statement, it should be annotated by the safety officer that it has been prepared on the basis of an interview with the witness who had subsequently refused to sign it or comment further. Where the witness asks for extensive alterations to the original statement a fresh statement may have to be prepared, but the original statement should be annotated by the safety officer and retained.

3.14.8 It is helpful to adopt a standard format for statements by incident witnesses. A suggested format is at Annex 3.2.

3.14.9 It is worth emphasising the importance of distinguishing between facts and opinions. Facts can normally be supported by evidence whereas opinions are personal beliefs. An investigation must depend on the facts gathered but opinions can be helpful in pursuing a particular line of enquiry and should not be disregarded.

3.14.10 Any record of incidents and dangerous occurrences (see 3.10.14 above) should contain at least the following information:

- details of incidents/ dangerous occurrences/ investigations/ complaints/ inspections;
- date;
- persons involved;
- nature of injuries suffered;
- all statements made by witness;
- any recommendations/ representations;
- any action taken.

3.14.11 Additionally it is suggested that it should contain the following:

- list of witnesses, addresses, positions and occupations;
- whereabouts of original signed statement made by witnesses;



- date accident/ dangerous occurrence reports sent to MAIB if applicable;
- list of items collected, why and where stored;
- index.

3.14.12 The record should be kept with the ship since it must be made available on request to the safety representative and safety committee, if any. It is also a necessary item of reference for safety officers on board the ship. If the ship is sold and remains on the UK register, the record should be transferred with the ship. Where the ship becomes a foreign ship the record should be retained by the original owners.



CHECKLIST FOR SAFETY OFFICER'S INSPECTION

The following are examples of questions the safety officer should consider.

This is not intended to be an exhaustive list, and should be varied according to the particular design or conditions on a particular ship.

MEANS OF ACCESS/SAFE MOVEMENT

- Are means of access, if any, to the area under inspection (particularly ladders and stairs), in a safe condition, well lit and unobstructed?
- If any means of access is in a dangerous condition, for instance when a ladder has been removed, is the danger suitably blocked off and warning notices posted?
- Is access through the area of inspection both for transit and working purposes clearly marked, well lit, unobstructed and safe?
- Are fixtures and fittings over which seamen might trip or which project, particularly overhead, thereby causing potential hazards, suitably painted or marked?
- Is any gear, which has to be stowed within the area, suitably secured?
- Are all guard-rails in place, secure and in good condition?
- Are all openings through which a person could fall, suitably fenced?
- If portable ladders are in use, are they properly secured and at a safe angle?

WORKING ENVIRONMENT

- Is the area safe to enter?
- Are lighting levels adequate?
- Is the area clear of rubbish, combustible material, spilled oil etc?
- Is ventilation adequate?
- Are members of the crew adequately protected from exposure to noise where necessary?



- Are dangerous goods and substances left unnecessarily in the area or stored in a dangerous manner?
- Are loose tools, stores and similar items left lying around unnecessarily?

WORKING CONDITIONS

- Is machinery adequately guarded where necessary?
- Are any necessary safe operating instructions clearly displayed?
- Are any necessary safety signs clearly displayed?
- Are permits-to-work used when necessary?
- Are crew working in the area wearing any necessary protective clothing and equipment?
- Is that protective clothing and equipment in good condition and being correctly used?
- Is there any evidence of defective plant or equipment and if so what is being done about it?
- Is the level of supervision adequate, particularly for inexperienced crew?
- What practicable safety improvements could be made?

GENERAL

- Are all statutory regulations and company safety procedures being complied with?
- Is the safety advice in publications such as this Code, Merchant Shipping Notices etc being followed where possible?
- Have the crew in the area any safety suggestions to make?
- Have any faults identified in previous inspections been rectified?



VOLUNTARY STATEMENT

Relating to an accident on board/Name of ship/official number
on/date of accident/at/time of accident.

Particulars of witness:

Name:

Rank and occupation:

Home address of crew members:

Address of employment of others:

STATEMENT OF WITNESS

I make this statement voluntarily having read it before signing it and believing the same to be true.

Signature of Witness

Date

Time

Particulars of interviewer

Name:

Rank:



CHAPTER 4

PERSONAL PROTECTIVE EQUIPMENT

4.1 Introduction

*MS and FV
(Personal
Protective
Equipment)
Regs 1999 -
SI 1999 No.
2205 &
MSN 1731
(M+F)*

Reg 5

4.1.1 Risks to the health and safety of workers must be identified and assessed. It will often not be possible to remove all risks, but attention should be given to control measures which make the working environment and working methods as safe as reasonably practicable.

4.1.2 Personal protective equipment must be used only when risks cannot be avoided or reduced to an acceptable level by safe working practices, that cause no health risk to any worker. This is because personal protective equipment does nothing to reduce the hazard, and can only protect the person wearing it, leaving others vulnerable. See Chapter 1 Annex 1.1 paragraph 5.4 on the hierarchy of control measures

4.1.3 It should be noted that the use of personal protective equipment may in itself cause a hazard - for example, through reduced field of vision, loss of dexterity or agility.

4.2 Employer duties

Reg 6(1)

4.2.1 It is the responsibility of the employer to ensure that workers are provided with suitable personal protective equipment where it is needed.

Reg 6(3)

4.2.2 As a general rule, personal protective equipment should be supplied at no cost to the worker. The exception to this is where it is not exclusive to the workplace and so workers may be required to contribute to the cost or when workers wish to have equipment which exceeds the minimum standards required by legislation (eg a more attractive design).



4.2.3 Employers should assess the equipment required to ensure that it is suitable and effective for the task in question, and meets the appropriate standards of design and manufacture.

4.2.4 Suitable equipment should

- (a) be appropriate for the risks involved, and the task being performed, without itself leading to any significant increased risk;
- (b) fit the worker correctly after any necessary adjustment;
- (c) take account of ergonomic requirements and the worker's state of health;
- (d) be compatible with any other equipment the worker has to use at the same time, so that it continues to be effective against the risk.

MSN 1731
(M+F); Reg
6(2)

4.2.5 Details of personal protective equipment are listed in a Merchant Shipping Notice, including the full title of each relevant standard. The appropriate personal protective equipment of the required standard must be supplied for workers doing the tasks listed in the M Notice. However, this should not be considered an exhaustive list, and personal protective equipment must also be supplied wherever risk assessment indicates that there is a risk to health and safety from a work process which cannot be adequately controlled by other means, but which can be alleviated by the provision of such clothing or equipment.

Reg 8

4.2.6 The employer is also required to ensure that personal protective equipment is regularly checked and maintained or serviced. Records should be maintained of servicing and any repair required and carried out.

Reg 9

4.2.7 All workers who may be required to use protective equipment must be properly trained in its use. This should include being advised of its limitations. A record should be kept of who has received training.



4.2.8 Defective or ineffective protective equipment provides no defence. It is therefore essential that the correct items of equipment are selected and that they are properly maintained at all times. The manufacturer's instructions should be kept safe with the relevant apparatus and if necessary referred to before use and when maintenance is carried out. Personal protective equipment should be kept clean and should be disinfected as and when necessary for health reasons.

4.2.9 A competent person should inspect each item of protective equipment at regular intervals and in all cases before and after use. All inspections should be recorded. Equipment should always be properly stowed in a safe place after use.

4.3 Worker duties

Reg 10

4.3.1 Workers must wear the protective equipment or clothing supplied when they are carrying out a task for which it is provided, and follow appropriate instructions for use.

4.3.2 Personal protective equipment should always be checked by the wearer each time before use. Workers should comply with the training they have received in the use of protective items, and follow the manufacturer's instructions for use.

4.4 Types of equipment

4.4.1 Overalls, gloves and suitable footwear are the proper working dress for most work about ship but these may not give adequate protection against particular hazards in particular jobs. Specific recommendations for the use of special personal protective equipment will also be found in relevant chapters in Section 3 of the Code but there will be other occasions when the need for such special protection will be identified by the risk assessment carried out by the officer in charge at that particular time.



Personal protective equipment must always be selected according to the hazard being faced and the kind of work being undertaken, in accordance with the findings of the risk assessment.

4.4.2 Personal protective equipment can be classified as follows:

Type	Examples
Head protection	Safety helmets, bump caps hair protection
Hearing protection	Ear muffs, ear plugs
Face and eye protection	Goggles and spectacles, facial shields
Respiratory protective equipment	Dust masks, respirators, breathing apparatus
Hand and foot protection	Gloves, safety boots and shoes
Body protection	Safety suits, safety belts, harnesses, aprons, high visibility clothing.
Protection against drowning	Lifejackets, buoyancy aids and lifebuoys
Protection against hypothermia	Immersion suits and anti-exposure suits

4.5 Head protection

Safety Helmets

4.5.1 Safety helmets are most commonly provided as protection against falling objects. They can also protect against crushing or a sideways blow, and chemical splashes.

4.5.2 Since the hazards may vary, it will be appreciated that no one type of helmet would be ideal as protection in every case. Design details are normally decided by the manufacturer whose primary consideration will be compliance with an appropriate standard (see 4.2.5.). The standard selected should reflect the findings of the risk assessment.

4.5.3 The shell of a helmet should be of one piece seamless construction designed to resist impact. The harness or suspension when



properly adjusted forms a cradle for supporting the protector on the wearers' head. The crown straps help absorb the force of impact. They are designed to permit a clearance of approximately 25mm between the shell and the skull of the wearer. The harness or suspension should be properly adjusted before a helmet is worn. Safety equipment should be used in accordance with manufacturers' instructions.

Bump caps

4.5.4 A bump cap is simply an ordinary cap with a hard penetration-resistant shell. They are useful as protection against bruising and abrasion when working in confined spaces such as a main engine crankcase or a double bottom tank. They do not, however, afford the same protection as safety helmets and are intended only to protect against minor knocks.

Hair nets and safety caps

4.5.5 Personnel working on or near to moving machinery have always to be on their guard against the possibility of their hair becoming entangled in the machinery. Long hair should always be covered by a hair net or safety cap when working with or near moving machinery.

4.6 Hearing protection

4.6.1 All persons exposed to high levels of noise, eg in machinery spaces, should wear ear protection of a type recommended as suitable for the particular circumstances. Protectors are of three types - ear plugs, disposable or permanent, and ear muffs. For further information see the Code of Practice Noise Levels in Ships, published by the Department of Transport (1990).

4.6.2 The simplest form of ear protection is the ear plug. This type however has the disadvantage of limited capability of noise level reduction.



Ear plugs of rubber or plastic also have only limited effect, in that extremes of high or low frequency cause the plug to vibrate in the ear canal causing a consequential loss in protection. It may be difficult to keep re-useable ear plugs clean on a ship, and disposable ear plugs are recommended. Ear-plugs should never be used by anyone with ear-trouble, without medical advice.

4.6.3 General fitting instructions for disposable earplugs is to be found in **Annex 4.1** of this Code.

4.6.4 In general, ear muffs provide a more effective form of hearing protection. They consist of a pair of rigid cups designed to completely envelope the ears, fitted with soft sealing rings to fit closely against the head around the ears. The ear cups are connected by a spring loaded headband (or neck band) which ensures that the sound seals around the ears are maintained. Different types are available and provision should be made according to the circumstances of use and expert advice.

4.6.5 General fitting instructions for ear muff type ear protection is to be found in **Annex 4.2** of this Code.

4.7 Face and eye protection

4.7.1 The main causes of eye injury are:

- (a) infra-red rays - gas welding;
- (b) ultra-violet rays - electric welding;
- (c) exposure to chemicals;
- (d) exposure to particles and foreign bodies.

Protectors are available in a wide variety, designed to international standard specifications, to protect against these different types of hazard (see 4.2.5).

4.7.2 Ordinary prescription (corrective) spectacles, unless manufactured to a safety standard, do not afford protection. Certain box-type goggles are designed so that they can be worn over ordinary spectacles.



4.8 Respiratory protective equipment

4.8.1 Respiratory protective equipment is essential for protection when work has to be done in conditions of irritating, dangerous or poisonous dust, fumes or gases. There are two main types of equipment which perform different functions:

- (a) a respirator filters the air before it is inhaled;
- (b) breathing apparatus supplies air or oxygen from an uncontaminated source.

4.8.2 Advice on selection, use and maintenance of the equipment is contained in the relevant Standard. This should be available to all those concerned with the use of respiratory protective equipment on board ship (see 4.2.5).

4.8.3 It is most important that the face-piece of respirators and breathing apparatus is fitted correctly to avoid leakage. The wearing of spectacles, unless adequately designed for that purpose, or of beards is likely to adversely affect the face seal. This is a particularly important consideration in emergency situations.

Respirators

4.8.4 The respirator selected must be of a type designed to protect against the hazards being met.

- (a) The dust respirator gives protection against dusts and aerosol sprays but not against gases. There are many types of dust respirator available but they are generally of the ori-nasal type, i.e. half-masks covering the nose and mouth. Many types of light, simple face masks are also available and are extremely useful for protecting against dust nuisance and non-toxic sprays but should never be used in place of proper protection against harmful dusts or sprays.
- (b) The positive pressure powered dust respirator incorporates a



battery-powered blower unit, connected by a tube to the face-mask to create a positive pressure in the face-piece. This makes breathing easier and reduces face-seal leakage.

- (c) The cartridge-type of respirator consists of a full face-piece or half mask connected to a replaceable cartridge containing absorbent or adsorbent material and a particulate filter. It is designed to provide protection against low concentrations of certain relatively non-toxic gases and vapours.
- (d) The canister-type of respirator incorporates a full face-piece connected to an absorbent or adsorbent material contained in a replaceable canister carried in a sling on the back or side of the wearer. This type gives considerably more protection than the cartridge type.

4.8.5 The filters, canisters and cartridges incorporated in respirators are designed to provide protection against certain specified dusts or gases. Different types are available to provide protection against different hazards and it is therefore important that the appropriate type is selected for the particular circumstances or conditions being encountered. It must be remembered, however, that they have a limited effective life and must be replaced or renewed at intervals in accordance with manufacturers' instructions.

4.8.6 RESPIRATORS PROVIDE NO PROTECTION AGAINST OXYGEN DEFICIENT ATMOSPHERE. They should never be used to provide protection in confined spaces such as tanks, cofferdams, double bottoms or other similar spaces against dangerous fumes, gases or vapours. Only breathing apparatus (self-contained or airline) is capable of giving protection in such circumstances.

Breathing apparatus

4.8.7 The type of breathing apparatus to be used when entering a space



that is known to be, or suspected of being deficient in oxygen or containing toxic gas or vapours is given in section 17.13.

4.8.8 Breathing apparatus should not be used underwater unless the equipment is suitable for the purpose, and then only in an emergency.

Resuscitators

4.8.9 It is recommended that resuscitators of an appropriate kind should be provided when any person may be required to enter a dangerous space; see Chapter 17.

4.9 Hand and foot protection

Gloves

4.9.1 The exact type of glove selected will depend on the kind of work being undertaken or the particular substance being handled, and in these cases expert advice should be followed. The following are general rules:

- (a) Leather gloves should generally be used when handling rough or sharp objects.
- (b) Heat-resistant gloves should be used when handling hot objects.
- (c) Rubber, synthetic or PVC gloves are generally best for handling acids, alkalis, various types of oils, solvents and chemicals in general.

Footwear

4.9.2 Foot injuries most often result from the wearing of unsuitable footwear (e.g. sandals, plimsolls and flip-flops) rather than from failure to wear safety shoes and boots. It is nevertheless strongly advisable that all personnel whilst at work on board ship wear appropriate safety footwear.



4.9.3 Injuries are commonly caused by impact, penetration through the sole, slipping, heat and crushing. Safety footwear is available which is designed to protect against these or other specific hazards identified in the risk assessment, manufactured to various standards appropriate to the particular danger involved (see 4.2.5).

4.10 Protection from falls

4.10.1 All personnel who are working aloft, outboard or below decks or in any other area where there is a risk of falling more than two metres, should wear a safety harness (or belt with shock absorber) attached to a lifeline. If a vessel is shipping frequent seas, nobody should be required to work on deck unless absolutely necessary. However, where this is unavoidable, persons on deck should wear a harness and, where practicable, should be secured by lifeline as a protection from falls and from being washed overboard or against the ship's structure.

4.10.2 Inertial clamp devices allow more freedom in movement.

4.11 Body protection

4.11.1 Special outer clothing may be needed for protection when personnel are exposed to particular contaminating or corrosive substances. This clothing should be kept for the particular purpose and dealt with as directed in the relevant sections of the Code.

4.11.2 High visibility clothing should be worn when it is important to be seen to be safe - for example, during loading and unloading operations.

4.12 Protection against drowning

4.12.1 Where work is being carried out overside or in an exposed position where there is a reasonably foreseeable risk of falling or being washed overboard or where work is being carried out in or from a ship's boat a lifebuoy with sufficient line should be provided. In addition and as



appropriate a lifejacket or buoyancy aid should be provided. Where necessary, personnel should be provided with thermal protective clothing to reduce the risks of cold shock.

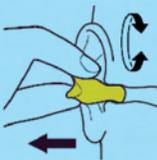
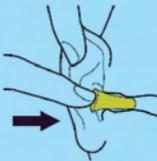




HEARING

DISPOSABLE EARPLUGS

GENERAL FITTING INSTRUCTIONS:



- Earplugs offer excellent protection against noise, but only if they are fitted correctly and properly.
- Make sure that your hands are clean before fitting any earplugs.
- Hold the earplug between the thumb and index finger. Roll and compress the whole earplug, use your other hand to reach over your head and pull up and back on your outer ear. This straightens the ear canal and makes way for a tight and snug fit.
- Insert the earplug into the ear canal and hold for 20 to 30 seconds. This enables the earplug to expand and fill your ear canal.
- **Test the fit of your earplugs -**
In a noisy environment, and with your earplugs inserted, cup both your hands over your ears and release. You should not notice any significant difference in the noise level. If the noise level appears to reduce when your hands are cupped over your ears, your earplugs are probably not correctly and properly fitted. Remove and refit your earplugs.
- Always remove your earplugs slowly. Twist them to break the seal. Removing your earplugs too quickly could damage your eardrum.
- **ALWAYS READ THE MANUFACTURER'S INSTRUCTIONS AND GET GUIDANCE ON HOW TO WEAR EARPLUGS CORRECTLY**
- **DO NOT RE-USE DISPOSABLE EARPLUGS**
- **DO NOT SHARE YOUR EARPLUGS**

PROTECT IT OR LOSE IT





HEARING

EARMUFFS

GENERAL FITTING INSTRUCTIONS:



- Earmuffs offer excellent protection against noise but only if the cups are fitted and adjusted correctly and properly.
- Your ears must be completely enclosed within the ear cups.
- Adjust the cups up or down to ensure that the head band fits securely on the crown of your head. The best performance is obtained when the cup cushions make a tight seal against your head.
- **Test the fit of your earmuffs -**
In a noisy environment, place the palms of your hands on both cups, push the cup cushions towards your head and then release the cups. You should not notice any significant difference in the noise level. If the noise level appears to reduce when you press the cups, your earmuffs are probably not correctly fitted.
- Check the cup cushions regularly for wear and tear. Clean them regularly with a damp hygienic cloth or wipe. If the cup cushions become hard, damaged or deteriorate they must be replaced immediately.
- **ALWAYS READ THE MANUFACTURER'S INSTRUCTIONS AND GET GUIDANCE ON HOW TO WEAR EARMUFFS CORRECTLY**
- **DO NOT SHARE YOUR EARMUFFS**

PROTECT IT OR LOSE IT



CHAPTER 5

SAFETY SIGNS

5.1 Safety Signs

MS and FV
(Safety Signs
& Signals)
Regs 2001 -
SI No 2001
No. 3444
and
Merchant
Shipping
Notice
MSN 1763

5.1.1 Any safety signs permanently erected on board the ship for the purpose of giving health and safety information or instruction shall comply with the Regulations and Merchant Shipping Notice. Other national or international standards providing for equivalent safety will be accepted.

5.1.2 Safety signs, which include hazard warnings, should be used whenever a hazard or obstruction exists and such a sign is appropriate. Particular attention should be paid on passenger ships to hazards which may be familiar to seafarers but not to passengers.

5.1.3 Where a language other than English is extensively used on a ship, any text used in conjunction with a sign should usually be displayed also in that language.

5.2 General

5.2.1 Colours and symbols, when used appropriately, can provide information and warnings of hazards which can be understood by anyone, regardless of what language they speak. Chapter 28 gives types of sign which generally conform with both international systems, where they exist, and European wide standards.

5.2.2 Symbols relating to life saving appliances are governed by international standards and are mandatory. Those relating to fire control plans are recommended international standards.

5.3 Role of the Employer

5.3.1 Employers should ensure that safety signs are displayed where



appropriate. If the employer is not in a position to provide signs - for example, where the fittings of the ship are not within his control - he should ensure that signs are in place before allowing workers to start any relevant work.

5.3.2 The employer should also ensure that the system of signs in use is clearly understood.

5.4 Workers' responsibilities

5.4.1 All workers should ensure that they understand the meaning of signs and any colour coding system in use on their ship and follow the relevant safety procedures.

5.4.2 Those aware of any deficiency in their colour vision should tell their supervisor or employer; and take extra care where colour is used as a means of identification.



CHAPTER 6

MEANS OF ACCESS AND SAFE MOVEMENT

6.1 Means of Access

*MS (Means of Access)
Regs 1988
SI No. 1637*

6.1.1 Merchant Shipping Regulations place an obligation on both the master of a ship and the employer of the master to ensure that a safe means of access is provided and maintained, both between the ship and the shore or another ship alongside which the ship is secured. In carrying out the duties arising from these Regulations full account must be taken of the principles and the guidance in Chapter 18 of this Code.

6.1.2 Where the provision of equipment is necessary to ensure safe means of access it must be placed in position promptly, be properly rigged and deployed, safe to use and adjusted as necessary to maintain safe access.

6.1.3 When access equipment is provided from the shore it is still the responsibility of the master to ensure as far as is reasonably practicable that the equipment meets these requirements.

Reg 4(1)(c)

6.1.4 Any access equipment and immediate approaches to it must be adequately lit. For these areas a lighting level of at least 20 lux should be provided (measured at a height of 1 metre above the surface level) unless:-

- (a) a higher level is required by other Regulations.
- (b) provision of such levels of lighting would contravene other Regulations, eg the Collision Regulations and the Distress Signals Order.

Guidance on lighting is given in Chapter 13 (and Chapter 18).

*Regs 4(d), 6
and 7*

6.1.5 Any equipment used for the provisions of means of access and any safety net must be fit for purpose and properly maintained. Accommodation ladders and any portable or rope ladders used for access must comply with



the standards in Annex 18.1 of the Code. All access equipment should be inspected by a competent person at appropriate intervals.

Reg 7

6.1.6 *A portable ladder should only be used for access to the ship where no safer access is reasonably practicable. A rope ladder should only be used between a ship with high freeboard and a ship with low freeboard or between a ship and a boat if no safer means of access is reasonable practicable.*

Reg 8

6.1.7 *A life-buoy with a self-activating light and also a separate buoyant safety line attached to a quoit or some similar device must be provided ready for use at the point of access aboard the ship.*

Reg 9

6.1.8 *An adequate number of safety nets of a suitable size and strength are to be carried on the ship or otherwise be readily available. Where there is a risk of a person falling from the access equipment or from the quayside or ship's deck adjacent to the access equipment, a safety net shall be mounted where reasonably practicable. Guidance on the rigging of safety nets is in Chapter 18.*

6.2 Use of Equipment

Reg 10

6.2.1 *When suitable access equipment is provided from the ship or from the shore or from another ship, any person boarding or leaving the ship must use that equipment.*

6.3 Access for Pilots

*MS (Safety of Navigation)
Regs. S.I. 2002
No. 1473*

6.3.1 *Merchant Shipping Regulations require the owner to provide pilot ladders, accommodation ladders and hoists which comply with the construction and testing requirements laid out in the Regulations. Guidance on these standards is included in Annex 18.1.*

6.3.2 *In addition, the Regulations require the master to ensure that:*

- *each pilot ladder, accommodation ladder, hoist and associated equipment is properly maintained and stowed, and regularly inspected to ensure that, so*



far as is reasonably practicable, each is safe to use.

- *each pilot ladder and hoist is used only for the embarkation and disembarkation of pilots and by officials and other persons while a ship is arriving at or leaving a port.*
- *the rigging of the pilot ladder, accommodation ladder, hoist and associated equipment is supervised by a responsible officer who is in communication with the navigating bridge. This officer's duties will include arranging for the pilot to be escorted by a safe route to and from the bridge. Advice on safe rigging of such equipment is in Chapter 18.*
- *personnel engaged in rigging or operating any mechanical equipment are instructed in the safe procedures to be adopted and that the equipment is to be tested prior to each use.*

6.3.4 *A safety-line and harness, a life-buoy with a self-igniting light, and a heaving line should be kept at hand ready for use.*

6.3.5 *The pilot ladder or hoist overside and its controls, and also the position where the person embarks and disembarks on the ship should be adequately lit.*

6.3.6 *The owner and the master must ensure that there is on board a copy of the approved manufacturer's maintenance manual for the hoist, containing a maintenance log book. The hoist must be maintained in accordance with the maintenance manual, and a record kept by the responsible officer in the maintenance log book.*

6.3.7 *The master is required to ensure that the hoist is subject to regular test rigging and inspection. Such tests should be carried out by designated ship's personnel at regular intervals. All tests should be logged.*

6.4 Safe Movement

6.4.1 *Merchant Shipping Regulations place an obligation on both the master of a ship and the employer of the master to ensure that a safe means of access is provided and maintained to any place on the ship to which a person may be*



expected to go. In carrying out the duties arising from these Regulations full account must be taken of the principles and the guidance in Chapter 13 of this Code.

6.4.2 Places on the ship where people may be expected to be include accommodation areas as well as normal places of work. "Persons" in this context include passengers, dock-workers, and other visitors to the ship on business but exclude persons who have no right to be on the ship.

Reg 5

6.4.3 All deck surfaces used for transit about the ship and all passageways, walkways and stairs must be properly maintained and kept free from substances liable to cause a person to slip or fall.

Reg 6

6.4.4 Areas used for the loading or unloading of cargo or for other work processes or for transit should be adequately and appropriately illuminated.

6.4.5 For areas used for loading or unloading of cargo or for other work processes a lighting level of at least 20 lux should be provided and for transit areas a level of at least 8 lux should be provided (measured at a height of 1 metre above the surface level) unless:-

- (a) a higher level is required by other Regulations, eg the Crew Accommodation Regulations; or
- (b) provision of such levels of lighting would contravene other Regulations, eg the Collision Regulations and the Distress Signals Order.

General rules for where these specific regulations do not apply are given in Chapter 13.

MS & FV
(Safety Signs
& Signals)
Regs 2001
S.I. 2001 No.
3444 and
Merchant
Shipping
Notice
MSN 1763

Reg 8

6.4.6 The employer and master are also responsible for ensuring that any permanent safety signs displayed on board the ship comply with the Regulations and Merchant Shipping Notice.

6.4.7 Any opening, open hatchway or dangerous edge into, through or over which a person may fall shall be fitted with secure guards or fencing of adequate design and construction. Advice on guard-rails and safety fencing is given in Chapter 13. These requirements do not apply where the opening is a permanent

access way, or where work is in progress which could not be carried out with the guards in place.

Regs 9 and 11

6.4.8 *All ship's ladders must be of good construction and sound material, strong enough for the purpose for which they are used, free from patent defect and properly maintained. Ladders providing access to the hold must comply with the standards in Annex 6.1.*

6.4.9 *Suitable hand-holds should be provided at the top and at any intermediate landing place of all fixed ladders.*

Reg 10

6.4.10 *The Regulations also require the employer and master to ensure that ship's powered vehicles (which includes mobile lifting plant) are only driven by a competent person who is authorised to do so, and to ensure that they are used safely. Such vehicles must be properly maintained.*

6.5 Entry into dangerous spaces

MS (Entry Into Dangerous Spaces) Regs 1988 SI No. 1638

6.5.1 *A dangerous space is defined in the regulations as "any enclosed or confined space in which it is foreseeable that the atmosphere may at some stage contain toxic or flammable gases or vapours, or be deficient in oxygen, to the extent that it may endanger the life or health of any person entering that space."* Section 17.4. gives advice on identifying these hazards.

6.5.2 *The master is required to ensure that all unattended dangerous spaces are secured against entry, except when it is necessary to enter.*

6.5.3 *Employers must have procedures in place for entering and working in confined spaces, and it is the master's responsibility to ensure these are followed. No person should enter or remain in a dangerous space except in accordance with the set procedures.*

6.5.4 *The guidance in this Code (Chapter 17) must be taken into account both in drawing up and implementing the procedures.*



STANDARDS FOR HOLD ACCESS

Hold Access - New Ships

Reg. 11 The Merchant Shipping (Safe Movement on Board Ship) Regs 1988 (SI 1988 No 1641)

Where the keel of a ship is laid or the ship is at a similar stage of construction, after 31 December 1988 the following standards of hold access should be provided:-

- (i) The access shall be separate from the hatchway opening, and shall be by a stairway if possible.
- (ii) A fixed ladder, or a line of fixed rungs, shall have no point where they fill a reverse slope.
- (iii) The rungs of a fixed ladder shall be at least 300 mm wide, and so shaped or arranged that a person's foot cannot slip off the ends. Rungs shall be evenly spaced at intervals of not more than 300 mm and there shall be at least 150 mm clear space behind each rung.
- (iv) There shall be space outside the stiles of at least 75 mm to allow a person to grip them.
- (v) There shall be a space at least 760 mm wide for the user's body, except that at a hatchway this space may be reduced to a clear space of at least 600 mm by 600 mm.
- (vi) Fixed vertical ladders should be provided with a safe intermediate landing platform at intervals of not more than 9 metres.
- (vii) Where vertical ladders to lower decks are not in a direct line a safe intermediate landing shall be provided.
- (viii) Intermediate landings shall be of adequate width and afford a secure footing and extend from beneath the foot of the upper ladder to the point of access to the lower ladder. They shall be provided with guard rails.
- (ix) Fixed ladders and stairways giving access to holds shall be so placed as to minimise the risk of damage to them from cargo handling operations.



- (x) Fixed ladders shall, if possible, be so placed or installed as to provide back support for a person using them; but hoops shall be fitted only where they can be protected from damage to them from cargo handling operations.

Hold Access - Existing Ships

Where the keel of a ship was laid or the ship was at a similar stage of construction before 1 January 1989, at least the following standards of hold access should be provided:-

- (i) Access should be provided by steps or ladder; except;
 - (a) at coamings; and
 - (b) where the provision of a ladder on a bulkhead or in a trunk hatchway is clearly not reasonably practicable.

In such cases ladder cleats or cups may be used.

- (ii) All ladders between lower decks should be used in the same line as the ladder from the top deck, unless the position of the lower hatch or hatches prevent this.
- (iii) Cleats or cups should be at least 250 mm wide and so constructed as to prevent a person's foot slipping off the side.
- (iv) Each cleat, cup, step or rung of a ladder shall provide a foothold, including any space behind the ladder; at least 115 mm deep. Cargo should not be stowed as to produce this foothold.
- (v) Ladders which are reached by cleats or cups on a coaming should not be recessed under the deck more than is reasonably necessary to keep the ladder clear of the hatchway.
- (vi) Shaft tunnels should be equipped with adequate handholds and footholds on each side.
- (vii) All cleats, cups, steps or rungs of ladders should provide adequate handholds.

Portable ladders

A portable ladder should only be used where no safer means of access is reasonably practicable.



Portable ladders should be pitched between 60° and 75° from the horizontal, properly secured against slipping or shifting sideways and be so placed as to afford a clearance of at least 150 mm behind the rungs. Where practicable the ladder should extend to at least 1 metre above any upper landing place unless there are other suitable handholds.



CHAPTER 7

PROVISION AND CARE OF WORK EQUIPMENT

7.1 Suitability of work equipment

*MS and
FV(Provision
and use of
work
Equipment)
Regs 2006
SI No.
2006/2183
Reg 25*

7.1.1 All equipment provided for use by workers should comply with any relevant standards laid down by merchant shipping or general UK regulations. Any equipment not covered by regulations or type approvals should comply with the appropriate British Standard or its nearest international equivalent.

Reg 6(1)

7.1.2 In addition all work equipment should be:-

- (a) suitable for the work to be carried out;
- (b) properly adapted for that purpose; and,
- (c) capable of being without any risks to the health or safety of any worker.

7.1.3 The term “work equipment” applies to any machinery, appliance, apparatus, tool or installation provided for use at work. The exception to this is any safety equipment or apparatus provided in compliance with SOLAS requirements, which is subject to other merchant shipping regulations.

7.1.4 In practice, work equipment supplied by the ship is generally the responsibility of the employer who supplies it. This is the position reflected in the Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006. It should be noted however that this obligation on the employer may be extended to other persons where the employer does not have responsibility for the operation of the ship. Where any work equipment is provided from ashore, responsibility for its safety will



rest with the supplier and it will also be subject to HSE's regulations.

7.2 Maintenance

Reg 7 and
25

7.2.1 All work equipment is to be maintained in efficient working order and in good repair in accordance with the manufacturer's instructions.

7.2.2 Maintenance should include regular inspections by a competent person as dealt with in paragraph 7.1. Where there is any suspicion that any work equipment is not working properly, or has been subjected to any treatment likely to cause damage, it should be taken out of service until it can be inspected and any necessary repairs or maintenance undertaken.

7.2.3 The decision on what maintenance work is required rests with the employer/ competent person however the following should normally form part of a maintenance routine:-

- (a) greasing of bearings etc should be thorough and frequent as bearings and other moving parts that are dry will impose additional loads that can lead to failure;
- (b) the condition of all ropes and chains should be checked regularly for wear, damage and corrosion and replaced as necessary;
- (c) regular function tests should be carried out on all controls, emergency stop controls, brakes, safety devices etc to ensure they are operating correctly. Such checks might usefully be carried out before the equipment is to be used.

7.2.4 Work equipment should as far as possible be constructed or adapted to permit maintenance operations to be carried out while the equipment is shut down. Where this is not possible



appropriate protective measures must be put in place to enable such maintenance operations to be carried out safely without exposing the person carrying out such maintenance, or any other person, to any risk to their health and safety. Such protective measures would include:-

- keeping exposure of the dangerous part to the minimum necessary;
- authorisation of the exposure by a responsible ship's officer or other responsible person;
- permitting only a competent person to carry out the operation;
- ensuring that any person working close to the machinery has enough clear space and adequate light while they are working;
- ensuring that any person operating or close to the machinery has adequate instruction in safe systems of work for that machinery, the dangers arising from its operation and the precautions to be taken; and
- the placing and display of a conspicuous warning notice on or close to the machinery.

7.2.5 Where any machinery has a maintenance log, the log must be kept up to date.

7.3 Inspection

Reg 8

7.3.1 Where the safety of work equipment depends on the installation conditions, it should be inspected by a competent person after initial installation, or after re-assembly at a new site or in a new location, and before being put into service for the first time, to ensure that it has been installed correctly, in accordance with any manufacturer's instructions, and is safe to use. In this context "inspection" means the carrying out of such visual or more rigorous inspection by a competent person and may include testing where this is considered appropriate.

7.3.2 Inspections should cover factors such as the standard of welding or



other fixing and materials used, together with the strength of any part of the ship to which it is attached and which supports it. Account should also be taken of any inspection requirements or guidance produced by the manufacturer: Work equipment should be re-inspected at regular intervals, not exceeding 5 years, or more frequently if recommended by the manufacturer; to ensure that no deterioration in its installation has occurred.

7.3.3 Structures should be examined frequently for corrosion, cracks, distortion or wear of bearings, securing points etc. Hollow structures, such as gantries or masts, should also be checked for trapped water inside them. If found the structure should be drained, suitably treated and then sealed to prevent further ingress of water.

7.3.4 Any work equipment exposed to conditions causing deterioration should be inspected by a competent person at suitable intervals and on each occasion that exceptional circumstances have occurred which may jeopardise the safety of the work equipment, to enable any necessary remedial action to be taken to ensure its continuing safety. In this context "exceptional circumstances" includes modification work, accidents, exposure to weather and prolonged periods of inactivity.

7.3.5 The results of all inspections are to be recorded and all such records are to be retained, readily available for inspection, until such time as a further inspection has been undertaken and recorded.

7.3.6 Where any ship's work equipment is to be used outside the ship, or work equipment from outside the ship is obtained for use on the ship, it must be accompanied by physical evidence that the



last inspection required to be carried out under the Merchant Shipping and Fishing Vessels (provision and Use of work equipment) Regulations 2006 has actually been carried out. In this context “used outside the ship” includes use on the quayside, dock or jetty or on board another ship; and/or operated by workers who are employed by another person.

7.3.7 Any work equipment used for lifting loads, including personnel, is also subject to the provisions of the Merchant Shipping and Fishing Vessels (Lifting Operations and Lifting Equipment) Regulations 2006, which set out specific requirements for the “inspection”, “testing” and “thorough examination” of such lifting equipment etc. This aspect is dealt with in detail in Chapter 21 of this Code.

7.4 Specific Risks

Reg 9

7.4.1 Where a specific risk to health or safety is identified in relation to a particular item of work equipment, its use and any repairs, modifications, or maintenance must only be carried out by persons who have been specifically designated to perform the particular task, and who are competent to do so, and who have been provided with appropriate training either as a result of the workers overall training for the position currently held, or provided by other qualified persons on board or ashore including the manufacturer of the equipment.

7.5 Information and Instructions

Reg 10

7.5.1 All workers who use work equipment, and any managers or supervisors, should have access to all necessary health and safety information and written instructions relating to the use of that equipment. These should be in an easily understood form and should include information and, where appropriate, written instructions on the conditions in which the work equipment may be used and its method of use; foreseeable abnormal situations and the action to be taken if such a situation occurs; and information on any conclusions drawn from previous



experience of using that work equipment.

7.5.2 Where any worker(s) likely to use an item of work equipment do not understand the language in which such information and instructions are provided, appropriate measures should be taken to ensure that the information/instructions are provided in a language that the worker(s) understands.

7.6 Training

Reg 11

7.6.1 All workers who use work equipment, or who supervise its use, should have received adequate training covering the method of use of the equipment, any risks which may arise from its use and any precautions to be taken.

7.6.2 Similarly workers specifically designated to carry out repairs, modifications, maintenance or servicing to work equipment, or who supervise such work, have received adequate training for that purpose where the use of that equipment may involve a specific health and safety risk to the person using it e.g. electrical equipment, mechanical cutting equipment.

7.6.3 In accordance with the International Safety Management (ISM) Code for Merchant Shipping, all such training is to be recorded and should indicate when full competence is achieved.

7.6.4 All instruction or information must be in a language that the workers receiving training understand, and should be communicated effectively.

Reg 12

7.7 Conformity with Community Requirements

7.7.1 All work equipment should conform to the appropriate European product standards, apart from equipment which pre-



dates any relevant standards. Annex 7.1 details the UK instruments which give effect to the relevant EC directives.

7.7.2 Work equipment which carries a **CE** marking is considered to comply with the provisions of a Community directive, provided that the **CE** marking is relevant for the purpose for which the equipment is to be used. In this context “**CE** marking” means a marking signifying compliance with the basic requirements of design and manufacture of, and the specifications and test methods applicable to, a piece of work equipment which have been adopted by the appropriate authorities in the European Economic Area. Reference to a **CE** marking also includes the marking for an alternative Standard which provides, in use, equivalent levels of safety, suitability and fitness for purpose.

7.8 Dangerous Parts of Work Equipment

Reg 13

7.8.1 Every dangerous or exposed working part of work equipment is to be provided with appropriate guards or protection devices. Such guards or protection devices are to be maintained and/or replaced as necessary and are to be kept in position when the relevant parts are in motion.

7.8.2 All guards or protection devices provided in accordance with the preceding paragraph should:-

- (a) be of substantial construction;
- (b) not give rise to any additional hazard;
- (c) not be easily removed;
- (d) be situated at a sufficient distance from the danger zone;
- (e) not restrict the view of the [operating cycle] [operation] of the equipment more than is necessary; and
- (f) be so constructed or adapted that they allow operations necessary to fit or replace parts and for the carrying out of maintenance work but restrict access only to the area where work is to be carried out and, where possible, without having to dismantle the guard or protection



device.

7.8.3 The reference in paragraph 7.8.2(d) to a “danger zone” means the zone within or around work equipment where the presence of a worker would expose him/her to a risk to his health or safety.

7.9 Electrical Equipment

Reg 14

7.9.1 All ship's electrical equipment and installations should be constructed, installed, operated and maintained in such a way that there is no electrical hazard to the ship or any person.

7.9.2 Isolation and Personal Protective Equipment appropriate to the ship's electrical installation should be carried, supplied and used as and when required for the carrying out of maintenance.

7.10 Protection against Specified Hazards

Reg 15

7.10.1 Where any worker using work equipment is, or could be, exposed to one or more of the hazards set out in paragraph 7.10.2, the employer shall ensure that any risk to his health and safety is either prevented by the provision of appropriate work equipment or protective devices, or, where that is not practicable, is adequately controlled by any appropriate means.

7.10.2 The hazards referred to in paragraph 7.10.1 are -

- (a) any article or substance falling or being ejected from work equipment;
- (b) rupture or disintegration of parts of work equipment;
- (c) work equipment catching fire or overheating;
- (d) the unintended or premature discharge of any article or of any gas, dust, liquid, vapour or other substance which, in each case, is produced, used or stored in the work equipment;



- (e) the unintended or premature explosion of the work equipment or any article or substance produced, used or stored in it;
- (f) work equipment being struck by lightning while being used.

7.11 High or Very Low temperatures

Reg 16

7.11.1 Where any equipment, parts of equipment or anything produced by, used by or stored in such equipment has the potential to burn or scald or cause any other injury to any worker by virtue of being at a high or low temperature, appropriate measures should be taken to prevent injury to any worker:

7.11.2 Appropriate measures includes the provision of Isolation and Personal Protective Equipment and ensuring it is worn.

7.12 Controls for Starting or Making a Significant Change in Operating Conditions

Reg 17

7.12.1 Where any work equipment could constitute a risk to the health or safety of workers, because it contains moving parts or is mobile, it must be fitted with one or more controls for the purposes of starting it and controlling any change in its speed, pressure or other operating conditions. Additionally it must only be possible to start the machine or change its speed, etc by operation of the relevant control.

7.12.2 The requirements in the preceding paragraph do not however apply to any automatic re-starting or other changes in the operating conditions which occur as a result of the normal operating cycle of any work equipment.

7.13 Stop Controls

Reg 18

7.13.1 In addition to the requirements of paragraph 7.12 where any work equipment could constitute a risk to health and safety, one or more readily accessible controls must be provided to either bring it to a stop or



otherwise render it safe. It is for the employer to decide the form such controls will take but they must be capable of bringing the equipment to a complete stop as well as switching off all sources of energy to, and from, the equipment.

7.13.2 Any stop control required by this regulation must override any control required by 7.12.

7.14 Emergency Stop Controls

Reg 19

7.14.1 In addition to the requirements of paragraph 7.13, where any work equipment could constitute a risk to health and safety one or more readily accessible emergency stop controls should be provided. Any emergency stop controls must override any controls required by paragraphs 7.12 and 7.13.

7.15 Controls

Reg 20

7.15.1 All operational controls for work equipment are to be clearly visible and identifiable, including the provision of appropriate marking where necessary. Unless there is no other option available, no control should be placed in a position where any worker operating it control is exposed to any risk to their health and safety.

7.15.2 Any worker operating the controls of any work equipment should be able to ensure from the control position that no other worker will be exposed to any risk to their health and safety as a result of the starting up or use of that equipment. Where such an arrangement is not reasonably practicable, appropriate systems of work must be introduced to ensure that no worker is exposed to any risk to his health and safety as a result of the starting up or use of the equipment. Such system of



work may include audible, visible or other suitable warning device, as required by paragraphs 7.20 or 7.21 to enable all workers affected, or likely to be affected, to be aware that the equipment is about to be started.

7.15.3 Measures must also be taken to ensure that any worker who is in a place where he would be exposed to a risk to his health and safety as a result of the starting or stopping of work equipment has sufficient time and suitable means to get out of the way prior to the starting or stopping of the equipment.

7.16 Control Systems

Reg 21

7.16.1 Any control systems for work equipment are to be safe and take account of any risks to health and safety, which might result from damage to, or breakdown of, that control system. In this context a control system cannot be considered safe unless-

- (a) its operation does not create any increased risk to health or safety;
- (b) any fault in, or damage to, any part of the control system or the loss of the power supply to it also does not result in additional or increased risk to health or safety;
- (c) it does not impede the operation of any stop control required by paragraphs 7.13 and 7.14 above.

7.17 Isolation from Sources of Energy

Reg 22

7.17.1 Where the risk assessment indicates the need for one, work equipment should be provided with a suitable system for isolating it from all its sources of energy. Any isolating system will not be considered suitable unless it is clearly identified and capable of being locked off and is indicated in the appropriate "Permit to Work".

7.17.2 Suitable measures must also be in place to ensure that re-connection of any energy source to work equipment does not expose the



worker using the equipment to any risk to his health or safety. Such measures must also be identified in the risk assessment and identified on the "Permit to Work".

7.18 Stability of Work Equipment

Reg 23

7.18.1 Where the safe use of any work equipment depends on its stability it should be stabilised by use of clamps or other appropriate method.

7.18.2 In deciding the most appropriate method for stabilising work equipment, the potential movement of a ship under all conditions should be taken into account.

7.19 Lighting

Reg 24

7.19.1 Suitable and sufficient lighting, appropriate for the work to be undertaken, is to be provided at any place where work equipment is used.

7.20 Markings

Reg 26

7.20.1 Where any health and/or safety markings are required to comply with the requirements of the Merchant Shipping and Fishing Vessels (Safety Signs and Signals) Regulations 2001 such markings which comply with Merchant Shipping Notice MSN 1763 and Chapter 28 of this Code are to be provided and applied to the equipment in such a way that they are clearly visible to any person using, or in the vicinity of that equipment.

7.21 Warnings

Reg 27

7.21.1 Where any work equipment is required to be fitted with warning signs, warning devices etc, their meaning should be clear and they should be easily seen or heard.



7.22 Carrying of Workers on Mobile Work Equipment

Reg 28

7.22.1 No worker is to be carried on any mobile work equipment unless it is designed for that purpose. In this context “designed for that purpose” includes being fitted out in such a way as to minimise risks to the safety of any worker, including any risks from wheels or tracks. Such equipment must also incorporate measures to prevent it rolling over or, where that is not possible, reduce the risks to health or safety of workers should it roll over whilst being used. Such measure could include-

- (a) stabilisation of the work equipment to prevent it rolling over
- (b) provision of a protection structure so that the work equipment cannot fall on its side
- (c) provision for a structure giving sufficient clearance around the workers being carried if the work equipment can overturn further than that; or
- (d) any device which is equally effective in providing protection for the workers being carried.

7.22.2 Where there would be a risk of any worker being carried by mobile work equipment being crushed by it, should it roll over, it should be fitted with a restraining system for the person.

7.22.3 The provisions of this paragraph do not apply to a fork-lift truck having a structure described in sub-paragraphs 7.22.1 (b) or (c) above.

7.23 Overturning of Fork-Lift Trucks

Reg 29

7.23.1 Any fork lift truck to which sub-paragraph 7.22.3 applies and which carries a worker must be adapted or equipped to minimise the risk to health or safety from its overturning. In deciding what adaptations etc are required, account should be taken of the manner and conditions in which the fork-lift truck is being used.

7.23.2 Any worker operating a fork lift truck must have received, and



comply with, appropriate safety training including that relating to the individual type of fork lift truck.

7.24 Use of Mobile Work Equipment

Reg 30

7.24.1 Where mobile work equipment is to be used on board a ship:-

- (a) no ship's powered vehicle or powered mobile lifting appliance shall be driven in the course of a work activity except by a competent person who is authorised to do so;
- (b) where work equipment is moving around in a work area, appropriate traffic rules are drawn up and followed for the safety of workers and others;
- (c) subject to sub-paragraph (d), workers on foot are, so far as is reasonably practicable, prevented from coming within the area of operation of self-propelled work equipment;
- (d) where work cannot be done properly unless workers on foot are present, appropriate measures are in place to prevent them from being injured by the work equipment.

7.24.2 Workers should be carried on mobile work equipment only where safe facilities are provided for this purpose.

7.24.3 Where workers are required to work while being carried on mobile work equipment, the speed of the work equipment is adjusted as necessary for the safety of the workers.

7.24.4 Mobile work equipment fitted with a combustion engine is not to be used in working areas, unless sufficient quantities of air can be guaranteed, such that the operation of the combustion engine presents no risk to the health or safety of workers.

7.25 Self Propelled Work Equipment



7.25.1 Where any self-propelled work equipment could present a hazard to health and safety while in motion -

- (a) it is fitted with a means (e.g. a key-operated switch) for preventing its being started by an unauthorised person;
- (b) where there is more than one item of rail-mounted work equipment in motion at the same time, it is fitted with appropriate facilities for minimising the consequences of a collision;
- (c) it is fitted with braking and stopping devices;
- (d) where safety constraints so require, there are emergency facilities operated by a readily accessible control or automatic system for braking and stopping it if the main device fails;
- (e) where the driver's direct field of vision is inadequate to ensure safety, there are adequate devices for improving his vision;
- (f) if used in the dark -
 - (i) it is to be fitted with lighting appropriate to the work to be carried out; and
 - (ii) is otherwise to be sufficiently safe for such use;
- (g) if it or anything carried or towed by it involves a risk from fire and is liable to injure workers, it should carry appropriate fire-fighting appliances, unless such appliances are kept sufficiently close to it.

7.26 Remote Controlled Self Propelled Work Equipment

7.26.1 Where any remote-controlled self-propelled equipment could endanger the safety of workers while it is in motion, it must be set up in such a way that it stops automatically once it leaves its control range. Additionally where it could create a risk to safety from crushing or other impact, it should incorporate features to guard against such risk.

7.27 Drive Units and Power Take-off Shafts

7.27.1 Where the seizure of a drive unit or power take-off could present a risk to workers appropriate measures such as the provision of guards or



other protection devices referred to in paragraph 7.8.1 should be taken to prevent or minimise as far as possible the potential risks from such seizure.

7.27.2 Measures should also be taken by means of an appropriate safeguard, to prevent any drive shaft becoming soiled or damaged by training on the ground as any soiling or damage could result in seizure.

7.28 Duty of Workers

Reg 34

7.28.1 All workers should comply fully with all instructions or training they have been given in respect of their use of any work equipment or health and safety in general. No worker should operate any item of work equipment he is competent, and authorised, to do so.



ANNEX 7.1

INSTRUMENTS WHICH GIVE EFFECT TO COMMUNITY DIRECTIVES CONCERNING THE SAFETY OF PRODUCTS

TITLE	REFERENCE
The Electro-medical Equipment (EEC Requirements) Regulations 1988	S.I. 1988/1586, amended by S.I. 1994/3017 and section 1(2)(a) of the Employment Rights (Dispute Resolution) Act 1998 (c.8)
The Low Voltage Electrical Equipment (Safety) Regulations 1989	S.I. 1989/728, amended by S.I. 1994/3260
The Construction Products Regulations 1991	S.I. 1991/1620, amended by S.I. 1994/3051 and section 1(2)(a) of the Employment Rights (Dispute Resolution) Act 1998 (c.8)
The Simple Pressure Vessels (Safety) Regulations 1991	S.I. 1991/2749, amended by S.I. 1994/3098 and S.I. 2003/1400
The Supply of Machinery (Safety) Regulations 1992	S.I. 1992/3073, amended by S.I. 1994/2063, S.I. 2004/693 and S.I. 2005/831
The Electrical Equipment (Safety) Regulations 1994	S.I. 1994/3260, amended by section 1(2)(a) of the Employment Rights (Dispute Resolution) Act 1998 (c.8) and S.I. 2000/730
The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996	S.I. 1996/192, amended by S.I. 1998/81, S.I. 2001/3766 and S.I. 2005/830
The Lifts Regulations 1997	S.I. 1997/831 amended by S.I. 2004/693 and S.I. 2005/831
The Merchant Shipping (Marine Equipment) Regulations 1999	S.I. 1999/1957, amended by S.I. 2001/1638, S.I. 2004/302 and S.I. 2004/1266
The Pressure Equipment Regulations 1999	S.I. 1999/2001, amended by S.I. 2002/1267 and S.I. 2004/693
The Merchant Shipping and Fishing Vessels (Personal Protective Equipment) Regulations 1999	S.I. 1999/2205
The Radio Equipment and Telecommunications Terminal Equipment Regulations 2000	S.I. 2000/730, amended by S.I. 2003/1903, S.I. 2003/3144 and S.I. 2005/281
The Noise Emission in the Environment by Equipment for Use Outdoors Regulations 2001	S.I. 2001/1701, amended by S.I. 2001/3958 and S.I. 2005/3525
The Medical Devices Regulations 2002	S.I. 2002/618, amended by S.I. 2003/1400, S.I. 2003/1697, S.I. 2005/2759 and S.I. 2005/2909
The Personal Protective Equipment Regulations 2002	S.I. 2002/1144, amended by S.I. 2004/693
The Electromagnetic Compatibility Regulations 2005	S.I. 2005/281, amended by S.I. 2006/1258 and S.I. 2006/1449



SECTION 2

2

PERSONAL HEALTH AND SAFETY



CHAPTER 8

SAFETY INDUCTION

8.1 General

International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978, as amended

8.1.1 Before being assigned to shipboard duties, all persons employed or engaged on a seagoing ship other than passengers, shall receive approved familiarization training in personal survival techniques or receive sufficient information and instruction to be able to:

- communicate with other persons on board on elementary safety matters and understand safety information symbols, signs and alarm signals;
- know what to do if:
 - a person falls overboard,
 - fire or smoke is detected, or
 - the fire or abandon ship alarm is sounded;
- identify muster and embarkation stations and emergency escape routes;
- locate and don lifejackets;
- raise the alarm and have basic knowledge of the use of portable fire extinguishers;
- take immediate action upon encountering an accident or other medical emergency before seeking further medical assistance on board; and
- close and open the fire, weathertight and watertight doors fitted in the particular ship other than those for hull openings.

8.1.2 It is recommended that each Company should design and implement a standard induction programme for each vessel, covering the STCW requirements, and incorporating any expanded detail specific to that vessel's particular needs. This Chapter gives guidance on the subjects to be covered.



8.1.3 On completion of the standard safety induction, it is also recommended that new personnel receive departmental induction covering safe working practices, areas of responsibility, departmental Standing Orders, and training/certification requirements to operate specific machinery or undertake specific tasks.

8.1.4 In addition anyone employed on board a vessel in any capacity with designated safety or pollution-prevention duties should, before being assigned to any of those duties, receive appropriate basic training as listed below relevant to those duties (the tables listed below refer to those in STCW 95):

- personal survival techniques as set out in table A-VI/1-1;
- fire prevention and fire fighting as set out in table A-VI/1-2;
- elementary first aid as set out in table A-VI/1-3; and
- personal safety and social responsibilities as set out in table A-VI/1-4.

8.2 Emergency procedures and fire precautions

MS (Musters, Training and Decision Support Systems) Regs 1999 - SI 1999 No. 2722 MGN 95 (M), MGN 96 (M) and MGN 71 (M)

8.2.1 All new personnel should be given a clear explanation of the vessel's alarm signals, and be given instruction on the emergency assembly stations, lifeboat stations and fire drill/team requirements.

8.2.2 Smoking regulations on the vessel should be strictly observed. Safe and correct disposal of cigarette ends is essential, and "No Smoking" notices should be strictly obeyed.

8.2.3 Fire aboard a vessel can be disastrous. Common causes are:

- faulty electrical appliances/circuitry
- overloading of electrical circuitry
- careless disposal of cigarette ends
- spontaneous combustion of dirty waste/ rags especially if contaminated with oil
- damp storage of linen/materials
- oil spillage/leakage in machinery spaces



- galley fires due to overheating of cooking oils
- carelessness with hand pressing irons
- incorrect methods of drying laundry

8.2.4 Personnel should be made aware of these risks and ensure at all times through good housekeeping, regular inspection and maintenance of electrical circuitry and appliances etc, that fire risks are removed where possible or kept to a minimum.

8.3 Accidents and Medical Emergencies

8.3.1 All personnel should know the action to be taken in cases of accident or medical casualty on board ship. For example, at least they will need to know how to raise the alarm and seek assistance.

8.4 Health and hygiene

8.4.1 It is the responsibility of individuals to ensure high standards of personal hygiene and to look after their own health. Attention should be paid to :

- personal cleanliness
- sensible diet
- adequate sleep during rest periods
- regular exercise
- avoidance of excess alcohol/tobacco
- prompt attention to cuts/abrasions
- maintenance of working clothes and protective equipment in a clean condition
- appropriate dress for the work and climate
- avoidance of recreational drugs.

8.4.2 On international voyages, any vaccinations/inoculations required should be fully updated. Medications for prevention of illness (eg anti-malarial tablets etc.) should be taken as and when required.



8.4.3 In hot climates, it is important to protect skin from strong sunlight and drink plenty of salt-containing liquids to replace the body fluids lost through perspiration.

8.5 Good Housekeeping

8.5.1 All ships move in a seaway and as space is very limited aboard any vessel, good housekeeping is essential for safe working/access and hygiene control. Attention should be paid in particular to the following areas:

- safe and secure stowage of loose items
- proper securing of doors etc.
- good maintenance of fittings and fixtures
- adequate illumination of all work/transit areas
- avoidance of overloading of electrical circuits especially in cabins
- clear and legible signs/operational notices
- proper clearance and disposal of garbage/ waste materials

8.6 Environmental Responsibilities

*MS
(Prevention of
Pollution by
Garbage)
Regs 1998 -
SI 1998 No.
1377 MSN
1807 (M+F)*

8.6.1 The maintenance of good standards to protect the environment, whether local (i.e. accommodation/work areas) or the wider environment is important and is the responsibility of all personnel. Many aspects are covered by international legislation and it is the duty of all personnel to ensure strict compliance with such legislation.

8.6.2 Handling and storage of garbage can present health and safety hazards to crews and ships. Requirements of the garbage management plan should be observed.

8.6.3 Particular attention should be paid to the correct methods of disposal of waste oils (bilge or other), chemicals, galley waste, garbage (especially plastics, glass, drums and other non-biodegradable items), redundant items (moorings, dunnage, cargo cleanings etc.) See Annex 8.1.



8.6.4 Incinerators and compactors should always be operated by competent personnel, and operating instructions should be strictly followed.

8.7 Occupational health and safety

8.7.1 All new personnel should be made aware of the regulations governing occupational health and safety on board, including activity specific regulations, such as those governing the use of lifting plant or means of access. Section 3 of this Code gives advice on complying with the regulations.

8.7.2 Where there are no specific regulations, the general duties contained in the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 apply. The main principle contained in these regulations is that all safety measures should be based on an assessment of the risks involved in a particular task, and the identification of the most effective measures to limit that risk. Guidance on risk assessment is in Chapter 1.

8.8 Employer and worker responsibilities

8.8.1 All new personnel should be informed of their employer's duties in respect of health and safety. The details are in the regulatory framework at the start of this Code.

8.8.2 It is particularly important that they are reminded to follow any training, oral or written instructions they have been given, and know to whom they should report any deficiencies in equipment or unsafe practices they may notice.

8.8.3 Personnel who find any defects in any equipment, or a condition they believe to be hazardous or unsafe, should immediately report it to a responsible person, who should take appropriate action.



8.9 Consultation procedures

8.9.1 New personnel must be told about the procedures for consultation on health and safety matters, who their safety representatives are (where applicable) and should be encouraged to contribute ideas to improve safety.



ANNEX 8.1

Merchant Shipping (Prevention of Pollution by Garbage) Regulations 1998 Statutory Instrument 1998 No. 1377

SUMMARY OF AT SEA GARBAGE DISPOSAL REGULATIONS

GARBAGE TYPE	ALL SHIPS EXCEPT PLATFORMS— Note 3		OFFSHORE PLATFORMS Note 3
	OUTSIDE SPECIAL AREAS	IN SPECIAL AREAS Note 1	
Plastics-include synthetic ropes and fishing nets and plastic garbage bags	Disposal prohibited	Disposal prohibited	Disposal prohibited
Floating dunnage, lining and packing materials	> 25 miles offshore	Disposal prohibited	Disposal prohibited
Paper, rags, glass, metal, bottles, crockery and similar refuse	> 12 miles	Disposal prohibited	Disposal prohibited
All other garbage including paper, rags, glass, etc comminuted or ground - Note 2	> 3 miles	Disposal prohibited	Disposal prohibited
Food waste not comminuted or ground	>12 miles	>12 miles -Note 6	Disposal prohibited
Food waste comminuted or ground	>3 miles	> 12 miles -Notes 5, 6	> 12 miles
Mixed refuse types	Note 4	Note 4	Note 4

Notes

- 1 "Special areas" are as defined in the Regulations.
- 2 Comminuted or ground garbage must be able to pass through a screen with mesh size no larger than 25mm.
- 3 Offshore platforms and associated ships include all fixed or floating platforms engaged in exploration or exploitation of seabed mineral resources, and all ships alongside or within 500 m of such platforms.
- 4 When garbage is mixed with other harmful substances having different disposal or discharge requirements, the more stringent requirements shall apply.
- 5 >3 miles for Wider Caribbean.
- 6 A UK ship shall not enter the Antarctic unless:
 - (a) it has sufficient capacity for the retention on board for all garbage while operating in the area.
 - (b) it has concluded arrangements for the retention of retained garbage at a reception facility after it has left the area.



CHAPTER 9

FIRE PRECAUTIONS

9.1 General

9.1.1 The prevention of fire on board ship is of utmost importance. Sections 9.2 to 9.6 of this chapter outline some important organisational measures that can be taken to reduce the risk of fire. Advice to seafarers is included in Chapter 10.

9.1.2 Chapter 10 deals with action in the event of fire and other emergency procedures.

9.2 Smoking

9.2.1 Conspicuous warning notices should be displayed in any part of the ship where smoking is forbidden (permanently or temporarily) and observance of them should be strictly enforced. Ashtrays or other suitable containers should be provided and used at places where smoking is authorised.

9.3 Electrical and other fittings

9.3.1 All electrical appliances should be firmly secured and served by permanent connections whenever possible.

9.3.2 Flexible leads should be as short as practicable and so arranged as to prevent their being chafed or cut in service.

9.3.3 Makeshift plugs, sockets and fuses should not be used.

9.3.4 Circuits should not be overloaded since this causes the wires to overheat, destroying insulation and thus resulting in a possible short-circuit which could start a fire. Notices should be displayed warning that approval



should be obtained from a responsible officer to connect any personal electrical appliances to the ship's supply.

9.3.5 All portable electrical appliances, lights etc should have insulation readings taken before use, and should be isolated from the mains after use.

9.3.6 Electrical equipment which is to be used in any cargo area should be of an approved design.

9.3.7 It is important that all fixed electric heaters are fitted with suitable guards securely attached to the heater and that the guards are maintained in position at all times. Drying clothing on or above the heaters should not be permitted and suitably designed equipment should be supplied, or areas designated.

9.3.8 When using drying cabinets or similar appliances, the ventilation apertures should not be obscured by overfilling of the drying space. Any screens or fine mesh covers around the ventilation apertures should be regularly inspected and cleaned, so that they do not become blocked by accumulated fluff from clothing.

9.3.9 The use of portable heaters should be avoided wherever possible. However, if they are required while the ship is in port (as temporary heating during repairs and as additional heating during inclement weather), a protective sheet of a non-combustible material should be provided to stand them on to protect wooden floors or bulkheads, carpets or linoleum. Portable heaters should be provided with suitable guards and should not be positioned close to furniture or other fittings. These heaters should never be used for drying clothes etc.

9.3.10 Personal portable space-heating appliances of any sort should not be used at sea and notices to this effect should be displayed.



9.3.11 The construction and installation of electric heaters should always be carried out in accordance with the relevant regulations and instructions or guidance supplied by the manufacturer.

9.4 Spontaneous combustion

9.4.1 Dirty waste, rags, sawdust and other rubbish - especially if contaminated with oil - may generate heat spontaneously which may be sufficient to ignite flammable mixtures or may set the rubbish itself on fire. Such waste and rubbish should therefore be properly stored until it can be safely disposed of.

9.4.2 Materials in ship's stores, including linen, blankets and similar absorbent materials are also liable to ignite by spontaneous combustion if damp or contaminated by oil. Strict vigilance, careful stowage and suitable ventilation are necessary to guard against such a possibility. If such materials become damp, they should be dried before being stowed away. If oil has soaked into them, they should be cleaned and dried, or destroyed. They should not be stowed in close proximity to oil or paints, or on or near to steam pipes.

9.5 Machinery spaces

9.5.1 All personnel should be made fully aware of the precautions necessary to prevent fire in machinery spaces - in particular, the maintenance of clean conditions, the prevention of oil leakage and the removal of all combustible materials from vulnerable positions (see Chapters 15 and 22).

9.5.2 Suitable metal containers should be provided for the storage of cotton waste, cleaning rags or similar materials after use. Such containers should be emptied at frequent intervals and the contents safely disposed of.

9.5.3 Wood, paints, spirits and tins of oil should not be kept in boiler rooms or machinery spaces including steering gear compartments.



9.5.4 All electric wiring should be well maintained and kept clean and dry. The rated load capacity of the wires and fuses should never be exceeded.

9.6 Galleys

9.6.1 Galleys and pantries present particular fire risks (see Chapter 14). Care should be taken in particular to avoid overheating or spilling fat or oil and to ensure that burners or heating plates are shut off when cooking is finished. Extractor flues and ranges etc should always be kept clean.

9.6.2 Means to smother fat or cooking oil fires, such as a fire blanket, should be readily available close to stoves. Remote cut-offs and stops should be conspicuously marked and known to galley staff.



CHAPTER 10

EMERGENCY PROCEDURES

10.1 Action in the event of fire

10.1.1 The risk of fire breaking out on board a ship cannot be eliminated but its effects will be much reduced if the advice given in this Chapter is conscientiously followed.

10.1.2 Training in fire-fighting procedures and maintenance of equipment should be assured by regular drills in accordance with section 10.2. Access to fire-fighting equipment should be kept clear at all times and emergency escapes and passage ways should never be obstructed.

10.1.3 A fire can usually be put out most easily in its first few minutes. Prompt and correct action is essential.

10.1.4 The alarm should be raised and the bridge informed immediately. If the ship is in port, the local fire authority should be called. If possible, an attempt should be made to extinguish or limit the fire, by any appropriate means readily available, either using suitable portable extinguishers or by smothering the fire as in the instance of a fat or oil fire in the galley.

10.1.5 The different types of portable fire extinguishers on board are appropriate to different types of fire. Water extinguishers should not be used on oil or electric fires.

10.1.6 Openings to the space should be shut to reduce the supply of air to the fire and to prevent it spreading. Any fuel lines feeding the fire or threatened by it should be isolated. If practicable combustible materials adjacent to the fire should be removed.



10.1.7 If a space is filling with smoke and fumes, any personnel not properly equipped with breathing apparatus should get out of the space without delay; if necessary, escape should be effected by crawling on hands and knees because air close to deck level is likely to be relatively clear.

10.1.8 After a fire has been extinguished, precautions should be taken against its spontaneous re-ignition.

10.1.9 Personnel should not re-enter a space until it has been fully ventilated in which a fire has occurred without wearing breathing apparatus.

MS (Musters, Training and Decision Support System) Regs 1999 - SI 1999 No. 2722

MGN71 (M) and Merchant Shipping Notice 1579

10.2 Musters and drills

10.2.1 Musters and drills are required to be carried out regularly in accordance with merchant shipping regulations. The guidance contained in this and the following sections should be read in conjunction with information and guidance on these regulations issued in the relevant Merchant Shipping Notices (MSNs, MGNs, MIINs).

10.2.2 Musters and drills are designed to prepare a trained and organised response to dangerous situations which may unexpectedly threaten loss of life at sea. It is important that they should be carried out realistically, approaching as closely as possible to emergency conditions. Changes in the ship's function and changes in the ship's personnel from time to time should be reflected in corresponding changes in the muster arrangements.

10.2.3 The muster list must be conspicuously posted before the ship sails and, on international voyages and in ships of Classes IIA and III should be supplemented by emergency instructions for each crew member (eg in the form of a card issued to each crew member or affixed to individual crew berths and bunks). These instructions should describe the allocated assembly station, survival craft station and emergency duty and all emergency signals and action, if any, to be taken on hearing such signals.

MS (Musters, Training) Regs SI 1986 No. 1071 Reg 5(2), (3) and (8)



10.2.4 An abandon ship drill and a fire drill must be held within 24 hours of leaving port if more than 25% of the crew have not taken part in drills on board the ship in the previous month. As soon as possible but not later than two weeks after joining the ship, onboard training in the use of the ship's life-saving appliances, including survival craft equipment, must be given to crew members. As soon as possible after joining the ship, crew members should also familiarise themselves with their emergency duties, the significance of the various alarm systems and the locations of their lifeboat station and of all lifesaving and fire fighting equipment.

10.2.5 All the ship's personnel concerned should muster/assemble at a drill wearing lifejackets properly secured. The lifejackets should continue to be worn during lifeboat drills and launchings but in other cases may be subsequently removed at the Master's discretion if they would impede or make unduly onerous the ensuing practice, provided they are kept ready to hand.

10.2.6 The timing of emergency drills should vary so that personnel who have not participated in a particular drill may take part in the next.

10.2.7 Any defects or deficiencies revealed during drills and the inspections which accompany them should be made good without delay.

10.3 Fire drills

10.3.1 Efficient fire-fighting demands the full co-operation of personnel in all departments of the ship. A fire drill should be held simultaneously with the first stage of the abandon ship drill. Fire-fighting parties should assemble at their designated stations. Engine room personnel should start the fire pumps in machinery spaces and see that full pressure is put on fire mains. Any emergency pump situated outside machinery spaces should also be started; all members of the crew should know how to start and operate the emergency pump.



10.3.2 The fire parties should be sent from their designated stations to the selected site of the supposed fire, taking with them emergency equipment such as axes and lamps and breathing apparatus. The locations should be changed in successive drills to give practice in differing conditions and in dealing with different types of fire so that accommodation, machinery spaces store rooms, galleys and cargo holds or areas of high fire hazard are all covered from time to time.

10.3.3 An adequate number of hoses to deal with the assumed fire should be realistically deployed. At some stage in the drill, they should be tested by bringing them into use, firstly with water provided by the machinery space pump and secondly with water provided by the emergency pump alone.

10.3.4 The drill should extend, where practicable, to the testing and demonstration of the remote controls for ventilating fans, fuel pumps and fuel tank valves, the closing of openings and the appropriate isolation of electrical equipment.

10.3.5 Fixed fire extinguishing installations should be tested to the extent practicable.

10.3.6 Portable fire extinguishers should be available for demonstration of the manner of their use. They should include the different types applicable to different kinds of fire. At each drill, one extinguisher or more should be operated by a member of the fire party, a different member on each occasion. Extinguishers so used should be recharged before being returned to their normal location or sufficient spares should otherwise be carried for demonstration purposes.

10.3.7 Breathing apparatus should be worn by members of the fire-fighting parties so each member in turn has experience of its use. Search



and rescue exercises should be undertaken in various parts of the ship. The apparatus should be cleaned and verified to be in good order before it is stowed; cylinders of self-contained breathing apparatus should be recharged or sufficient spare cylinders otherwise carried for this purpose.

MS
(Passenger
Ship
Construction
Ships of
Classes I, II
and III(A))
Regs 1998 -
SI 1998 No.
2514

10.3.8 In addition to the statutory inspection, fire appliances, fire and watertight doors, other closing appliances, and fire detection and alarm systems which have not been used in the drill should be inspected, either at the time of the drill or immediately afterwards.

10.4 Survival craft drills

MSN 1722
(M+F)

10.4.1 When arranging drills reference should be made to the relevant M Notice. Arrangements for drills should take account of prevailing weather conditions.

10.4.2 Crew members taking part in life-raft or lifeboat drills should muster wearing warm outer clothing and lifejackets properly secured.

10.4.3 Where appropriate, the lowering gear and chocks should be inspected and a check made to ensure that all working parts are well lubricated.

10.4.4 When turning out davits or when bringing boats or rafts inboard under power, seamen should always keep clear of any moving parts.

10.4.5 The engines on motor lifeboats should be started and run ahead and astern. Care should be taken to avoid overheating the engine and the propeller shaft stern gland. All personnel should be familiar with the engine starting procedure.

10.4.6 Hand-operated mechanical propelling gear, if any, should be examined and similarly tested.



10.4.7 Radio life-saving appliances should be examined and tested, and the crew instructed in their use.

10.4.8 Water spray systems, where fitted, should be tested in accordance with the lifeboat manufacturer's instructions.

MS (Musters, Training and Decision Support Systems) Regs 1999 - SI 1999 No. 2722 Reg 10 (6)

10.4.9 When a drill is held in port, as many as possible of the lifeboats should be cleared and swung out. Each lifeboat should be launched and manoeuvred in the water at least once every three months. Where launching of free-fall lifeboats is impracticable, they may be lowered into the water provided that they are free-fall launched at least once every six months. However, this may be extended to twelve months provided that arrangements are made for simulated launching which will take place at intervals not exceeding six months.

Reg 10 (7)

10.4.10 When fast rescue boats/rescue boats are carried which are not also lifeboats they should be launched and manoeuvred in the water every month so far as is reasonable and practicable. The interval between such drills must not exceed three months.

10.4.11 Where simultaneous off-load/on-load release arrangements are provided great care should be exercised to ensure that the hooks are fully engaged before a boat is recovered, after it has been stowed and prior to launching.

10.4.12 Where davit-launched liferafts are carried then on-board training, including an inflation, must be carried out at intervals not exceeding four months. Great care should be taken that the hook is properly engaged before taking the weight of the raft. The release mechanism should not be cocked until just prior to the raft landing in the water. If the raft used for the inflation is part of the ship's statutory equipment and not a special training raft, then it **MUST** be repacked at an approved service station.



10.4.13 Where the handle of the lifeboat winch would rotate during the operation of the winch, it should be removed before the boat is lowered on the brake or raised with an electric motor. If a handle cannot be removed, personnel should keep well clear of it.

10.4.14 Personnel in a fast rescue boat/rescue boat or survival craft being lowered should remain seated, keeping their hands inside the gunwale to avoid them being crushed against the ship's side. Lifejackets should be worn. In totally enclosed lifeboats seat belts should be secured. Only the launching crew should remain in a lifeboat being raised.

10.4.15 During drills, lifebuoys and lines should be readily available at the point of embarkation.

10.4.16 While craft are in the water, crews should practice manoeuvring the vessel by oar, or the appropriate motive power and should operate the water spray system when fitted on enclosed lifeboats.

10.4.17 Seamen should keep their fingers clear of the long-link when unhooking or securing blocks onto lifting hooks while the boat is in the water, and particularly if there is a swell.

10.4.18 Before craft in gravity davits are recovered by power, the operation of the limit switches or similar devices should be checked.

10.4.19 A portable hoist unit to recover a craft should be provided with a clutch or have an attachment to resist the torque. These should be checked. If neither device is available, the craft should be raised by hand.

10.4.20 Where liferafts are carried, instruction should be given to the ship's personnel in their launching handling and operation. Methods of boarding them and the disposition of equipment and stores on them should be explained.



10.4.21 The statutory scale of life-saving appliances must be maintained at all times. If the use of a liferaft for practice would bring equipment below the specified scale, a replacement must first be made available.

10.5 Drills and rescue from dangerous spaces (Chapter 17 should be read in conjunction with these guidelines where more information can be found)

10.5.1 There is a statutory requirement for drills simulating the rescue of an incapacitated person from a dangerous space to be carried out every two months. Each drill should be recorded in the official log book. A drill should normally be held soon after significant changes in crew members.

10.5.2 Any attempt to rescue a person who has collapsed within a space should be based on a pre-arranged plan, which should take account of the design of the individual ship. Allocation of personnel to relieve or back-up those first into the space should be borne in mind.

10.5.3 Regular drills should prove the feasibility of the ship's rescue plan under different and difficult circumstances. The space should be made safe or, for operational convenience, a non-dangerous space may be used, provided that it provides realistic conditions for an actual rescue.

10.5.4 If there are indications that the person in the space is being affected by the atmosphere, the person outside the space should immediately raise the alarm. ON NO ACCOUNT SHOULD THE PERSON STATIONED AT THE ENTRANCE TO THE SPACE ATTEMPT TO ENTER IT BEFORE ADDITIONAL HELP HAS ARRIVED. NO ONE SHOULD ATTEMPT A RESCUE WITHOUT WEARING BREATHING APPARATUS AND A RESCUE HARNESS AND, WHENEVER POSSIBLE, USE OF A LIFELINE.



10.6 Assisting a casualty

10.6.1 Anyone on board ship may find a casualty, and everyone should know the basic priorities for action, the positioning of an unconscious casualty and how to give artificial respiration. These actions may save life until more qualified help arrives.

- Personnel encountering a casualty should first ensure that they are not themselves at risk.
- If necessary the casualty should be removed from danger, or danger removed from the casualty - BUT SEE BELOW ON CASUALTIES IN AN ENCLOSED SPACE
- **If there is only one unconscious casualty** (irrespective of the total number of casualties)
 - immediate basic treatment should be given to the unconscious casualty;
 - then help should be summoned.
- **If there is more than one unconscious casualty**
 - help should be summoned first;
 - then appropriate treatment should be given, priority being given to any casualty with stopped breathing/heart.
- **If the unconscious casualty is in an enclosed space:**
 - personnel **MUST NOT** enter the enclosed space unless they are a trained member of a rescue team acting upon instruction.
 - help should be summoned and the master informed.
 - it must be assumed that the atmosphere in the space is unsafe. The rescue team must not enter unless wearing breathing apparatus
 - separate breathing apparatus or resuscitation equipment should also be fitted on the casualty as soon as possible.
 - the casualty should be removed quickly to the nearest safe adjacent area outside the enclosed space unless his injuries and the likely time of evacuation makes some treatment essential before he is moved.



10.6.2 Should it be necessary to remove injured persons from a hold, the best available method should be adopted but where practicable all access openings should be opened and the following equipment used where available:

- (a) a manually-operated davit, suitably secured over the access opening;
- (b) a cage or stretcher fitted with controlling lines at the lower end.

10.6.3 Casualties who have been exposed to a hazardous chemical should rest quietly and be observed for at least 24 hours, in case any complications arise.

10.7 Dangerous Goods

10.7.1 Emergency responses to spillage of dangerous goods are contained in the IMO Medical First Aid Guide and the IMO Emergency Procedures for Ships Carrying Dangerous Goods (EmS). Both of these are available either as free-standing documents or incorporated into the International Maritime Dangerous Goods (IMDG) Code.

General

10.7.2 Recommendations on emergency action differ depending on where the goods are stowed and whether a substance is gaseous, liquid or solid. When dealing with incidents involving flammable gases or flammable liquids, all sources of ignition (eg naked lights, unprotected light bulbs, electric handtools) should be avoided.

10.7.3 Normally dangerous goods in packaged form can be handled without the use of special protective clothing or equipment. If the packaging has been damaged the contents may have spilt or leaked. Under these circumstances the emergency team may have to deal with toxic corrosive or flammable solids, liquids or vapours. Vapours may arise from a spilt substance itself or as a result of the reaction between spilt substances



themselves and other materials. Eye protection should always be worn, and if hazardous dust may be encountered, respiratory protection should be used - where the substance offers a significant toxic hazard this should be self-contained breathing apparatus.

Spillages

10.7.4 In general the recommendation is to wash spillages on deck overboard with copious quantities of water, and, where there is likely to be a dangerous reaction with water, from as far away as practicable. Disposal of dangerous goods overboard is a matter for judgement by the master, bearing in mind that the safety of the crew has priority over pollution of the sea. If it is safe to do so, spillages and leakages of substances, articles and materials identified in the IMDG Code as MARINE POLLUTANT should be collected for safe disposal. Absorbent material should be used for liquids.

10.7.5 Spillages collected with absorbent material and kept in plastic bags or other receptacles may need to be stowed safely for ultimate disposal ashore. Collection of spillages with absorbent material under deck may not be fully effective, and precautions for entry into enclosed spaces should be observed.

10.7.6 A careful inspection for structural damage should be carried out after dealing with spillages of highly corrosive substances.

Fire

10.7.7 Water is generally recommended as the fire fighting medium for most dangerous goods at sea. However, reference should be made to the relevant EmS schedules.

10.7.8 Where possible, a package should be removed from the vicinity of the fire. Where there is a possibility that the heat will cause a chemical or



physical change in the substance, or affect the integrity of a package, leading to rupture and dispersal of the contents, keeping the packages cool may limit the hazard. Care should be exercised with those substances liable to polymerise, as this reaction can continue long after the removal of external heat.

10.7.9 For incidents under deck, the best course of fire fighting will usually be to batten down the hatch, exclude all ventilation and operate the fixed fire-fighting installation. Self-contained breathing apparatus should be worn when battening down the hatches or if there is any need to enter the space, for example after the fire is out.

10.7.10 For certain substances which are highly reactive with water; only the use of dry chemical fire extinguishers is recommended. This would not preclude the use of suitable powdered inert material if available in sufficient quantity. The only alternative is the use of copious quantities of water; which will have a cooling effect on the fire, although reacting with the substance.

10.7.11 Where an EmS advises against the use of foam, this does not preclude the use of special foams.

10.7.12 The general fire-fighting recommendations for a number of dangerous goods suggest that they should be jettisoned if there is a likelihood of their involvement in a fire. Where full or nearly full container loads or other units are concerned, this may be impractical, in which case everything possible should be done to prevent the spread of fire to those containers. If, despite preventive measures, fire seems likely to affect these containers, it should be borne in mind the contents may burn with explosive violence and personnel should be withdrawn accordingly.



CHAPTER 11

SECURITY ON BOARD

11.1 Introduction

*EU Reg 725
& MS Ship
and Port
Facility
(Security
Regulations)
SI 2004
No 1495*

11.1.1 Shipboard security is essential in reducing the risks of terrorism, stowaways, piracy and drug smuggling. The International Ship and Port Facility Security (ISPS) Code published by the International Maritime Organisation, was introduced on 1 July 2004 and provides a framework through which ships and port facilities can co-operate to detect and deter acts which threaten security in the maritime transport sector:

11.2 Ship Security Plans

*International
Ship and
Port Facility
Security
(ISPS) Code,
2003*

11.2.1 The ISPS Code requires internationally trading ships to have on board an approved Ship Security Plan (SSP) to prevent acts of terrorism and have an appointed Ship Security Officer (SSO). The ISPS Code requires the shipping company to appoint a Company Security Officer (CSO) who is responsible maintaining the security infrastructure of the company's ships.

11.2.2 The SSP covers amongst other criteria the procedures required at different security levels:

- to prevent unauthorised weapons, dangerous substances and devices intended for use against persons, ships or ports from being taken aboard,
- to prevent unauthorised access to the ship,
- to respond to security threats or breaches of security,
- for the use of the ship security alert system, and
- to maintain the ship's security infrastructure.



11.2.3 The SSP is protected from unauthorised access or disclosure, which may include restricted distribution of copies amongst ship's crew. The SSP will also specify the frequency of training drills and exercises. The SSO is responsible for enhancing security awareness and vigilance on board and ensuring that adequate training has been provided to those with security responsibilities.

11.2.4 The Maritime and Coastguard Agency has provided guidance on compiling SSPs and a model SSP directed to shipping companies with ships on the UK register. For information please contact the Maritime Security Branch on 02380 329478, or follow the link on the MCA website [Home > Ships and Cargoes > Legislation and Guidance > International Ship and Port Facility Security \(ISPS\) Code](#). Further guidance is available from other organisations to assist shipping companies in preparing SSPs that comply with the ISPS Code.

11.3 Security Levels

ISPS Code
A/7

11.3.1 Governments are required to set one of three security levels for ships flying their flag, and for ports under the Government's control. The ship is required to maintain the security level set by the Government of the port it is entering unless the ship's Government requires a higher security level to be maintained.

ISPS Code
A/2.1.9

11.3.2 Security Level 1 is the level for which minimum appropriate protective security measures shall be maintained at all times.

ISPS Code
A/2.1.10

11.3.3 Security Level 2 is the level for which appropriate additional protective security measures shall be maintained for a period of time as a result of a heightened risk of a security incident.

ISPS Code
A/2.1.11

11.3.4 Security Level 3 is the level for which further specific protective security measures shall be maintained for a limited period of time when a



security incident is probable or imminent, although it may not be possible to identify the specific target. When Governments set security level 3 they will issue, as necessary, appropriate instructions and provide security-related information to the ships affected.

11.3.5 For British ships the Transport Security Directorate (TRANSEC) of the Department for Transport is responsible for setting the security levels and communicates changes direct to CSOs for onward transmission to ships. They can be contacted on +44 (0)207 944 2844. Different security levels may apply to different countries.

11.4 International terrorism

11.4.1 The chances of a ship experiencing a terrorist attack are very low, but attacks do happen. The main threat is from people trying to smuggle weapons and explosives on board. An appropriate sign at all access points stating that “all items brought on board this ship are liable to be searched” will act as a deterrent. Other security measures that may be considered include surveillance and detection equipment.

11.5 Stowaways

*MGN 70(M)
Guidelines on
the allocation
of responsibilities
to seek the
successful
conclusion of
stowaway
cases*

11.5.1 If there is any likelihood of stowaways, a thorough search of the vessel should be made before departure. It is easiest to send stowaways ashore in the port where they boarded, and they may hide in places which are secured at sea and which may be deficient in oxygen so that they suffocate or starve, or in holds which may be fumigated.

11.6 Piracy and Armed Robbery

*MGN 241 (M)
Measures to
Counter Piracy and
Armed Robbery
and other acts of
Violence against
Merchant Ships*

11.6.1 The latest information on piracy attacks and the regions at greatest risk may be obtained from the International Chamber of Commerce Piracy Reporting Centre who can be contacted via the International Maritime Bureau: ICC IMB (Far Eastern Regional Office), PO Box 1255950782, Kuala Lumpur, Malaysia.
Telephone: +60 3 2078 5763, Fax: +60 3 2078 5769,



11.6.2 The dangers to a vessel can be significantly reduced if the ship's crew take relatively simple precautions, such as remaining vigilant and keeping means of access closed as much as possible, particularly access to crew accommodation.

11.6.3 All ships operating in waters where attacks occur should have an anti attack plan. The plan should, *inter alia*, cover:

- the need for enhanced surveillance and the use of lighting and surveillance or detection equipment;
- crew responses if a potential attack is detected or an attack is underway;
- minimising the opportunity to steal cargo, stores or personal effects;
- ensuring the safety of the ships crew and passengers.
- details of the radio and alarm procedures to be followed, and
- the reports that should be made after an attack, or attempted attack.

11.6.4 The SSP contains details of precautionary measures that are to be taken. The following notes are for guidance only based of advice from security experts:

- **Be vigilant** — the majority of attacks will be deterred if the robbers are aware that they have been observed, and that the crew has been alerted and is prepared to resist attempts to board. Ensure that crew members are constantly seen to be moving around the ship, making random rather than predictable patrols.
- **Maintain a 24 hour visual and security watch** — including shortrange radar surveillance of the waters around the ship. The use of a small yacht radar, fitted in such a way as to ensure complete coverage of the stern, unobscured by the radar shadow of the ship itself, should be considered. Keep a special lookout for small boats and fishing boats that pirates often use because they are difficult to observe on radar. In



piracy blackspots, discourage the crew from trading with locals using small craft which may approach the ship.

- **Strengthen night watches** — especially around the rear of the ship and particularly between the hours of 0100 and 0600 when most attacks occur; with continuous patrols linked by “walkietalkie” to the bridge. A drill should be established for regular twoway communication between the watch and the bridge. If possible, an additional officer should assist the normal bridge watchkeepers at night, in order to provide a dedicated radar and visual watch for small craft which might attempt to manoeuvre alongside, and allow the watchkeepers to concentrate on normal navigational duties.
- **Seal off means of access to the ship** — fit hawse pipe plates, lock doors and hatches etc. While taking due account of the need for escape in the event of fire or other emergency, so far as possible all means of access to the accommodation should be sealed off and windows and doors of crews quarters should be kept locked at all times. Blocking access between the aft deck and the crews quarters is particularly important.
- **Establish radio (VHF) contact** — and agree emergency signals specifically for pirate attacks with:
 - crew
 - ships in the vicinity
 - shore authorities
- **Locate an emergency VHF set** — away from the master's cabin and the radio room which are often the first targets.
- **Provide adequate lighting** — deck and overside lights, particularly at the bow and stern, should be provided to illuminate the deck and the waters beyond and to dazzle potential boarders. Searchlights should be available on the bridge wings, and torches carried by the security patrols to identify suspicious craft. Such additional lighting should not however, be so bright as to obscure navigation lights or to interfere with the safe navigation of other vessels.



- **Water hose and any other equipment** — which may be used to repel potential boarders should be readily available. Keep a constant supply of water provided to the hoses. In danger areas keep the deck wash pump in operation at all times spray water over the rear deck where it is easiest for the attackers to board.
- **Reduce opportunities for theft** — remove all portable equipment from the deck, so far as is possible stow containers containing valuables door to door and in tiers, seal off access to the accommodation.
- **Establish a secure area or areas** — if large numbers of armed robbers succeed in boarding the ship, it may be essential for crew members to retreat to a secure area or areas. Depending upon the construction of the accommodation and the extent to which areas can be effectively sealed off, the secure area may be established in the accommodation as a whole, or in more restricted parts around the bridge and inside the engine room. Provision should be made, however for escape during a fire or other emergency.
- **Inform crew of the security plan** — hold a training exercise and ensure that they are fully briefed on the actions to take in the event of an attack by armed robbers.

11.6.5 If pirates succeed in boarding the vessel, resistance and confrontation are not recommended as the likelihood of violence will undoubtedly be magnified. Agreeing to the demands of the attackers will hopefully keep the unwelcome visit brief, thereby allowing full control of the ship to be regained as soon as possible. Crew members can assist passively by mentally noting as many details as possible and pooling such information later on.

11.7 Drugs

11.7.1 Another benefit of good security is preventing illegal drugs being smuggled aboard. Personnel should be alert to the possibility, and should be made aware of the procedures to follow if such substances are found or the activity is suspected.



11.8 Travel Advice Notices

11.8.1 Information on personal safety is available through the Foreign and Commonwealth Office (FCO) and can be obtained by contacting the FCO or British Embassies, High Commissions and Consulates in the area concerned.

11.8.2 The full range of FCO Travel Advice Notices for over 200 countries based on the most accurate and up-to-date information available can be viewed by following the links at www.fco.gov.uk or by telephoning 0845 850 2829 (24hrs, 7 Days a week).



CHAPTER 12

LIVING ON BOARD

12.1 General

12.1.1 The aim of the Code as a whole is to provide information and guidance aimed at improving the health and safety of those living and working on board ship. This chapter gives some more specific advice for the individual seafarer.

12.2 Health and hygiene

12.2.1 It is the seafarer's responsibility to look after his own health and fitness. High standards of personal cleanliness and hygiene should be maintained.

12.2.2 On board ship, simple infections can easily be spread from one person to others. Thus preventive measures, as well as easily effective treatment, are essential.

12.2.3 Good health depends on sensible diet, adequate sleep and avoidance of recreational drugs, and substance or drug misuse, excesses of alcohol and tobacco. Regular exercise is also beneficial in maintaining good health.

12.2.4 Treatment should be sought straight away for minor injuries; cuts and abrasions should be cleaned and first aid treatment given as necessary to protect against infection. Barrier creams may help to protect exposed skin against dermatitis and also make thorough cleansing easier.

12.2.5 The risk of contracting malaria in infected areas can be much reduced by taking precautions to avoid mosquito bites, for example by using mosquito wire-screening and nets, keeping openings closed, and using anti-

MGN 399
(M+F)



mosquito preparations or insecticides. Further guidance is included in Merchant Shipping Notice MGN399 (M+F).

12.2.6 Rats and other rodents may be carriers of infection and should never be handled, dead or alive, with bare hands.

Medication

MSN
1822(M)

12.2.7 Anyone taking medication, particularly any medication which may affect alertness, should notify a responsible officer, so that allowance may be made in allocating tasks.

12.2.8 Drinking alcohol whilst under treatment with medication should be avoided, since even common remedies such as aspirin, seasickness tablets, anti-malarial tablets and codeine may be dangerous in conjunction with alcohol.

12.2.9 The individual has a responsibility to ensure that inoculations and vaccinations required for international voyages are kept up to date and medications for the prevention of illness, such as suitable anti-malarial tablets, are taken when required.

12.2.10 Personnel on board ship are trained and equipped to provide initial medical care for the range of health problems that may arise. If a worker develops a serious health problem or suffers a serious injury, medical advice should be obtained by radio. Where necessary, arrangements may be made to transport the sick or injured worker ashore for medical treatment. Further advice on medical care is contained in the Ship Captain's Medical Guide.

12.3 Working in hot climates

12.3.1 High humidity and heat can lead to heat exhaustion and heat stroke. Perspiration is the body's best heat control mechanism, but sweat consists mainly of salt and water which must be replaced. When working in these conditions it is advisable to drink at least 4.5 litres (8 pints) of cool (but



not iced) water daily. It is best to take small quantities at frequent intervals. Salt can be taken in food, supplemented by salt-containing drinks to prevent heat cramps. Alcohol should be avoided.

12.3.2 If working in enclosed spaces, they should be well ventilated. The minimum of light clothing should be worn, in order to allow the largest possible surface for free evaporation of sweat.

12.3.3 In tropical areas especially, exposure to the sun, particularly during the hottest part of the day, should be avoided as far as possible. When it is necessary to work in very strong sunlight, appropriate clothing offering protection to both head and body should be worn. Light cotton clothing will reflect the heat and help to keep the body temperature down.

12.3.4 When working in exceptionally hot and/or humid conditions or when wearing respiratory equipment, breaks at intervals in the fresh air or in the shade may be necessary.

12.4 Working clothes

12.4.1 Clothing should be appropriate for the working conditions. Working clothes should be close-fitting with no loose flaps, pockets or ties, which could become caught up in moving parts of machinery or on obstructions or projections. Where there is a risk of burning or scalding, as in galleys, clothing should adequately cover the body and material should be of low flammability, such as cotton or a cotton/terylene mix.

12.4.2 Shirts or overalls provide better protection if they have long sleeves. Long sleeves should not be rolled up. Long hair should be tied back and covered. Industrial or safety footwear should be worn when appropriate.

12.5 Shipboard housekeeping

12.5.1 Good housekeeping is an essential element in promoting health and safety on board;



- equipment and other items should be safely and securely stored. This ensures not only that defects are discovered but articles can be found when required;
- fixtures and fittings should be properly maintained;
- all work and transit areas should be adequately lit;
- electric circuits should not be overloaded, particularly in cabins;
- garbage and waste materials should be cleared up and disposed of correctly and promptly;
- doors and drawers should be properly secured.
- instruction plates, notices and operating indicators should be kept clean and legible.

12.5.2 Many aerosols have volatile and inflammable contents. They should never be used or placed near naked flames or other heat source even when 'empty'. Empty canisters should be properly disposed of.

12.5.3 Some fumigating or insecticidal sprays contain ingredients which, though perhaps themselves harmless to human beings, may be decomposed when heated. Smoking may be dangerous in sprayed atmospheres while the spray persists.

12.6 Substances hazardous to health

12.6.1 Many substances found on ships are capable of damaging the health of those exposed to them. They include not only recognised hazard substances, such as dangerous goods cargoes and asbestos, but also some domestic substances. For example caustic soda and bleaching powders or liquids can burn or penetrate the skin. They may react dangerously with other substances and ought never to be mixed.

12.6.2 The employer's risk assessment will identify when personnel are working in the presence of substances hazardous to health, and evaluate the risks (see Chapter 1 and Chapter 27). Appropriate measures should be taken to remove, control or minimise the risk.



12.6.3 It is important to read carefully all labels on chemical containers before opening them, to find out about any hazards from the contents. A chemical from an unlabelled container should never be used unless it is clearly established what it is.

12.6.4 If asbestos-containing panels, cladding or insulation become loose or are damaged in the course of a voyage, pending proper repair, the exposed edges or surfaces should be protected by a suitable coating or covering to prevent asbestos fibres being released and dispersed in the air.

12.6.5 Prolonged exposure to mineral oils and detergents, may cause skin problems. All traces of oil should be thoroughly washed from the skin but hydrocarbon solvents should be avoided. Inadvertent contact with toxic chemicals or other harmful substances should be reported immediately and the appropriate remedial action taken. Working clothes should be laundered frequently. Oil-soaked rags should not be put in pockets.

12.6.6 Coughs and lung damage can be caused by breathing irritant dust. The risk is usually much greater for a person who smokes than for a non-smoker.

12.6.7 Employers are required to instruct, inform and train personnel so that they know and understand the risks arising from their work, the precautions to be taken and the results of any monitoring of exposure.

12.6.8 Personnel should always comply with any control measures in place, and wear any protective clothing and equipment supplied.

12.6.9 In cases where failure of the control measures could result in serious risks to health, or where their adequacy or efficiency is in doubt, health surveillance should be undertaken.



12.7 Common personal injuries

Hand injuries

12.7.1 Gloves are a sensible precaution when handling sharp or hot objects but may easily be trapped on drum ends and on machinery. Whilst loose-fitting gloves allow hands to slip out readily, they do not give a good grip on ladders. Wet or oily gloves may be slippery and great care should be taken when working in them.

Foot injuries

12.7.2 Unsuitable footwear, such as sandals plimsolls and flip-flops, gives little protection if there is a risk of burning or scalding, for example, and may lead to trips and falls. Chapter 4 gives advice on suitable footwear. Care should be taken to keep feet away from moving machinery, bights of ropes and hawsers.

Eye injuries

12.7.3 Great care should be taken to protect the eyes. Appropriate protective goggles should be worn for any work involving sparks, chips of wood, paint or metal and dangerous substances.

Head injuries

12.7.4 It is important to remember to duck, when stepping over coamings etc. to avoid hitting the head on the door frame.

Cuts

12.7.5 To avoid cuts all sharp implements and objects should be handled with care. They should not be left lying around where someone may accidentally cut themselves. In the galley, sharp knives and choppers should not be mixed with other items for washing up but cleaned individually and stored in a safe place. Broken glass should be swept up carefully, not picked by hand.



Smoking

12.7.6 Ashtrays should always be used where provided. Matches and cigarette ends should not be thrown overboard since there is a danger that they may be blown back on board. It is dangerous to smoke in bed. The use of safety ashtrays is to be preferred.

Burns and Scalds

12.7.7 Burns and scalds are commonly caused by hot pipelines and stoves, as well as by fires. Every hot machine and every container of scalding liquid should be regarded as a hazard, capable of causing injury and adequate precautions should be taken.

12.7.8 Faulty electrical equipment can cause severe burns as well as an electric shock. Equipment should be checked before use and if something appears wrong, it should be reported.

12.7.9 In hot climates, precautions should always be taken against sun burn and heat stroke.

Misuse of Tools

12.7.10 Injury can be caused by the misuse of tools. It is important always to use the correct tool for the job, and to make sure it is used in the right way. Tools should never be left lying around where they can fall on someone, or be tripped over. After a job is finished, they should be put away in a safe place.

Manual Handling

12.7.11 It is easy to strain muscles when manual handling. Pulled muscles may be avoided if proper lifting techniques are used. Chapter 19 gives guidance on handling loads.

Mooring

12.7.12 Mooring and unmooring operations provide the circumstances for



potentially serious accidents. Personnel should never stand in the bight of a rope or near a rope under tension, and should treat ropes on drums and bollards with the utmost care.

Electrical hazards

12.7.13 Unauthorised persons should not interfere with electrical fittings. No personal electrical appliance should be connected to the ship's electrical supply without approval from a responsible officer.

12.7.14 Clothing or other articles should be left to dry only in designated areas, not in machinery spaces or over or close to heaters or light bulbs. This may restrict the flow of air and so lead to overheating and fire.

12.7.15 Hand pressing irons should not be left standing on combustible materials. They should be switched off after use and stowed safely.



CHAPTER 13

SAFE MOVEMENT

13.1 General Advice

13.1.1 Personnel are reminded to take care as they move about the ship. In particular, the following points, though obvious, are all too often overlooked:

- personnel should watch out for tripping hazards, and protrusions such as pipes, framing etc;
- the possibility of a sudden or heavy roll of the ship should always be borne in mind;
- suitable footwear should be worn which will protect toes against accidental stubbing and falling loads, and will afford a good hold on deck and give firm support while using ladders; extra care should be taken when using ladders whilst wearing sea boots;
- it is dangerous to swing on or vault over stair rails, guard-rails or pipes;
- injuries are often caused by jumping off hatches etc;
- manholes and other deck accesses should be kept closed when not being used; guard-rails should be erected and warning signs posted when they are open;
- spillage of oil, grease, soapy water etc, should be cleaned up as soon as practicable;
- areas made slippery by snow, ice or water should be treated with sand or some other suitable substance;
- the presence of temporary obstacles should be indicated by appropriate warning signs;
- litter and loose objects, e.g. tools, should be cleared up;
- wires and ropes should be coiled and stowed;
- lifelines should be rigged securely across open decks in rough weather;
- ladders should be secured and ladder steps kept in good condition; care should be taken when using ladders and gangways providing access to or



about the vessel, particularly when wearing gloves;

- means of access to fire fighting equipment, emergency escape routes and watertight doors should never be obstructed.

13.2 Drainage

13.2.1 Decks which need to be washed down frequently or are liable to become wet and slippery, should be provided with effective means of draining water away. Apart from any open deck these places include the galley, the ship's laundry and the washing and toilet accommodation.

13.2.2 Drains and scuppers should be regularly inspected and properly maintained.

13.2.3 Where drainage is by way of channels in the deck, these should be suitably covered.

13.2.4 Duck boards, where used, should be soundly constructed and designed and maintained so as to prevent accidental tripping.

13.3 Transit Areas

13.3.1 Where necessary for safety, walkways on decks should be clearly marked, eg by painted lines or other means. Where a normal transit area becomes unsafe to use for any reason, the area should be closed until it can be made safe again.

13.3.2 Transit areas should where practicable have slip-resistant surfaces. Where an area is made slippery by snow, ice or water, sand or some other suitable substance should be spread over the area. Spillages of oil or grease etc should be cleaned up as soon as possible.

13.3.3 When rough weather is expected, life-lines should be rigged securely across open decks.



13.3.4 Gratings in the deck should be properly maintained and kept closed when access to the space below is not required.

13.3.5 Permanent fittings which may cause hazards to movement, e.g. pipes, single steps, framing, door arches, top and bottom rungs of ladders, should be made conspicuous by use of contrasting colouring, marking, lighting or signing. Temporary obstacles can also be hazardous and, if they are to be there for some time, they should be marked by appropriate warning signs.

13.3.6 When at sea, any gear or equipment stowed to the side of a passageway or walkway should be securely fixed or lashed against the movement of the ship.

13.3.7 Litter and loose objects, eg tools, should not be left lying around. Wires and ropes should be stowed and coiled so as to cause least obstruction.

13.3.8 Particular attention should be given to areas to which shore-based workers and passengers have access, especially on deck, as they will be less familiar with possible hazards.

13.3.9 When deck cargo is being lashed and secured, special measures may be needed to ensure safe access to the top of, and across, the cargo.

13.4 Lighting

13.4.1 The level of lighting should be such as to enable obvious damage to, or leakage from, packages to be seen. When there is a need to read labels or container plates or to distinguish colours the level of lighting should be adequate to allow this, or other means of illumination should be provided.

13.4.2 Lighting should be reasonably constant and arranged to minimise glare and dazzle, the formation of deep shadows and sharp contrasts in the level of illumination between one area and another.



13.4.3 Where visibility is poor, e.g. due to fog, clouds of dust, or steam, which could lead to an increase in the risks of accidents occurring, the level of lighting should be increased above the recommended minimum.

13.4.4 Lighting facilities should be properly maintained. Broken or defective lights should be reported to the responsible person and repaired as soon as practicable.

13.4.5 Before leaving an illuminated area or space a check should be made that there are no other persons remaining within that space before switching off or removing lights.

13.4.6 Unattended openings in the deck should either be kept illuminated or be properly or safely closed before lights are switched off.

13.4.7 When portable or temporary lights are in use, the light supports and leads should be arranged, secured or covered so as to prevent a person tripping, or being hit by moving fittings, or walking into cables or supports. Any slack in the leads should be coiled. The leads should be kept clear of possible causes of damage eg running gear, moving parts of machinery, equipment and loads. If they pass through doorways, the doors should be secured open. Leads should not pass through doors in watertight bulkheads or fire door openings when the ship is at sea. Portable lights should never be lowered or suspended by their leads.

13.4.8 Where portable or temporary lighting has to be used fittings and leads should be suitable and safe for the intended usage. To avoid risks of electric shock from mains voltage, the portable lamps used in damp or humid conditions should be of low voltage, preferably 12 volts, or other suitable precaution taken.



13.5 Guarding of Openings

13.5.1 Hatchways open for handling cargo or stores, through which persons may fall or on which they may trip, should be closed as soon as work stops, except during short interruptions or where they cannot be closed without prejudice to safety or mechanical efficiency because of the heel or trim of the ship.

*BS MA 40:
1975. Marine
guardrails,
stanchions. etc
(or an
alternative
equivalent
Standard).*

13.5.2 The guard-rails or fencing should have no sharp edges and should be properly maintained. Where necessary, locking devices and suitable stops or toe-boards should be provided. Each course of rails should be kept substantially horizontal and taut throughout their length.

13.5.3 Guard-rails or fencing should consist of an upper rail at a height of 1 metre and an intermediate rail at a height of 0.5 metres. The rails may consist of taut wire or taut chain.

13.5.4 Where the opening is a permanent access way, or where work is in progress which could not be carried out with the guards in place, guards do not have to be fitted during short interruptions in the work - eg for meals, although warning signs should be displayed where the opening is a risk to other persons.

13.6 Watertight doors

*MGN 35
(M+F)*

13.6.1 Watertight doors can inflict serious injury if their operation is not carried out correctly, therefore, all members of the crew who would have occasion to use any watertight doors should be instructed in their safe operation. **Crew members who have not been instructed in their use should not under any circumstance operate them until such training has been given.**

13.6.2 Particular care should be taken when using power operated watertight doors which have been closed from the bridge. If opened locally under these circumstances the door will re-close automatically with a force



sufficient to crush anyone in its path as soon as the local control has been released. The local controls are positioned on each side of the door so that a person passing through may open the door and then reach to the other control to keep the door in the open position until transit is complete. As both hands are required to operate the controls, no person should attempt to carry any load through the door unassisted. **If it is necessary to carry anything through a watertight door in these circumstances another person should be employed to assist.**

13.6.3 Notices clearly stating the method of operation of the local controls should be prominently displayed on both sides of each watertight door:

13.6.4 No-one should attempt to pass through a watertight door when it is closing and/or the warning bell is sounding. In all cases you should wait until the door is fully open before attempting to pass through it.

13.6.5 **When reading this advice, note should be made of the content of MGN 35 (M+F) (Accidents when using power operated watertight doors).**

- Class C watertight doors should never be opened without prior authority and will often close automatically so extra care should be paid when transiting them.
- Class B watertight doors will normally be closed unless personnel are working in an adjacent compartment. If it is closed, after opening manually it may automatically close.
- Class A watertight doors will normally be open. In all cases, if a watertight door is found closed it may automatically close after being opened manually so extra care must be taken.

13.6.6 Any watertight door found in a closed position must be returned to that position after opening.

MGN 35
(M+F)



13.7 Ship-board Vehicles

13.7.1 Persons selected to drive ships' powered vehicles and powered mobile lifting appliances should be fit to do so, and have been trained for the particular category of vehicle or mobile lifting appliance to be driven, and tested for competence.

13.7.2 Authorisations of crew members should either be individually issued in writing or comprise a list of persons authorised to drive. These authorisations may need to be made available for inspection to Dock Authorities.

13.7.3 Maintenance of ships' powered vehicles and powered mobile lifting appliances should be undertaken in accordance with manufacturers' instructions.

13.7.4 Drivers of ships' powered vehicles and powered mobile lifting appliances should exercise extreme care, particularly when reversing.

13.8 Working on deck while ship is at sea

The responsible officer should ensure that seafarers working on deck are properly instructed in the tasks that they are required to perform.

Seafarers should be prohibited at all times from sitting upon the vessel's bulwark or rail.

Bridge watchkeeping officers should be informed of all work being performed on deck or in deck spaces.

13.9 Heavy weather

If heavy weather is expected, lifelines should be rigged in appropriate locations on deck.



Attention should be given to the dangers of allowing any person out on deck during heavy weather:

No seafarers should be on deck during heavy weather unless it is ABSOLUTELY NECESSARY for the safety of the ship or crew.

The lashings of all deck cargo should be inspected and tightened, as necessary, when heavy weather is expected.

Anchors should be secured and hawse and spurling pipe covers fitted and cemented when rough weather is expected, regardless of the expected voyage duration.

Work on deck during heavy weather should be authorised by the master and the bridge watch should be informed. A risk assessment should be undertaken, and a permit to work and company checklist for work on deck in heavy weather completed.

Any persons required to go on deck during heavy weather should wear a suitable life-jacket, waterproof PPE, and be equipped with a portable transceiver.

Seafarers should work in pairs or in teams. All seafarers should be under the command of an experienced senior officer:

Risk assessment should give consideration to:

- ✓ Necessity of work (i.e. can it wait until daylight, next port, do the risks outweigh the benefits?)
- ✓ Availability of rescue & emergency medical care if things go wrong
- ✓ Use of stabilising fins (if fitted) to reduce rolling
- ✓ Adjust vessel course & speed



- ✓ Permit to work & company checklist completed
- ✓ Rigging Lifelines
- ✓ Lifejacket with Safety harness
- ✓ Adequate PPE (including full head protection that will reduce exposure to the elements)
- ✓ Using head mounted torches
- ✓ Using waterproof worksuits with reflective tape fitted
- ✓ Deck illumination
- ✓ Visual contact from bridge
- ✓ Working in [at least] pairs
- ✓ Water resistant [proof] portable radios for communications with bridge
- ✓ Use of bridge searchlight to determine predominant wave direction at night. In restricted visibility or darkness radar may be used to determine the predominant wave direction
- ✓ Be aware that even in a regular wave pattern "rogue" waves can exist which can vary in direction and size from the regular wave pattern being experienced
- ✓ ALWAYS plan for, and expect the unexpected



CHAPTER 14

FOOD PREPARATION AND HANDLING

14.1 Health and hygiene

MGN 397 (M+F)

14.1.1 Catering staff should have a basic knowledge of food safety and hygiene as they have a responsibility for ensuring that high standards of personal hygiene and cleanliness of the galley, pantry and mess rooms are always maintained. Further guidance is contained in MGN397 (M+F).

14.1.2 There should be no smoking in galleys, pantries, store rooms or other places where food is prepared.

14.1.3 Hands and fingernails should be washed before handling food using a dedicated hand-basin, a bacterial liquid soap from a dispenser and disposable towels or another individual method of hand drying such as a hot air dryer. It is important to wash hands after using the toilet, blowing your nose, or handling refuse or contaminated food.

14.1.4 All cuts, however small, should be reported immediately and receive first aid attention to prevent infection.

14.1.5 An open cut, burn or abrasion should be covered with a coloured waterproof dressing which must be changed regularly. Anyone with a septic cut or a boil, stye etc, should stop working with food until it is completely healed.

14.1.6 Illness, rashes or spots, however mild should be reported immediately the symptoms appear.

14.1.7 A person suffering from diarrhoea and vomiting, which are signs of



food poisoning, should not work in food handling areas until medical clearance has been given.

14.1.8 Catering staff should wear clean protective clothing when handling food and preparing meals.

14.1.9 Catering staff should not wear jewellery apart from a plain wedding band.

14.1.10 Cleanliness of all food, crockery, cutlery, linen, utensils, equipment and storage is vital. Cracked or chipped crockery and glassware should be destroyed. Foodstuffs which may have come into contact with broken glass or broken crockery should be thrown away.

14.1.11 As a general rule fresh fruit and salad should be thoroughly washed in fresh water before being eaten.

14.1.12 Foodstuffs and drinking water should not be stored where germs can thrive. Frozen food must be defrosted in controlled conditions, i.e. an area entirely separate from other foods in cool conditions. Food should be prevented from sitting in the thaw liquid by placing it on grids in a container or on a shelf. Deep frozen food which has been defrosted is not to be refrozen.

14.1.13 The risks of cross contamination should be eliminated by thoroughly stripping and cleaning the relevant parts of equipment when successive different foods are to be used (especially raw and cooked foods). It is important to wash hands after handling raw meat, fish, poultry or vegetables.

14.1.14 Raw food should be kept apart from cooked food or food that requires no further treatment before consumption (eg milk). Separate refrigerators are preferred although if stored in the same unit, the raw food



must always be placed at the bottom to avoid drips contaminating ready prepared food. Food should also be covered to prevent drying out, cross-contamination and absorption of odour.

14.1.15 Separate work surfaces, chopping boards and utensils should be set aside for the preparation of raw meat and must not be used for the preparation of foods which will be eaten without further cooking. Colour coding is an established way of ensuring separation between the two activities.

14.1.16 Ensure all food is kept at the correct temperature to prevent the multiplication of bacteria.

14.1.17 Crockery and glassware should not be left submerged in washing up water where it may easily be broken and cause injury. Such items should be washed up individually as should knives and any utensils or implements with sharp edges. Crockery, glassware and utensils should preferably be washed in a dishwasher, where much higher temperatures can be achieved compared with hand washing.

14.1.18 Some domestic cleaning substances contain bleach or caustic soda (sodium hydrochloride) whilst some disinfectants contain carbolic acid (phenol). These substances can burn the skin and they are poisonous if swallowed. They should be treated with caution and should not be mixed together or used at more than the recommended strength. Inadvertent contact with toxic chemicals or other harmful substances should be reported immediately and the appropriate remedial action taken. Cleaning substances, materials, should be stored in a suitable locker/cupboard separate from food handling areas.

MSN 1807 (M+F) **14.1.19** Food waste, empty food containers and other garbage are major sources of pollution and disease and should be placed in proper storage facilities safely away from foodstuffs. Their discharge into the sea is prohibited



except in circumstances specified in Merchant Shipping Notice MSN 1807 (M+F).

14.2 Slips, falls and tripping hazards

14.2.1 Suitable footwear; preferably with slip-resistant soles, should be worn at all times. A large proportion of injuries to catering staff arise because they wear unsuitable footwear such as sandals, plimsolls or flip-flops, which do not grip greasy decks or protect the feet from burns or scalds if hot or boiling liquids are spilt.

14.2.2 Decks, and particularly stairs, should be regularly maintained so that cracks and worn areas do not cause a trip hazard.

14.2.3 Decks and gratings should be kept clear from grease, rubbish and ice etc to avoid slipping. Any spillage should be cleared up immediately.

14.2.4 Broken glass or crockery should be cleared away with a brush and pan - never with bare hands.

14.2.5 The area of deck immediately outside the entrance to refrigerated rooms should have an anti-slip surface.

14.2.6 Care should always be taken when using stairs and companionways; one hand should always be kept free to grasp the handrail.

14.2.7 Trays, crates, cartons etc should not be carried in such fashion that sills, storm steps or other obstructions in the path are obscured from view.

14.2.8 Lifts that involve reaching up too high or too low should be avoided. Personnel should not stand on unsecured objects to reach articles which are out of reach.

14.3 Galley stoves, steamboilers and deep fat fryers

14.3.1 Ships using oil fired stoves should operate safety procedures



according to manufacturers' instructions, particularly when lighting the stove. Instructions should be clearly displayed in the galley.

14.3.2 Catering staff should not attempt to repair electric or oil-fired ranges or electric microwave ovens. Defects should always be reported so that proper repairs may be made. The equipment should be kept out of use and a warning notice displayed until it has been repaired.

14.3.3 The indiscriminate use of water in hosing down and washing equipment in the galley can be very dangerous, particularly when there are electrical installations. Whenever the galley deck is washed down, power to an electric range and all electric equipment should be switched off and isolated from the supply and water kept from contact with the electric equipment.

14.3.4 Range guard rails should always be used in rough weather. Pots and pans should never be filled to the extent that the contents spill over when the ship rolls.

14.3.5 All catering staff should be fully instructed in avoiding burns from hot surfaces on hot serving tables, bain marie, steamers and tilting pans.

14.3.6 Dry cloths or pot holders and oven gloves (long enough to cover the arms) should always be used to handle hot pans and dishes. Wet cloths conduct heat quickly and may scald the hands.

14.3.7 No one should be directly in front of an oven when the door is opened - the initial heat blast can cause burns.

14.3.8 The steam supply to pressure cookers, steamers and boilers should be turned off and pressure released before their lids are opened.

14.4 LPG appliances

14.4.1 Suitable means for detecting the leakage of gas should be provided



and securely fixed in the lower part of the galley as gas is heavier than air. A gas detector should incorporate an audible and a visible alarm, and should be tested frequently. A suitable notice, detailing the action to be taken when an alarm is given by the gas detection system should be prominently displayed.

14.4.2 Equipment should be fitted, where practicable, with an automatic gas shut-off device which operates in the event of flame failure.

MGN 312(F)

14.4.3 When gas burning appliances are not in use the controls should be turned off. If they are not going to be used again for some length of time, the main regulators close to the storage bottles should be shut. MGN 312(F) gives further guidance on the operation of L.P.G. appliances.

14.4.4 A safe system of working, training and supervision over lighting and operating procedures should be established.

14.4.5 Defects in joints, valves and connections can be detected by smell. Catering staff should not attempt to repair electric, oil or gas appliances.

14.5 Deep fat frying

14.5.1 Water should never be poured into hot oil; the water turns to steam, throwing the oil considerable distances. This may cause severe burns to personnel, and possibly start a fire.

14.5.2 If fat catches fire in a container; the flames should be smothered using a fire blanket if practicable and the container removed from the source of heat. Otherwise a suitable fire extinguisher should be used. In no circumstances should water be used.

14.5.3 The flash point of the cooking medium should be no lower than 315°C (600°F).



14.5.4 Deep fat fryers should be provided with suitable safety lids which should be kept in position when the fryers are not in use.

14.5.5 To minimise the risk of fire from failure of the control thermostat all deep fat fryers should be fitted with a second thermostat set to provide a thermal cut-out.

14.5.6 Electrically operated deep fat fryers should be switched off immediately after use.

14.5.7 A safe system of work for cleaning and draining fat fryers should be established.

14.5.8 A strict schedule of cleaning for galley uptakes/grills should be established so that fat deposits are not allowed to accumulate.

14.5.9 A notice should be prominently displayed detailing the action to be taken in the event of a deep fat fryer fire.

14.6 Microwave ovens

14.6.1 When microwave ovens are used, it is important to ensure that the food is cooked thoroughly and evenly. This is particularly important with deep frozen foods which should be thoroughly defrosted before cooking. The instructions issued by the oven manufacturers should be followed carefully in conjunction with the information on the packaging of the foodstuff.

14.6.2 No microwave oven should be operated if the oven door or its interlock is out of use, the door broken or ill-fitting or the door seals damaged. Each microwave oven should carry a permanent notice to this effect. Microwave radiation checks should be carried out at regular intervals.



14.7 Catering equipment

14.7.1 Except under the supervision of an experienced person, no one should use catering equipment unless trained in its use and fully instructed in the precautions to be observed.

14.7.2 Dangerous parts of catering machines should be properly guarded and the guards kept in position whenever the machine is used.

14.7.3 Any machine or equipment that is defective in its parts, guards or safety devices should be reported and taken out of service, with power disconnected, until repaired.

14.7.4 When a power-operated machine has to be cleaned or a blockage in it removed, it should be switched off and isolated from the power supply. Some machines will continue to run down for a while thereafter; and care should be taken to see that dangerous parts have come to rest before cleaning is begun.

14.7.5 A safe procedure for cleaning all machines should be established and carefully followed. Every precaution should be taken where cutting edges, for example on slicing machines, are exposed by the necessary removal of guards to allow thorough cleaning. Guards should be properly and securely replaced immediately the job is done.

14.7.6 Unless properly supervised, a person under 18 years of age should not clean any power operated or manually driven machine with dangerous parts which may move during the cleaning operation.

14.7.7 Appropriate implements, not fingers, should be used to feed materials into processing machines.

14.7.8 Electrical equipment should not be used with wet hands.



14.7.9 All electrical equipment should be regularly inspected by a competent person.

14.8 Knives, saws, choppers etc

14.8.1 Sharp implements should be treated with respect and handled with care at all times. They should not be left lying around working areas where someone may accidentally cut themselves. They should not be mixed in with other items for washing up but cleaned individually and should be stored in a safe place.

14.8.2 Knives should be kept tidily in secure racks or sheaths when not in use.

14.8.3 The handles of knives, saws, choppers etc should be securely fixed and kept clean and free from grease. The cutting edges should be kept clean and sharp.

14.8.4 Proper can openers in clean condition should be used to open cans; improvisations are dangerous and may leave jagged edges on the can.

14.8.5 Chopping meat requires undivided attention. The chopping block must be firm, the cutting area of the meat well on the block and hands and body clear of the line of strike. There must be adequate room for movement and no obstructions in the way of the cutting stroke. Particular care is required when the vessel is moving in a seaway.

14.8.6 Foodstuffs being chopped with a knife should not be fed towards the blade with outstretched fingers. Fingertips should be bent inwards towards the palm of the hand with the thumb overlapped by the forefinger. The knife blade should be angled away from the work and so away from the fingers.



14.8.7 A falling knife should be left to fall, not grabbed.

14.8.8 A meat saw should be guided by the forefinger of the free hand over the top of the blade. The use of firm even strokes will allow the blade to feel its way; if forced, the saw may jump possibly causing injury.

14.9 Refrigerated rooms and store rooms

14.9.1 All refrigerated room doors should be fitted with means both of opening the door and of sounding the alarm from the inside.

14.9.2 A routine testing of the alarm bell and checking of the door clasps and inside release should be carried out regularly, at least at weekly intervals.

14.9.3 Those using the refrigerated room should make themselves familiar with the operation, in darkness, of the inside release for the door and the location of the alarm button.

14.9.4 All refrigerated room doors should be fitted with an arrangement of adequate strength to hold the door open in a seaway and should be secured open while stores are being handled. These doors are extremely heavy and can cause serious injury to a person caught between the door and the jamb.

14.9.5 Anyone going into a refrigerated room should take the padlock, if any, inside with him. Another person should be informed.

14.9.6 Cold stores or refrigerated rooms should not be entered if it is suspected that there has been a leakage of refrigerant. A warning notice to this effect should be posted outside the doors.

14.9.7 All stores and crates should be stowed securely so that they do not shift or move in a seaway.



14.9.8 When wooden boxes or crates are opened, protruding fastenings should be removed or made safe.

14.9.9 Metal hooks not in use should be stowed in a special container provided for the purpose. Where hooks cannot be removed they should be kept clear.



SECTION 3

3

WORK ACTIVITIES



CHAPTER 15

SAFE SYSTEMS OF WORK

15.1 Introduction

15.1.1 This chapter suggests some control measures which may be taken to protect those who may be put at risk in some key areas on board ship. Such measures should be based on the findings of the risk assessment.

15.2 Working aloft and outboard

MGN 410 (M+F)

15.2.1 Anyone working and not standing on level ground or at deck level is working at height. Also undertaking work inside a tank, near an opening, such as a hatch, or on a fixed stairway may be regarded as working at height if there is a danger of injury if the worker fell. Further guidance is contained in MGN 410 (M+F).

MS (Provision and Use of Work Equipment) Regs SI 2006 No 2183 and MS (Lifting Operations and Lifting Equipment) Regs SI 2006 No 2184

15.2.2 Work should only be carried out at height if there is no reasonably practicable alternative to doing so. Where a reasonably practicable alternative does exist it should be adopted. Where work must be carried out at height, the employer must ensure that such work is properly planned, appropriately supervised and carried out in as safe a manner as is reasonably practicable. In this context, planning should include the carrying out of a risk assessment in accordance with regulation 7 of the MS (Health and Safety at Work) Regs 1997 No 2962 which might include considering potential risks from falling objects or fragile surfaces. In addition, work equipment should be selected and used in accordance with the provisions of the PUWER 2006 and LOLER 2006 Regulations.

15.2.3 Personnel working at a height may not be able to give their full attention to the job and at the same time guard themselves against falling. Proper precautions should therefore always be taken to ensure personal safety when work has to be done aloft or when working outboard. It must be



remembered that the movement of a ship in a seaway and extreme weather conditions even when alongside, will add to the hazards involved in work of this type. A stage or ladder should also be utilised when work is to be done beyond normal reach.

15.2.4 Personnel under 18 years of age or with less than 12 months experience at sea, should not work aloft unless accompanied by an experienced person or otherwise adequately supervised.

15.2.5 Personnel working aloft should wear safety harness with lifeline or other attesting device at all times (see section 4.10). A safety net should be rigged where necessary and appropriate. Additionally, where work is done overside, buoyancy garments should be worn and a lifebuoy with sufficient line attached should be kept ready for immediate use. Personnel should be under observation from a person on deck.



15.2.6 Other than emergency situations personnel should not work overside whilst the vessel is underway. If such work has to be undertaken lifeboats or rescue boats should be ready for immediate use. Any such work should be closely monitored/watched by a responsible person.

15.2.7 Before work is commenced near the ship's whistle, the officer responsible should ensure that power is shut off and warning notices posted on the bridge and in the machinery spaces.

15.2.8 Before work is commenced on the funnel, the officer responsible should inform the duty engineer to ensure that steps are taken to reduce as far as practicable the emission of steam, harmful gases and fumes.



15.2.9 Before work is commenced in the vicinity of radio aerials, the officer responsible should inform the radio room or person in charge of radio equipment so that no transmissions are made whilst there is risk to personnel. A warning notice should be put up in the radio room.

15.2.10 Where work is to be done near the radar scanner, the officer responsible should inform the officer on watch so that the radar and scanner are isolated. A warning notice should be put on the set until the necessary work has been completed.

15.2.11 On completion of the work of the type described above, the person responsible should, where necessary, inform the appropriate person that the precautions taken are no longer required and that warning notices can be removed.

15.2.12 Work aloft should not be carried out in the vicinity of cargo working, unless it is essential. Care must always be taken to avoid risks to anyone working or moving below. Suitable warning notices should be displayed. Tools and stores should be sent up and lowered by line in suitable containers which should be secured in place for stowage of tools or materials not presently being used.

15.2.13 No one should place tools where they can be accidentally knocked down and may fall on someone below, nor should tools be carried in pockets from which they may easily fall. When working aloft it is often best to wear a belt designed to hold essential tools securely in loops.

15.2.14 Tools should be handled with extra care when hands are cold and greasy and where the tools themselves are greasy.



15.3 Portable ladders

MGN 410 (M+F)
Annex A

15.3.1 A portable ladder should only be used where no safer means of access is reasonably practicable. It is very important that the ladder is checked regularly by a competent person. Annex A (reproduced from MGN 410) gives further guidance.

15.3.2 Wooden ladders should not be painted or treated so as to hide defects and cracks. When not in use they should be stowed safely in a dry ventilated space away from any heat source.

15.3.3 Portable ladders should be pitched between 60 and 75 degrees from the horizontal, on a firm base, properly secured against slipping or shifting sideways and be so placed as to afford a clearance of at least 150 mm behind the rungs. Where practicable the ladder should extend to at least 1 metre above any upper landing place unless there are other suitable handholds.

15.3.4 When portable extending ladders are in use, there should be sufficient overlap between the extensions.

15.3.5 Personnel negotiating a ladder should use both hands, and not attempt to carry tools or equipment in their hands.

15.3.6 Planks should not be supported on rungs of ladders to be used as staging, nor should ladders be used horizontally for such purposes.

15.3.7 Working from ladders should be avoided as far as possible, but where necessary personnel must use a safety harness with lifeline secured above the work position.



15.4 Cradles and stages

MGN 410 (M+F)
Annex C

15.4.1 Cradles should be at least 430 mm (17 inches) wide and fitted with guard rails or stanchions with taut ropes to a height of one metre (39 inches) from the floor. Toeboards add safety. Annex C (reproduced from MGN 410) gives further guidance.

15.4.2 Planks and materials used for the construction of ordinary plank stages must be carefully examined to ensure adequate strength and freedom from defect.

15.4.3 Wooden components of staging should be stowed in a dry, ventilated space and not subjected to heat.

15.4.4 Ancillary equipment, lizards, blocks and gantlines should be thoroughly examined before use.

15.4.5 When a stage is rigged overside, the two gantlines used in its rigging should be at least long enough to trail into the water to provide additional lifelines should the operator fall. A lifebuoy and line should still be kept ready at a close position.

15.4.6 Gantlines used for working aloft should not be used for any other purpose and should be kept clear of sharp edges when in use.

15.4.7 The anchoring points for lines, blocks and lizards must be of adequate strength and, where practicable, be permanent fixtures to the ship's structure. Integral lugs should be hammer tested. Portable rails or stanchions must not be used as anchoring points. Any anchoring points should be treated as lifting points and should be inspected/tested in accordance with Chapter 21 of this Code.

15.4.8 Stages and staging which are not suspended should always be



secured against movement. Hanging stages should be restricted against movement to the extent practicable.

15.4.9 In machinery spaces, staging and its supports should be kept clear of contact with hot surfaces and moving parts of machinery. In the engine room, a crane gantry should not be used directly as a platform for cleaning or painting, but can be used as the base for a stable platform if suitable precautions are taken (see section 24.3.6).

15.4.10 Where personnel working from a stage are required to raise or lower themselves, great care must be taken to keep movements of the stage small and closely controlled.

15.5 Bosun's chair

*MGN 410 (M+F)
Annex C*

15.5.1 When used with a gantline the chair should be secured to it with a double sheet bend and the end seized to the standing part with adequate tail. Annex C (reproduced from MGN 410) gives further guidance.

15.5.2 Hooks should not be used to secure bosun's chairs unless they are of the type which because of their special construction cannot be accidentally dislodged, and have a marked safe working load which is adequate for the purpose.

15.5.3 On each occasion that a bosun's chair is rigged for use, the chair, gantlines and lizards must be thoroughly examined, and renewed if there is any sign of damage, and load tested to at least 4 times the load they will be required to lift before a person is hoisted.

15.5.4 When a chair is to be used for riding topping lifts or stays, it is essential that the bow of the shackle, and not the pin, rides on the wire. The pin in any case should be seized.

15.5.5 When it is necessary to haul a person aloft in a bosun's chair it should be done only by hand; a winch should not be used.



15.5.6 If a worker is required to lower himself while using a bosun's chair, he should first frap both parts of the gantline together with a suitable piece of line to secure the chair before making the lowering hitch. The practice of holding on with one hand and making the lowering hitch with the other is dangerous. It may be prudent to have someone standing by to tend the lines.

15.6 Working from punts

15.6.1 Punts should be stable and provided with suitable fencing. Unsecured trestles and planks should not be used to give additional height.

15.6.2 The person in charge should have due regard to the strength of tides and other hazards, such as wash from passing vessels, before a punt is put to use.

15.6.3 When work is to be done at or near the stern or other propeller aperture, the person in charge should inform the duty engineer and deck officers so that warning notices are put up in the engine room, at the controls and on the bridge.

15.6.4 The duty engineer and deck officers should also be informed by the person in charge when seamen are working below ship's side discharges so they are not used until the work is completed. Notices to this effect should be attached to the relevant control valves and not taken off until those working are reported clear.

15.7 Work in machinery spaces

*MS (Guarding of Machinery and Safety of Electrical Equipment)
Regs SI 1988 No 1636
MSN No M.331(M+F)*

15.7.1 Merchant Shipping regulations require every dangerous part of a ship's machinery to be securely guarded unless it is so positioned or constructed that it is as safe as if it were securely guarded or is otherwise safeguarded. Guidance on the interpretation of these Regulations is given in MGN 331(M+F).



15.7.2 All steam pipes, exhaust pipes and fittings which by their location and temperature present a hazard, should be adequately lagged or otherwise shielded. The insulation of hot surfaces should be properly maintained, particularly in the vicinity of oil systems.

15.7.3 Personnel required to work in machinery spaces which have high noise levels should wear suitable hearing protectors (see section 4.6).

15.7.4 Where a high noise level in a machinery space, or the wearing of ear protectors, may mask an audible alarm, a visual alarm of suitable intensity should be provided, where practicable, to attract attention and indicate that an audible alarm is sounding. This should preferably take the form of a light or lights with rotating reflectors. Guidance may be found in the IMO Code on Alarms and Indicators.

15.7.5 The source of any oil leakage should be located and repaired as soon as practicable.

15.7.6 Waste oil should not be allowed to accumulate in the bilges or on tank tops. Any leakage of fuel, lubricating and hydraulic oil should be disposed of in accordance with Oil Pollution Regulations at the earliest opportunity. Tank tops and bilges should, wherever practicable, be painted a light colour and kept clean and well-illuminated in the vicinity of pressure oil pipes so that leaks may be readily located.

15.7.7 Great caution is required when filling any settling or other oil tank to prevent it overflowing, especially in an engine room where exhaust pipes or other hot surfaces are directly below. Manholes or other openings in the tanks should always be secured so that should a tank be overfilled the oil is directed to a safe place through the overflow arrangements.

15.7.8 Particular care should be taken when filling tanks which have their sounding pipes in the machinery spaces to ensure that weighted cocks are



closed. In no case should a weighted cock on a fuel or lubricated oil tank sounding pipe or on a fuel, lubricating or hydraulic oil tank gauge be secured in the open position.

15.7.9 Engine room bilges should at all times be kept clear of rubbish and other substances so that mud-boxes are not blocked and the bilges may be readily and easily pumped.

15.7.10 Remote controls fitted for stopping machinery or pumps or for operating oil-tank quick-closing valves in the event of fire, should be tested regularly to ensure that they are functioning satisfactorily. This also applies to the controls on fuel storage daily service tanks (other than double bottoms) and lubricating oil tanks.

15.7.11 Cleaning solvents should always be used in accordance with manufacturers' instructions and in an area that is well ventilated.

15.7.12 Care should be taken to ensure that spare gear is properly stowed and items of machinery under overhaul safely secured so that they do not break loose and cause injury or damage even in the heaviest weather.

15.8 Boilers

15.8.1 A notice should be displayed at each boiler setting out operating instructions. Information provided by the manufacturers of the oil-burning equipment should be displayed in the boiler room.

15.8.2 To avoid the danger of a blowback when lighting boilers, the correct flashing up procedure should always be followed:

- (a) there should be no loose oil on the furnace floor;
- (b) the oil should be at the correct temperature for the grade of oil being used; if not, the temperature of the oil must be regulated before lighting is attempted;



- (c) the furnace should be blown through with air to clear any oil vapour;
- (d) the torch, specially provided for the purpose, should always be used for lighting a burner unless an adjacent burner in the same furnace is already lit; other means of ignition, such as introducing loose burning material into the furnace, should not be used. An explosion may result from attempts to relight a burner from the hot brickwork of the furnace;
- (e) if all is in order, the operator should stand to one side, and the lighted torch inserted and fuel turned on. Care should be taken that there is not too much oil on the torch which could drip and possibly cause a fire;
- (f) if the oil does not light immediately, the fuel supply should be turned off and the furnace ventilated by allowing air to blow through for two or three minutes to clear any oil vapour before a second attempt to light is made. During this interval the burner should be removed and the atomizer and tip inspected to verify that they are in good order;
- (g) if there is a total flame failure while the burner is alight, the fuel supply should be turned off.

15.8.3 The avenues of escape from the boiler fronts and firing spaces should be kept clear.

15.8.4 Where required to be fitted, the gauge glass cover should always be in place when the glass is under pressure. If a gauge glass or cover needs to be replaced or repaired, the gauge should be shut off and drained before the cover is removed.

15.9 Unmanned machinery spaces

15.9.1 Personnel should never enter or remain in an unmanned machinery space alone, unless they have received permission from, or been instructed by the engineer officer in charge at the time. They may only be sent to carry out a specific task which they may be expected to complete in a comparatively short time. Before entering the space, at regular intervals whilst in the space and on leaving the space, they must report by telephone, or other means



provided, to the duty deck officer. Before they enter the space the method of reporting should be clearly explained. Consideration should be given in appropriate instances to using a 'permit-to-work' (see section 16.2).

15.9.2 If it is the engineer officer in charge who enters the machinery space alone, he too should report to the deck officer.

15.9.3 Notice of safety precautions to be observed by personnel working in unmanned machinery spaces should be clearly displayed at all entrances to the space. Warning should be given that in unmanned machinery spaces there is a likelihood of machinery suddenly starting up.

15.9.4 Unmanned machinery spaces should be adequately illuminated at all times.

15.9.5 When machinery is under bridge control, the bridge should always be advised when a change in machinery setting is contemplated by the engine room staff, and before a reversion to engine room control of the machinery.

15.10 Refrigeration machinery

15.10.1 Adequate information should be available on each vessel, laying down the operation and maintenance safeguards of the refrigeration plant, the particular properties of the refrigerant and the precautions for its safe handling.

15.10.2 No one should enter a refrigerated compartment without first informing a responsible officer.

15.10.3 The compartment or flat in which refrigeration machinery is fitted should be adequately ventilated and illuminated. Where fitted, both the supply and exhaust fans to and from compartments in which refrigeration machinery is situated should be kept running at all times. Inlets and outlets



should be kept unobstructed. When there is any doubt as to the adequacy of the ventilation, a portable fan or other suitable means should be used to assist in the removal of toxic gases from the immediate vicinity of the machine.

15.10.4 Should it be known or suspected that the refrigerant has leaked into any compartments, no attempt should be made to enter those compartments until a responsible officer has been advised of the situation. If it is necessary to enter the space, it should be ventilated to the fullest extent practicable and the personnel entering should wear approved breathing apparatus. A person should be stationed in constant attendance outside the space, also with breathing apparatus (see Chapter 17).

15.11 Scaffolding

*MGN 410 (M+F)
Annex B*

15.11.1 Annex B (reproduced from MGN 410) gives further guidance.

15.11.2 Only scaffolding of an approved design should be used or one rigged in conformity with a generally recognised configuration. If necessary a calculation of its strength should be carried out and recorded.

15.11.3 Care should be taken when assembling and dismantling the scaffold.

15.11.4 Great care should be taken to ensure the stability of the structure and safe access to it. If it is a mobile structure it should be securely fixed to ensure it cannot inadvertently move while in use.

15.11.5 Anyone rigging or dismantling scaffolding should have received adequate training.

15.11.6 Measures, such as adequate safety rails etc., should be incorporated to prevent the risk of persons or objects falling off.

15.11.7 Care must be taken to ensure that safe working load of the structure is not exceeded.



ANNEX A

REQUIREMENTS FOR LADDERS

1. A ladder shall be positioned so as to ensure its stability during use.
2. (1) A suspended ladder shall be attached in a manner that :
 - (a) is secure;
 - (b) ensures it cannot be displaced; and
 - (c) prevents it swinging.(2) Paragraphs (b) and (c) of sub-paragraph (1) do not apply to a rope ladder.
3. (1) Portable ladders shall rest on footing that is stable, firm, of sufficient strength and of suitable size and composition safely to support the ladder so that its rungs or steps remain horizontal.
(2) Where, owing to the movement of the ship, it is not reasonably practicable to ensure that the rungs or steps of the portable ladder remain horizontal all appropriate measures to ensure the stability of the portable ladder shall be taken.
4. The feet of a portable ladder shall be prevented from slipping during use by:
 - (a) securing the stiles at or near their upper or lower ends; or
 - (b) any anti-slip device; or
 - (c) any other arrangement of equivalent effectiveness.
5. A ladder used for access shall be long enough to protrude sufficiently above the place of landing to which it provides access, unless other measures have been taken to ensure a firm handhold.
6. No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use.
7. A mobile ladder shall be prevented from moving before it is stepped on.
8. A ladder shall be used in such a way that:
 - (a) a secure handhold and secure support are always available to the user; and
 - (b) the user can maintain a safe handhold when carrying a load by hand.



ANNEX B

REQUIREMENTS FOR SCAFFOLDING

1. Strength and stability calculations for scaffolding shall be carried out unless:
 - (a) a note of the calculations, covering the structural arrangements contemplated, is available; or
 - (b) the scaffolding is assembled in conformity with a generally recognised standard configuration.
2. Depending on the complexity of the scaffolding chosen, an assembly, use and dismantling plan shall be drawn up by a competent person. This may be in the form of a standard plan, supplemented by items relating to specific details of the scaffolding in question.
3. A copy of the plan, including any instructions it may contain, shall be made available for the use of the person supervising and the workers concerned in the assembly, use, dismantling or alteration of the scaffolding.
4. The bearing components of the scaffolding shall be prevented from slipping by:
 - (a) attachment to the bearing surface;
 - (b) provision of an anti-slip device; or
 - (c) any other arrangement of equivalent effectiveness.
5. The load-bearing surface of the scaffolding shall be of sufficient capacity.
6. The scaffolding shall be positioned to ensure its stability.
7. Wheeled scaffolding shall be prevented by appropriate devices from moving accidentally during work at height.
8. The dimensions, form and layout of scaffolding decks shall:
 - (a) be appropriate to the nature of the work to be performed;
 - (b) be suitable for the loads to be carried; and
 - (c) permit work and passage in safety.
9. Scaffolding decks shall be assembled in such a way that their components are prevented from moving inadvertently during work at height.



10. There shall be no dangerous gaps between the scaffolding deck components and the vertical collective safeguards to prevent falls.
11. When any part of a scaffold is not available for use, including during the assembly, dismantling or alteration of scaffolding, it shall be:
 - (a) marked with general warning signs in accordance with the Merchant Shipping and Fishing Vessels (Safety Signs and Signals) Regulations 2001; and
 - (b) suitably delineated by physical means preventing access to the danger zone.
12. Scaffolding shall be assembled, dismantled or significantly altered only under the supervision of a competent person and by workers who have received appropriate and specific training in the operations envisaged in accordance with regulation 12 of the MS (Health and Safety at Work) Regs 1997 No 2962 and regulation 11 of the MS (Provision and Use of Work Equipment) Regs 2006 No 2183 which shall include:
 - (a) understanding the plan for the assembly, dismantling or alteration of the scaffolding;
 - (b) safety during the assembly, dismantling or alteration of the scaffolding;
 - (c) measures to prevent the risk of persons or objects falling;
 - (d) safety measures in the event of changing weather conditions which could adversely affect the safety of the scaffolding;
 - (e) permissible loads; and
 - (f) any other risks which the assembly, dismantling or alteration of the scaffolding may entail.
13. For the purposes of this Annex, “competent person” means the person possessing the knowledge or experience necessary for the performance of the duties imposed on that person by this Annex.



ANNEX C

REQUIREMENTS FOR ROPE ACCESS AND POSITIONING TECHNIQUES

1. A rope access or positioning technique shall only be used if:
 - (a) subject to paragraph 2, it involves a system comprising at least two separately anchored ropes, of which one ("the working rope") is used as a means of access, egress and support and the other is the safety rope;
 - (b) the worker is provided with and uses a suitable harness and is connected by it to the working rope and the safety rope;
 - (c) the working rope is equipped with safe means of ascent and descent and has a self-locking system to prevent the worker falling should he lose control of his movements;
 - (d) the safety rope is equipped with a mobile fall prevention system which is connected to and travels with the worker;
 - (e) the tools and other accessories to be used by the worker are secured to the worker's harness or seat or by some other suitable means; and
 - (f) appropriate training in accordance with regulation 9,10 or 11 of the MS (Provision and Use of Work Equipment) Regs 2006 No 2183, including training in rescue procedures, has been provided to the worker or workers concerned.
2. A rope access or positioning technique may involve a system comprising a single rope where:
 - (a) the risk assessment has demonstrated that the use of a second line would entail higher risk to persons; and
 - (b) appropriate measures have been taken to ensure safety.



CHAPTER 16

PERMIT TO WORK SYSTEMS

16.1 Introduction

16.1.1 Based on the findings of the risk assessment, appropriate control measures should be put into place to protect those who may be affected. This Chapter covers permits to work, which are suggested control measures for particular operations.

16.2 Permit-to-work systems

16.2.1 There are many types of operation on board ship where the routine actions of one person may inadvertently endanger another or when a series of action steps need to be taken to ensure the safety of those engaged in a specific operation. In all instances it is necessary, before the work is done, to identify the hazards and then to ensure that they are eliminated or effectively controlled. Ultimate responsibility rests with the employer to see that this is done.

16.2.2 The permit to work system consists of an organised and pre-defined safety procedure. A permit-to-work does not in itself make the job safe, but contributes to measures for safe working.

16.2.3 The particular circumstances of individual ships will determine when permit-to-work systems should be used. In using a permit to work, the following principles apply:

- (a) The permit should be relevant and as accurate as possible. It should state the location and details of the work to be done, the nature and results of any preliminary tests undertaken, the measures undertaken to make the job safe and the safeguards that need to be taken during the operation.



- (b) The permit should specify the period of its validity (which should not exceed 24 hours) and any time limits applicable to the work which it authorises.
- (c) Only the work specified on the permit should be undertaken.
- (d) Before signing the permit, the authorising officer should ensure that all measures specified as necessary have in fact been taken.
- (e) The authorising officer retains responsibility for the work until he has either cancelled the permit or formally transferred it to another authorised person who should be made fully conversant with the situation. Anyone who takes over, either as a matter of routine or in an emergency, from the authorising officer, should sign the permit to indicate transfer of full responsibility.
- (f) The person responsible for carrying out the specified work should countersign the permit to indicate his understanding of the safety precautions to be observed.
- (g) On completion of the work, that person should notify the responsible officer and get the permit cancelled.
- (h) The person carrying out the specified work should not be the same person as the authorising officer.

16.2.4 Annex 16.1 gives examples of permits-to-work for various types of activity. The examples show the headings that may need to be covered. These should be adapted to the circumstances of the individual ship or the particular job to be carried out, in the light of the risk assessment.

16.3 Sanction-to-Test Systems

16.3.1 A sanction-to-test shall be issued in an identical manner to a permit-to-work. A sanction-to-test shall not be issued on any apparatus on which a permit-to-work is still in force, or on which another sanction-to-test is in force.



16.3.2 A sanction-to-test is to be issued where testing operations require the removal of the circuit Main Earth. Note: Maintenance and repair cannot be carried out under a sanction-to-test.

16.3.3 Annex 16.2 gives an example of a sanction-to-test for testing work carried out on electrical high voltage systems OVER 1000 Volts. The example shows the headings for each section and each section's requirements. These should be adapted to the circumstances of the individual ship or ship's electrical high voltage system or the particular job to be carried out, in light of the risk assessment.



ANNEX 16.1

This Annex contains suggested minimum headings for a Permit-to-Work under the following categories:

- 16.1.1 – Work in Unmanned Machinery Spaces
- 16.1.2 – Entry into Enclosed or Confined Space
- 16.1.3 – Machinery or Equipment
- 16.1.4 – Hot Work
- 16.1.5 – Working Aloft/Overside
- 16.1.6 – General Electrical (Under 1000 Volts)
- 16.1.7 – Electrical High Voltage (Over 1000 Volts)

Additional Permits-to-Work, following a similar format, may be required and developed for other categories of work.



ANNEX 16.1.1
PERMIT-TO-WORK –
WORK IN UNMANNED MACHINERY SPACES

Note (i): The Authorising Officer should indicate the sections applicable by ticks in the lefthand boxes next to headings, deleting any subheading not applicable.

Note (ii): The Authorising Officer should insert the appropriate details when the Sections for Other Work or Additional precautions are used.

Note (iii): The Authorised Person should tick each applicable righthand box as they make their check.

Note (iv): This Permit-to-Work contains 5 sections.

SECTION A – Scope of Work

Location (designation of space)

Plant Apparatus /Identification
 (designation of machinery / equipment)

Work to be done (description)

Permit issued to (name of person carrying out work or in charge of the work party)

SECTION B – Check List / Isolation Data

Has a risk assessment of the proposed work been carried out?

		Checked
Permission from engineer officer in charge	<input type="checkbox"/>	1
Reporting procedures established and checked	<input type="checkbox"/>	2
Warning notices in place	<input type="checkbox"/>	3
Bridge notified	<input type="checkbox"/>	4
Machinery space adequately lit	<input type="checkbox"/>	5



SECTION C – Authorising of permit

Period of validity of permit (should not exceed 24 hours)..... hours

I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.

Authorising person

(Name) (Signature)

(Time) (Date)

SECTION D – Receipt of Permit

I accept responsibility for carrying out the work on the apparatus detailed on this permit to work and no attempt will be made by me or people under my charge to work on any other apparatus or in any other area.

I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.

Competent person

(Name) (Signature)

(Time) (Date)

Note: After signing the receipt, this permit to work should be retained by the person in charge at the place where the work is being carried out until work is complete and the clearance section signed

SECTION E – Clearance of Permit

The work for which this permit to work was issued is now suspended* / completed* and all people under my charge have been withdrawn and warned that it is no longer safe to work on the apparatus detailed in this permit to work.

All work equipment, tools, test instruments etc have been removed

Competent person

(Name) (Signature)

(Time) (Date)

* Delete words not applicable and where appropriate state:

The work is complete* / incomplete* as follows: (description)

.....
.....
.....
.....



ANNEX 16.1.2
PERMIT-TO-WORK –
ENTRY INTO ENCLOSED OR CONFINED SPACE

Note (i): The Authorising Officer should indicate the sections applicable by ticks in the lefthand boxes next to headings, deleting any subheading not applicable.

Note (ii): The Authorising Officer should insert the appropriate details when the Sections for Other Work or Additional precautions are used.

Note (iii): The Authorised Person should tick each applicable righthand box as they make their check.

Note (iv): This Permit-to-Work contains 4 sections.

SECTION A – Scope of Work

Location (designation of space)

Plant Apparatus /Identification

(designation of machinery / equipment)

Work to be done (description)

Permit issued to (name of person carrying out work or in charge of the work party)

SECTION B – Check List / Isolation Data

Has a risk assessment of the proposed work been carried out?

Checklist

		Checked
1 Space thoroughly ventilated	<input type="checkbox"/>	1
2 Atmosphere tested and found safe	<input type="checkbox"/>	2
3 Space secured for entry	<input type="checkbox"/>	3
4 Rescue and resuscitation equipment available at entrance	<input type="checkbox"/>	4
5 Testing equipment available for regular checks	<input type="checkbox"/>	5
6 Responsible person in attendance at entrance	<input type="checkbox"/>	6



ANNEX 16.1.3

PERMIT-TO-WORK – MACHINERY OR EQUIPMENT

Note (i): The Authorising Officer should indicate the sections applicable by ticks in the lefthand boxes next to headings, deleting any subheading not applicable.

Note (ii): The Authorising Officer should insert the appropriate details when the Sections for Other Work or Additional precautions are used.

Note (iii): The Authorised Person should tick each applicable righthand box as they make their check.

Note (iv): This Permit-to-Work contains 5 sections.

SECTION A – Scope of Work

Location (designation of space)

.....

Plant Apparatus /Identification

(designation of machinery / equipment)

.....

.....

Work to be done (description)

.....

.....

Permit issued to (name of person carrying out work or in charge of the work party)

.....

SECTION B – Check List / Isolation Data

Has a risk assessment of the proposed work been carried out?

Checked

Removed from service/isolated from sources of power or heat 1

All relevant personnel informed 2

Warning notices displayed 3

SECTION C – Authorising of permit

Period of validity of permit (should not exceed 24 hours)..... hours

I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.



Authorising person

(Name) (Signature)

(Time) (Date)

SECTION D – Receipt of Permit

I accept responsibility for carrying out the work on the apparatus detailed on this permit to work and no attempt will be made by me or people under my charge to work on any other apparatus or in any other area. I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.

Safety Key No Received* /Applied*

Competent person

(Name) (Signature)

(Time) (Date)

Note: After signing the receipt, this permit to work should be retained by the person in charge at the place where the work is being carried out until work is complete and the clearance section signed

SECTION E – Clearance of Permit

The work for which this permit to work was issued is now suspended* / completed* and all people under my charge have been withdrawn and warned that it is no longer safe to work on the apparatus detailed in this permit to work.

All work equipment, tools, test instruments etc have been removed

Safety Key No Received* /Applied*

Competent person

(Name) (Signature)

(Time) (Date)

* Delete words not applicable and where appropriate state:

The work is complete* / incomplete* as follows: (description)

.....
.....
.....
.....
.....
.....



ANNEX 16.1.4

PERMIT-TO-WORK –

HOT WORK

Note (i): The Authorising Officer should indicate the sections applicable by ticks in the lefthand boxes next to headings, deleting any subheading not applicable.

Note (ii): The Authorising Officer should insert the appropriate details when the Sections for Other Work or Additional precautions are used.

Note (iii): The Authorised Person should tick each applicable righthand box as they make their check.

Note (iv): This Permit-to-Work contains 5 sections.

SECTION A – Scope of Work

Location (designation of space)

.....

Plant Apparatus /Identification

(designation of machinery / equipment)

.....

.....

Work to be done (description)

.....

.....

Permit issued to (name of person carrying out work or in charge of the work party)

SECTION B – Check List / Isolation Data

Has a risk assessment of the proposed work been carried out?

	Checked
Area clear of dangerous material and gas-free	<input type="checkbox"/> 1
Adjacent areas checked	<input type="checkbox"/> 2
Ventilation adequate	<input type="checkbox"/> 3
Fire watchman posted /instructed	<input type="checkbox"/> 4
Equipment in good order	<input type="checkbox"/> 5
Fire appliances in good order and accessible	<input type="checkbox"/> 6
Personal protective equipment:	<input type="checkbox"/> 7
Hard hats, overalls, leather gauntlets/apron, safety spectacles, visor etc	<input type="checkbox"/>

SECTION C – Authorising of permit

Period of validity of permit (should not exceed 24 hours)..... hours

I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.

Authorising person

(Name) (Signature)

(Time) (Date)

SECTION D – Receipt of Permit

I accept responsibility for carrying out the work on the apparatus detailed on this permit to work and no attempt will be made by me or people under my charge to work on any other apparatus or in any other area.

I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.

Competent person

(Name) (Signature)

(Time) (Date)

Note: After signing the receipt, this permit to work should be retained by the person in charge at the place where the work is being carried out until work is complete and the clearance section signed

SECTION E – Clearance of Permit

The work for which this permit to work was issued is now suspended* / completed* and all people under my charge have been withdrawn and warned that it is no longer safe to work on the apparatus detailed in this permit to work.

All work equipment, tools, test instruments etc have been removed

Competent person

(Name) (Signature)

(Time) (Date)

* Delete words not applicable and where appropriate state:

The work is complete* / incomplete* as follows: (description)

.....
.....
.....
.....



ANNEX 16.1.5
PERMIT-TO-WORK –
WORKING ALOFT/OVERSIDE

Note (i): The Authorising Officer should indicate the sections applicable by ticks in the lefthand boxes next to headings, deleting any subheading not applicable.

Note (ii): The Authorising Officer should insert the appropriate details when the Sections for Other Work or Additional precautions are used.

Note (iii): The Authorised Person should tick each applicable righthand box as they make their check.

Note (iv): This Permit-to-Work contains 5 sections.

SECTION A – Scope of Work

Location (designation of space)

.....

Plant Apparatus /Identification

(designation of machinery / equipment)

.....

.....

Work to be done (description)

.....

.....

Permit issued to (name of person carrying out work or in charge of the work party)

SECTION B – Check List / Isolation Data

Has a risk assessment of the proposed work been carried out?

	Checked
Duty Officer informed	<input type="checkbox"/> 1
Warning notices posted	<input type="checkbox"/> 2
On-deck supervisor identified	<input type="checkbox"/> 3
Equipment in good order	<input type="checkbox"/> 4
Work on funnel:	<input type="checkbox"/> 5
- advise Duty Engineer	<input type="checkbox"/>
- isolate whistle, if appropriate	<input type="checkbox"/>
Work near Radar Scanners/Radio Aerials	<input type="checkbox"/> 6
- isolate radar and scanner/radio room notified	<input type="checkbox"/>
- notices placed to stop use of radar/radio	<input type="checkbox"/>



Work overside:	<input type="checkbox"/>	7
- advise duty officer/engineer	<input type="checkbox"/>	
- lifebuoy and line ready	<input type="checkbox"/>	
Personal protective equipment required:	<input type="checkbox"/>	8
- safety helmet	<input type="checkbox"/>	
- safety harness and line attached to a strong point	<input type="checkbox"/>	
- lifejacket	<input type="checkbox"/>	
As necessary, all tools to be taken aloft secured by lanyard/ bag/ belt	<input type="checkbox"/>	9

SECTION C – Authorising of permit

Period of validity of permit (should not exceed 24 hours)..... hours

I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.

Authorising person

(Name) (Signature)

(Time) (Date)

SECTION D – Receipt of Permit

I accept responsibility for carrying out the work on the apparatus detailed on this permit to work and no attempt will be made by me or people under my charge to work on any other apparatus or in any other area.

I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.

Competent person

(Name) (Signature)

(Time) (Date)

Note: After signing the receipt, this permit to work should be retained by the person in charge at the place where the work is being carried out until work is complete and the clearance section signed.



ANNEX 16.1.6
PERMIT-TO-WORK –
GENERAL ELECTRICAL (UNDER 1000 VOLTS)

Note (i): The Authorising Officer should indicate the sections applicable by ticks in the lefthand boxes next to headings, deleting any subheading not applicable.

Note (ii): The Authorising Officer should insert the appropriate details when the Sections for Other Work or Additional precautions are used.

Note (iii): The Authorised Person should tick each applicable righthand box as they make their check.

Note (iv): This Permit-to-Work contains 6 sections.

SECTION A – Scope of Work

Location (designation of space)

Plant Apparatus /Identification

(designation of machinery / equipment)

Work to be done (description)

Permit issued to (name of person carrying out work or in charge of the work party)

Section B – Check List / Isolation Data

Has a risk assessment of the proposed work been carried out?

The above apparatus is dead and has been isolated from the system at the following points (Description)

Safety Locks (Detail location fitted and identify lock set)



Additional Precautions to avoid danger have been taken by
(Description)
.....
.....

Caution/Danger notices have been applied at all points of isolation, and Safety Signs appropriately positioned.

TREAT ALL OTHER APPARATUS AND AREAS AS DANGEROUS

.....
.....
.....
.....
.....
.....

SECTION C – Authorising of permit

Period of validity of permit (should not exceed 24 hours)..... hours

I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.

Authorising person

(Name) (Signature)

(Time) (Date)

SECTION D – Receipt of Permit

I accept responsibility for carrying out the work on the apparatus detailed on this permit to work and no attempt will be made by me or people under my charge to work on any other apparatus or in any other area.

I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.

Safety Key No Received* /Applied*

Competent person

(Name) (Signature)

(Time) (Date)

Note: After signing the receipt, this permit to work should be retained by the person in charge at the place where the work is being carried out until work is complete and the clearance section signed



ANNEX 16.1.7
PERMIT-TO-WORK –
ELECTRICAL HIGH VOLTAGE (OVER 1000 VOLTS)

Note (i): The Authorising Officer should indicate the sections applicable by ticks in the lefthand boxes next to headings, deleting any subheading not applicable.

Note (ii): The Authorising Officer should insert the appropriate details when the Sections for Other Work or Additional precautions are used.

Note (iii): The Authorised Person should tick each applicable righthand box as they make their check.

Note (iv): This Permit-to-Work contains 6 sections.

SECTION A – Scope of Work

Location (designation of space)

Plant Apparatus /Identification

(designation of machinery / equipment)

Work to be done (description)

Permit issued to (name of person carrying out work or in charge of the work party)

Section B – Check List / Isolation Data

Has a risk assessment of the proposed work been carried out?

The above apparatus is dead and has been isolated from the system at the following points (Description)

Circuit Main Earths have been applied to the equipment at the following points. (Description)



Safety Locks

(Detail location fitted and identify lock set)
.....

Additional Precautions to avoid danger have been taken by

(Description)
.....

Caution/Danger notices have been applied at all points of isolation, and Safety Signs appropriately positioned.

TREAT ALL OTHER APPARATUS AND AREAS AS DANGEROUS

.....
.....
.....
.....
.....

SECTION C – Authorising of permit

Period of validity of permit (should not exceed 24 hours)..... hours

I hereby declare that the above equipment is dead and isolated from all live conductors.

Authorising person

(Name) (Signature)

(Time) (Date)

SECTION D – Receipt of Permit

I accept responsibility for carrying out the work on the apparatus detailed on this permit to work and no attempt will be made by me or people under my charge to work on any other apparatus or in any other area.

I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.

Safety Key No Received* /Applied*

Competent person

(Name) (Signature)

(Time) (Date)

Note: After signing the receipt, this permit to work should be retained by the person in charge at the place where the work is being carried out until work is complete and the clearance section signed



ANNEX 16.2

This Annex contains suggested minimum headings for a Sanction-to-Test under the following category:

16.2.1 Electrical high voltage (over 1000 volts)

Additional Sanctions-to Test, following a similar format, may be required and developed for other categories of work.



ANNEX 16.2.1

SANCTION-TO-TEST – ELECTRICAL HIGH VOLTAGE SYSTEMS (OVER 1000 VOLTS)

Note (i): The Authorising Officer should indicate the sections applicable by ticks in the left hand boxes next to headings, deleting any subheading not applicable.

Note (ii): The Authorising Officer should insert the appropriate details when the Sections for Other Work or Additional precautions are used.

Note (iii): The Authorised Person should tick each applicable righthand box as they make their check.

Note (iv): This Sanction-to-Test contains 6 sections.

SECTION A – Scope of Work

Location (designation of space)

.....

Plant Apparatus /Identification

(designation of machinery / equipment)

.....

.....

Work to be done (description)

.....

.....

Permit issued to (name of person carrying out work or in charge of the work party)

.....

Section B – Check List / Isolation Data

Has a risk assessment of the proposed work been carried out?

The above apparatus is dead and has been isolated from the system at the following points (Description)

.....

.....

Circuit Main Earths have been applied to the equipment at the following points.

(These Earths may be removed and replaced to your instructions)

(Description)

.....

.....



Safety Locks

(Detail location fitted and identify lock set)
.....

Additional Precautions to avoid danger have been taken by

(Description)
.....

Caution/Danger notices have been applied at all points of isolation, and Safety Signs appropriately positioned.

TREAT ALL OTHER APPARATUS AND AREAS AS DANGEROUS

.....
.....
.....
.....
.....

SECTION C – Authorising of Sanction-to-Test

Period of validity of sanction-to-test (should not exceed 24 hours) hours
I hereby declare that the above equipment is dead and isolated from all live conductors and connected to earth.

Authorising person

(Name) (Signature)
(Time) (Date)

SECTION D – Receipt of Sanction-to-Test

I accept responsibility for carrying out the work on the apparatus detailed on this sanction-to-test and no attempt will be made by me or people under my charge to work on any other apparatus or in any other area. I am satisfied that all precautions have been taken and that safety arrangements will be maintained for the duration of the work.

Safety Key No Received* /Applied*

Competent person

(Name) (Signature)
(Time) (Date)

Note: After signing the receipt, this sanction-to-test should be retained by the person in charge at the place where the work is being carried out until work is complete and the clearance section signed



CHAPTER 17

ENTERING ENCLOSED OR CONFINED SPACES

17.1 Introduction

17.1.1 Based on the findings of the risk assessment, appropriate control measures should be put into place to protect those who may be affected. This Chapter highlights suggested control measures for entry into enclosed or confined spaces.

17.1.2 The Regulations define a “Dangerous Space” as: “Any enclosed or confined space in which it is foreseeable that the atmosphere may at some stage contain toxic or flammable gases or vapours, or be deficient in oxygen, to the extent that it may endanger the life or health of any person entering that space”. **The atmosphere of any enclosed or confined space is potentially dangerous.** The space may be deficient in oxygen and/or contain flammable or toxic fumes, gases or vapours. Where possible, alternative means of working which avoid entering the space should be found.

17.1.3 The Regulations say that “Except when necessary for entry thereto, the master of a ship shall ensure that all entrances to unattended dangerous spaces on the ship are either kept closed or otherwise secured against entry”. When determining whether a space can be regarded as dangerous it should be remembered that **any space** deprived of regular and constant ventilation can become “dangerous”. This could include spaces which would not normally be regarded as such. Some places which fall within the definition of a “Dangerous Space” may be so only occasionally, perhaps due to the type of work to be undertaken, for example, a compartment during spray painting. A “Dangerous Space” may not necessarily be enclosed on all sides, for example ships’ holds may have open



tops, but the nature of the cargo makes the atmosphere in the lower hold dangerous. Such places are not usually considered to be Dangerous Spaces but may become so because of a change in the condition inside or a change in the degree of enclosure or confinement, which may occur intermittently. Personnel need to be aware of any space onboard a ship that has not been opened for some time. Examples of such spaces:

Cargo pump rooms

Some machinery spaces

Holds

This is not an exhaustive list and awareness of potential risks is necessary for all spaces onboard ship. **If in any doubt, such a space should be regarded as dangerous and appropriate action taken.**

17.1.4 Should there be any unexpected reduction in or loss of the means of ventilation of those spaces that are usually continuously or adequately ventilated then such spaces should also be dealt with as dangerous spaces.

17.1.5 When it is suspected that there could be a deficiency of oxygen in any space, or that toxic gases, vapours or fumes could be present, then such a space should be considered to be a dangerous space.

17.2 Precautions on Entering Dangerous Enclosed or Confined Spaces

17.2.1 The following precautions should be taken as appropriate before a potentially dangerous space is entered so as to make the space safe for entry without breathing apparatus and to ensure it remains safe whilst persons are within the space.

1. A competent person should make an assessment of the space and a responsible officer to take charge of the operation should be appointed - see 17.3
2. The potential hazards should be identified - see 17.4
3. The space should be prepared and secured for entry - see 17.5



4. The atmosphere of the space should be tested - see 17.6
5. **A “permit-to-work” system should be used** - see 17.7
6. Procedures before and during the entry should be instituted - see 17.8 and 17.9

17.2.2 Where the procedures listed at 1 to 4 in the previous paragraph have been followed and it has been established that the atmosphere in the space is or could be unsafe then the additional requirements including the use of breathing apparatus specified in 17.11 should also be followed.

17.2.3 No one should enter any dangerous space to attempt a rescue without taking suitable precautions for his own safety since not doing so would put his own life at risk and almost certainly prevent the person he intended to rescue being brought out alive.

17.2.4 An Emergency Escape Breathing Device (EEBD) is a supplied air or oxygen device , only to be used for escape from a compartment that has a hazardous atmosphere, they should not be worn by a rescuer to attempt a rescue of persons in any circumstances.

17.2.5 EEBDs shall not be used to fight fires, entering oxygen deficient voids or tanks, or worn by fire fighters. In these events, a self-contained breathing apparatus, which is specifically suited for such applications, should be used. If it is found that it is not possible to enter a tank wearing a self-contained breathing apparatus the bottle harness can be removed and passed through the access but the face mask must always be worn.

17.2.6 It is recommended that any person entering a potentially dangerous space should wear a personal gas detection meter capable of detecting oxygen deficiency, toxic gases and explosive atmospheres.



17.3 Duties and Responsibilities of a Competent Person and of a Responsible Officer

17.3.1 A competent person is a person capable of making an informed assessment of the likelihood of a dangerous atmosphere being present or arising subsequently in the space. This person should have sufficient theoretical knowledge and practical experience of the hazards that might be met in order to be able to assess whether precautions are necessary. This assessment should include consideration of any potential hazards associated with the particular space to be entered. It should also take into consideration dangers from neighbouring or connected spaces as well as the work that has to be done within the space.

17.3.2 A responsible officer is a person appointed to take charge of every operation where entry into a dangerous space is necessary. This officer may be the same as the competent person (see 17.3.1 above) or another officer. Both the competent person and/or the responsible officer may be a shore-side person.

17.3.3 It is for the responsible officer to decide on the basis of the risk assessment the procedures to be followed for entry into a potentially dangerous space. These will depend on whether the assessment shows:

- (a) there is a minimal risk to the life or health of a person entering the space then or at any future time;
- (b) there is no immediate risk to health and life but a risk could arise during the course of work in the space; or
- (c) the risk to life or health is immediate.

17.3.4 Where the assessment shows that there is no immediate risk to health or life but that a risk could arise during the course of the work in the space the precautions described in sections 17.4 to 17.9 should be taken as appropriate.



17.3.5 Where the risk to health or life is immediate then the additional requirements specified in section 17.11 are necessary.

17.3.6 For inland water vessels such as harbour craft either or both the competent person and the responsible officer may only be available from shore-based personnel. No entry into a potentially dangerous space should be made in these circumstances until such suitably qualified persons are available.

17.4 Identifying Potential Hazards

Oxygen Deficiency

17.4.1 If an empty tank or other confined space has been closed for a time the oxygen content may have been reduced owing to a number of reasons:

- (a) Rusting may have occurred due to oxygen combining with steel.
- (b) Oxygen absorbing chemicals may have been present.
- (c) Oxygen absorbing cargoes may have been carried or gases from volatile cargoes may have displaced the oxygen in tanks.
- (d) Hydrogen may have been produced in a cathodically-protected cargo tank used for ballast.
- (e) Oxygen may have been displaced by the use of carbon dioxide or other fire-extinguishing or -preventing media, or inert gas in the tanks or inter-barrier spaces of tankers or gas carriers.

Toxicity of Oil Cargoes

17.4.2 Hydrocarbon gases are flammable as well as toxic and may be present in fuel or cargo tanks which have contained crude oil or its products.

17.4.3 Hydrocarbon gases or vapours may also be present in pump rooms and cofferdams, duct keels or other spaces adjacent to cargo tanks due to the leakage of cargo.



17.4.4 The components in the vapour of some oil cargoes, such as benzene and hydrogen sulphide are very toxic.

Toxicity of Other Substances

17.4.5 Cargoes carried in chemical tankers or gas carriers may be toxic.

17.4.6 There is the possibility of leakage from drums of chemicals or other packages of dangerous goods where there has been mishandling or incorrect stowage or damage due to heavy weather.

17.4.7 The trace components in inert gas such as carbon monoxide, sulphur dioxide, nitric oxide and nitrogen dioxide are very toxic.

17.4.8 The interaction of vegetable or animal oils or sewage with sea water may lead to the release of hydrogen sulphide which is very toxic.

17.4.9 Hydrogen sulphide or other toxic gases may be generated where the residue of grain or similar cargoes permeates into or chokes bilge pumping systems.

17.4.10 The chemical cleaning, painting or the repair of tank coatings may involve the release of solvent vapours.

Flammability

17.4.11 Flammable vapours may still be present in cargo or other tanks that have contained oil products or chemical or gas cargoes.

17.4.12 Cofferdams and other spaces that are adjacent to cargo and other tanks may contain flammable vapours should there have been leakage into the space.



Other Hazards

17.4.13 Although the inhalation of contaminated air is the most likely route through which harmful substances enter the body, some chemicals can be absorbed through the skin.

17.4.14 Some of the cargoes carried in chemical tankers and gas carriers are irritant or corrosive if permitted to come into contact with the skin.

17.4.15 The disturbance of rust, scale or sludge residues of cargoes of animal, vegetable or mineral origin, or of water that could be covering such substances may lead to the release of toxic or flammable gases.

17.5 Preparing and Securing the Space for Entry

17.5.1 When opening the entrance to a potentially dangerous space, precautions should be taken in case pressurised or unpressurised vapour or gases are released from the space.

17.5.2 The space should be isolated and secured against the ingress of dangerous substances by blanking off pipe-lines or other openings and by closing valves.

Valves should then be lashed or some other means used to indicate that they are not to be opened and notices placed on the relevant controls. The officer on watch should be informed.



17.5.3 Where necessary, any sludge or other deposit liable to give off fumes should be cleaned out. This may in itself lead to the release of gases, and precautions should be taken (see 17.11).

17.5.4 The space should be thoroughly ventilated either by natural or mechanical means and then tested (see 17.6) to ensure that all harmful gases are removed and no pockets of oxygen deficient atmosphere remain.

17.5.5 Compressed oxygen should not be used to ventilate any space.



17.5.6 Where necessary pumping operations or cargo movements should be suspended when entry is being made into a dangerous space.

17.6 Testing the Atmosphere of the Space

17.6.1 Testing of a space should be carried out only by persons trained in the use of the equipment.

17.6.2 Testing should be carried out before entry and at regular intervals thereafter.

17.6.3 If possible, the testing of the atmosphere before entry should be made by remote means. If this is not possible, the person selected to enter the space to test the atmosphere should only do so in accordance with the additional precautions specified in 17.11, which include the wearing of breathing apparatus.

17.6.4 Where appropriate, the testing of the space should be carried out at different levels.

17.6.5 Personal monitoring equipment is designed for personal use only, to provide a warning against oxygen deficiency, toxic gases and explosive atmospheres whilst the wearer is in the space. This should not be used as a means of determining whether a dangerous space is safe prior to entry.



Testing for Oxygen Deficiency

17.6.6 A steady reading of at least 20% oxygen by volume on an oxygen content meter should be obtained before entry is permitted.

17.6.7 A combustible gas indicator cannot be used to detect oxygen deficiency.

Testing for Flammable Gases and Vapours

17.6.8 The combustible gas indicator (sometimes called an explosimeter) detects the amount of flammable gas or vapour in the air. An instrument capable of providing an accurate reading at low concentrations should be used to judge whether the atmosphere is safe for entry.

17.6.9 Combustible gas detectors are calibrated on a standard gas. When testing for other gases and vapours reference should be made to the calibration curves supplied with the instrument. Particular care is required should accumulations of hydrogen be suspected.

17.6.10 In deciding whether the atmosphere is safe to work in, a 'nil' reading on a suitably sensitive combustible gas indicator is desirable but, where the readings have been steady for some time, up to 1% of lower flammable limit may be accepted, eg for hydrocarbons in conjunction with an oxygen reading of at least 20% by volume.

17.6.11 Direct measurement of trace components of inert gas (see 17.4.7) is not required when the gas freeing of the atmosphere of a tank reduces the hydrocarbon concentration from about 2% by volume to 1% of lower flammable limit or less in conjunction with a steady oxygen reading of at least 20% by volume, because this is sufficient to dilute the components to a safe concentration. If, before the commencement of gas freeing, the hydrocarbon concentration of a tank containing inert gas is below 2% by volume due to excessive purging by inert gas, then additional gas freeing is necessary to remove toxic products introduced with the inert gas. It is difficult to measure



the quantities of these toxic products at the safe level without specialised equipment and trained personnel. If this equipment is not available for use, the period of gas freeing should be considerably extended.

Testing for Toxic Gases

17.6.12 The presence of certain gases and vapours on chemical tankers and gas carriers is detected by fixed or portable gas or vapour detection equipment. The readings obtained by this equipment should be compared with the occupational exposure limits for the contaminant given in international industry safety guides or the latest edition of the Health and Safety Executive Guidance Note EH-40 Occupational Exposure Limits. These occupational exposure limits provide guidance for the level of exposure to toxic substances which should not be exceeded if the health of persons is to be protected. However, it is necessary to know for which chemical a test is being made in order to use the equipment correctly and it is important to note that not all chemicals may be tested by these means.

17.6.13 When a toxic chemical is encountered for which there is no means of testing then the additional requirements specified in 17.11 should also be followed.

17.6.14 A combustible gas indicator will probably not be suitable for measuring levels of gas at or around its occupational exposure limit, where there is solely a toxic, rather than a flammable, risk. This level will be much lower than the flammable limit, and the indicator will probably not be sufficiently sensitive to give accurate readings.

17.7 Use of Control systems

17.7.1 Entry into a dangerous space should be planned in advance and use should preferably be made of a 'permit-to-work' system. Details of the arrangements to be followed in a 'permit-to-work' system are described in section 16.2. A sample "permit to work" is at Annex 1 of Chapter 16.



17.7.2 For situations for which a well established safe system of work exists a check-list may exceptionally be accepted as an alternative to a full 'permit-to-work' provided that the principles of the 'permit-to-work' system are covered and the risks arising in the dangerous space are low.

17.8 Procedures and Arrangements Before Entry

17.8.1 Access to and within the space should be adequate and well illuminated.

17.8.2 No source of ignition should be taken or put into the space unless the master or responsible officer is satisfied that it is safe to do so.

17.8.3 In all cases rescue and available resuscitation equipment should be positioned ready for use at the entrance to the space. Rescue equipment means breathing apparatus together with fully charged spare cylinders of air, life lines and rescue harnesses, and torches or lamp, approved for use in a flammable atmosphere, if appropriate. A means of hoisting an incapacitated person from the confined space may be required.

17.8.4 The number of personnel entering the space should be limited to those who actually need to work in the space. When necessary a rescue harness should be worn to facilitate recovery in the event of an accident.

17.8.5 At least one attendant should be detailed to remain at the entrance to the space whilst it is occupied.

17.8.6 An agreed and tested system of communication should be established between any person entering the space and the attendant at the entrance, and between the attendant at the entrance to the space and the officer on watch.

17.8.7 Before entry is permitted it should be established that entry with



breathing apparatus is possible. Any difficulty of movement within any part of the space, or any problems if any incapacitated person had to be removed from the space, as a result of breathing apparatus or lifelines or rescue harnesses being used, should be considered and any risks minimised.

17.8.8 Lifelines should be long enough for the purpose and capable of being firmly attached to the harness, but the wearer should be able to detach them easily should they become tangled.

17.9 Procedures and Arrangements During Entry

17.9.1 Ventilation should continue during the period that the space is occupied and during temporary breaks. In the event of a failure of the ventilation system any personnel in the space should leave immediately.

17.9.2 The atmosphere should be tested periodically whilst the space is occupied and personnel should be instructed to leave the space should there be any deterioration of the conditions. Should a personal gas detector alarm, the space should be vacated by all persons immediately.

17.9.3 If unforeseen difficulties or hazards develop, the work in the space should be stopped and the space evacuated so that the situation can be re-assessed. Permits should be withdrawn and only re-issued, with any appropriate revisions, after the situation has been re-assessed.

17.9.4 If any personnel in a space feel in any way adversely affected they should give the pre-arranged signal to the attendant standing by the entrance and immediately leave the space.

17.9.5 Should an emergency occur the general (or crew) alarm should be sounded so that back-up is immediately available to the rescue team. Under no circumstances should the attendant enter the space before help has arrived and the situation has been evaluated to ensure the safety of those entering the space to undertake the rescue.



17.9.6 If air is being supplied through an air line to the person who is unwell, a check should be made immediately that the air supply is being maintained at the correct pressure.

17.9.7 Once the casualty is reached, the checking of the air supply must be the first priority. Unless he is gravely injured, eg a broken back, he should be removed from the dangerous space as quickly as possible.

17.10 Procedures on completion

17.10.1 On expiry of the 'permit-to-work', everyone should leave the space and the entrance to the space should be closed or otherwise secured against entry or alternatively, where the space is no longer a dangerous space, declared safe for normal entry.

17.11 Additional Requirements for Entry into a Space where the Atmosphere is Suspect or Known to be Unsafe

17.11.1 If the atmosphere is considered to be suspect or unsafe to enter, then the space should only be entered if it is essential for testing purposes, for the safety of life or of the ship, or for the working of the ship. Breathing apparatus should always be worn (see 17.13). The number of persons entering the space should be the minimum compatible with the work to be performed.

17.11.2 Except in the case of an emergency, or where impracticable because movement in the space would be seriously impeded, two air supplies as described in 17.13.2 should be available. While working the wearer should use the continuous supply provided from outside the space. If it becomes necessary to change over to the self-contained supply, the user should immediately exit from the space.

17.11.3 Precautions should be taken against any disruption to the air supply while the individual is inside the enclosed space. Special attention should be given to supplies originating from the engine room.



17.11.4 Where remote testing of the space (as recommended in 17.6.3) is not reasonably practicable, or where a brief inspection only is required, a single air supply may be acceptable provided that the wearer of breathing apparatus is so situated that he can be hauled out immediately in the case of an emergency.

17.11.5 In addition to rescue harnesses, wherever practicable lifelines should be used. Lifelines should be attended by a person stationed at the entrance who has been trained in how to pull an unconscious person from a dangerous space. If hoisting equipment would be required for any rescue, arrangements should be made to ensure that personnel would be available to operate it as soon as necessary.

17.11.6 When appropriate, portable lights and other electrical equipment should be of a type approved for use in a flammable atmosphere.

17.11.7 Should there be any hazard due to chemicals, whether in liquid, gaseous or vapour form, coming into contact with the skin and/or eyes then protective clothing should be worn.

17.12 Training, Instruction and Information

17.12.1 Employers should provide any necessary training, instruction and information to employees in order to ensure that the requirements of the Entry into Dangerous Spaces Regulations are complied with. This should include:

1. recognition of the circumstances and activities likely to lead to the presence of a dangerous atmosphere,
2. the hazards associated with entry into dangerous spaces, and the precautions to be taken,
3. the use and maintenance of equipment and clothing required for entry into dangerous spaces,
4. instruction and drills in rescue from dangerous spaces.



17.13 Breathing Apparatus and Resuscitation Equipment

17.13.1 No one should enter a space where the atmosphere is unsafe or suspect without wearing breathing apparatus which they are trained to use, even to rescue another person.

17.13.2 As described in 17.11.2, breathing apparatus for those working in a dangerous space will usually comprise a continuous supply from outside the space and a self-contained supply to enable the wearer to escape to a safe atmosphere in the event of difficulty with, or failure of, the continuous supply. It should not be necessary to remove any part of the equipment or any protective clothing to change over to the self-contained supply.

17.13.3 Equipment for use with two air supplies may consist of:

*EN 137: 2006, Self contained open-circuit contained compressed air breathing apparatus.
BS 1146: 2005, Self contained open-circuit breathing apparatus incorporating a hood.*

- (a) a conventional self-contained breathing apparatus of the open circuit compressed air type that is approved to EN 137:1993 and has been additionally tested for use with an air line connection; or
- (b) a compressed air line breathing apparatus incorporating an emergency self-contained supply. The compressed air line breathing apparatus should be of the demand valve type and should be approved to EN 139:1995, or for self-rescue purposes, to BS 1146: 1997 (or equivalent Standard). The emergency self-contained supply should comply with the relevant parts of the appropriate Standard.

The capacity of the self-contained supply should be sufficient for the wearer to escape to a safe atmosphere. When determining this capacity it should be recognised that, under stress or in difficult conditions, the wearer's breathing rate may be in excess of the nominal breathing rate of 40 litres per minute.

17.13.4 The responsible officer should make sure that the supply of air from outside the space is continuous and is available only to those working in the space. Pipeline or hoses supplying air should be placed so that they are not likely to be so distorted that supply might be interrupted or damaged. If the purpose for which such air lines are used is not immediately apparent to



personnel not engaged in the entry, then notices should be posted at appropriate positions. Where a mechanical pump is being used it should frequently be checked carefully to ensure that it continues to operate properly. Any air pumped directly into a pipeline or put into reserve bottles must be filtered and should be as fresh as possible. Pipelines or hoses used to supply air should be thoroughly blown through to remove moisture and freshen the air before connection to breathing apparatus and face masks. It is essential that where the air supply is from a compressor sited in a machinery space, the engineer of the watch be informed so that the compressor is not shut-down until the work is completed.

17.13.5 Everyone likely to use breathing apparatus must be instructed by a competent person in its proper use.

17.13.6 The master, or responsible officer, and the person about to enter the space should undertake the full pre-wearing check and donning procedures recommended in the manufacturer's instructions. In particular they should check:-

1. that there will be sufficient clean air at the correct pressure;
2. that low pressure alarms are working properly;
3. that the facemask fits correctly against the user's face so that, combined with pressure of the air coming into the mask, there will not be an ingress of oxygen deficient air or toxic vapours when the user inhales. It should be noted that facial hair or spectacles may prevent the formation of an air-tight seal between a person's face and the facemask;
4. that the wearer of the breathing apparatus understands whether or not their air supply may be shared with another person and if so is also aware that such procedures should only be used in an extreme emergency;
5. that when work is being undertaken in the space the wearer should keep the self-contained supply for use when there is a failure of the continuous supply from outside the space.



17.13.7 When in a dangerous space:-

1. No one should remove their own breathing apparatus.
2. Breathing apparatus should not be removed from a person unless it is necessary to save their life.

17.13.8 It is recommended that resuscitators of an appropriate kind should be provided where any person may be required to enter a dangerous space. Where entry is expected to occur at sea the ship should be provided with appropriate equipment. Otherwise entry should be deferred until the ship has docked and use can be made of shore side equipment.

Maintenance of Equipment for entry into dangerous spaces

17.13.9 All breathing apparatus, rescue harnesses, lifelines, resuscitation equipment and any other equipment provided for use in, or in connection with, entry into dangerous spaces, or for use in emergencies, should be properly maintained, inspected periodically and checked for correct operation by a competent person and a record of the inspections and checks should be kept. All items of breathing apparatus should be inspected for correct operation before and after use.

17.13.10 Equipment for testing the atmosphere of dangerous spaces, including oxygen meters, should be kept in good working order and, where applicable, regularly serviced and calibrated. Due regard should be paid to manufacturers' recommendations which should always be kept with the equipment.



CHAPTER 18

BOARDING ARRANGEMENTS

18.1 Introduction

18.1.1 Based on the findings of the risk assessment, appropriate control measures should be put into place to protect those who may be affected. This chapter highlights some areas which may require attention in respect of boarding arrangements.

18.2 Positioning of Boarding Equipment

18.2.1 The angles of inclination of a gangway or accommodation ladder should be kept within the limits for which it was designed. Gangways should not be used at an angle of inclination greater than 30° from the horizontal and accommodation ladders should not be used at an angle greater than 55° from the horizontal, unless specifically designed for greater angles.

18.2.2 When the inboard end of the gangway or accommodation ladder rests on or is flush with the top of the bulwark, a bulwark ladder should be provided. Any gap between the bulwark ladder and the gangway or accommodation ladder should be adequately fenced to a height of at least 1 metre.

18.2.3 Gangways and other access equipment should not be rigged on ships' rails unless the rail has been reinforced for that purpose. They should comply with the guidance in Annex 18.1.

18.2.4 The means of access should be checked to ensure that it is safe to use after rigging. There should be further checks to ensure that adjustments are made when necessary due to tidal movements or change of trim and freeboard. Guard ropes, chains etc should be kept taut at all times and stanchions should be rigidly secured.

18.2.5 Each end of a gangway or accommodation or other ladder should provide safe access to a safe place or to an auxiliary safe access.



18.2.6 The means of access should be sited clear of the cargo working area and so placed that no suspended load passes over it. Where this is not practicable, access should be supervised at all times.

18.2.7 A life-buoy should be available and ready for use at the point of access aboard the ship.

18.3 Lighting and Safety of Movement

18.3.1 In normal circumstances, the boarding equipment and the immediate approaches to it should be effectively illuminated from the ship or the shore to at least a level of 20 lux, as measured at a height of 1 metre above the surface of the means of access or its immediate approaches. Where the dangers of tripping or falling are greater than usual because of bad weather conditions or where the means of access is obscured, eg by the presence of coal dust, consideration should be given to a higher minimum level of say 30 lux.

18.3.2 The means of boarding and its immediate approaches should be kept free from obstruction and, as far as is reasonably practicable, kept clear of any substance likely to cause a person to slip or fall. Where this is not possible, appropriate warning notices should be posted and if necessary the surfaces suitably treated.

18.4 Portable and Rope Ladders

18.4.1 Where, exceptionally, a portable ladder is used for the purpose of access to the ship, it is very important that the ladder is checked regularly by a competent person, and that account is taken of vessel movement and tide changes.

18.4.2 When it is necessary to use a portable ladder for access it should be used at an angle of between 60° and 75° from the horizontal. The ladder should extend at least 1 metre above the upper landing place unless there



are other suitable handholds. It should be properly secured against slipping or shifting sideways or falling and be so placed as to afford a clearance of at least 150 mm behind the rungs.

18.4.3 When a portable ladder is resting against a bulwark or rails, suitable safe access to the deck as recommended in paragraph 18.2.2 should be provided.

18.4.4 A rope ladder should never be secured to rails or to any other means of support unless the rails or support are so constructed and fixed as to take the weight of a man and a ladder with an ample margin of safety.

18.4.5 A rope ladder should be left in such a way that it either hangs fully extended from a securing point or is pulled up completely. It should not be left so that any slack will suddenly pay out when the ladder is used.

18.4.6 Where the freeboard is 9 metres or more, a rope ladder should be used in conjunction with an accommodation ladder, leading aft and positioned in such a way as to provide safe and easy access from the rope ladder to the bottom platform. Further guidance is contained in Annex 18.1.

18.5 Safety nets

18.5.1 A safety net should be mounted whenever possible where a person may fall from boarding equipment or from the ship's deck or quayside. The aim of safety nets is to minimise the risk of injury arising from falling between the ship and the quay or falling onto the quay or deck and as far as is reasonably practicable the whole length of the means of access should be covered. Safety nets should be securely rigged, with use being made of attachment points on the quayside where appropriate.

18.6 Maintenance of equipment for means of access

18.6.1 Any equipment used for boarding must be properly maintained, and should be inspected by a competent person at appropriate intervals. Any



defects affecting the safety of any access equipment, including access provided by a shore authority, should be reported immediately to a responsible person and should be made good before further use.

18.6.2 Aluminium equipment should be examined for corrosion in accordance with the instructions in Annex 18.2.

18.6.3 Gangways, accommodation ladders and winches used for lifting or access should be tested in the same way as all other lifting appliances and records maintained including any test certificates.

18.7 Special Circumstances

18.7.1 In some circumstances it may not be practical to mount proper safe boarding arrangements by conventional means, for example, where there is frequent movement of the ship during cargo operations. On such occasions boarding should be carefully supervised and consideration given to providing alternative means of access.

18.7.2 Small boats or tenders used between the shore and the ship should be safe and stable, be suitably powered, correctly operated and properly equipped with the necessary safety equipment and, if not a ship's boat, be approved for that purpose.

18.7.3 Where a vessel is moored alongside another vessel, there should be co-operation between the two vessels in order to provide suitable and safe boarding arrangements. Access should generally be provided by the ship lying outboard, except that, where there is a great disparity in freeboard, access should be provided by the ship with the higher freeboard.

18.7.4 Care should be taken at all times, but particularly at night, when boarding or leaving a ship, or when moving through the dock area. The edges of the docks, quays etc should be avoided and any sign prohibiting entry to an area



should be strictly observed. Where there are designated routes they should be followed exactly. This is particularly important in the vicinity of container terminals or other areas where rail traffic, straddle carriers or other mechanical handling equipment is operating, as the operators of such equipment have restricted visibility, placing anyone walking within the working area at risk.

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18.7.5 Transfer of personnel between two unsecured ships at sea is potentially a particularly dangerous manoeuvre. A risk assessment of the transfer arrangements should be undertaken and appropriate safety measures put into place to ensure the safety of those involved. Both vessels should be properly equipped and/or modified to allow the boarding to be undertaken without unnecessary risk. A proper embarkation point should be provided, and the boarding procedure clearly agreed. The relative movements of both vessels in any seaway and varying sea, tide and swell conditions make the judgement of when to effect a transfer crucial. The Master responsible for the transfer operation should have full sight of the area of transfer and he, and at least one designated crew member should be able to communicate at all times with the crew member making the transfer. It is recommended that vessels undertaking ship to ship transfers while underway, should carry equipment designed to aid in the rapid recovery of a casualty from the waters.

18.7.6 A lifejacket should be donned where there is a risk of falling into the water when transferring to a vessel or structure not alongside. The transfer of baggage or other items being transferred should be done by the crews of the vessels and not by those boarding.

18.8 Pilot ladders and hoists

18.8.1 Where a pilot hoist is provided, personnel engaged in rigging and operating it should be fully instructed in the safe procedures to be adopted and the equipment should be tested prior to use.



18.8.2 The pilot ladder and any accommodation ladder used in conjunction with it should conform to the standards contained in Annex 18.1

18.8.3 In addition to the general points in sections 18.2 to 18.4 above, in order to minimise the danger to pilots when boarding and leaving ships, particular attention should be given to the following points:

- (a) Pilot ladders should be rigged in such a manner that the steps are horizontal, and such that the lower end is at a height above the water to allow ease of access to and from the attendant craft;
- (b) The ladder should rest firmly against the side of the ship;
- (c) When an accommodation ladder is used in conjunction with a pilot ladder, the pilot ladder should extend at least two metres above the bottom platform;
- (d) The rigging of pilot ladders and the embarkation and disembarkation of pilots must be supervised by a responsible officer of the ship, who should be in contact with the bridge.
- (e) A life-buoy with self-igniting light should be kept available at the point of access to the ship.
- (f) At night, the pilot ladder and ship's deck should be lit by a forward-shining, outside light.

18.8.4 It is very important that the ship offers a proper lee to the pilot boat. The arrangements for boarding should preferably be sited as near amidships as possible, but in no circumstances should they be in a position which could lead to the pilot boat running the risk of passing underneath overhanging parts of the ship's hull structure. Further information is contained in the relevant Merchant Shipping Notice.



ANNEX 18.1

CONSTRUCTION OF MEANS OF ACCESS

General

*Regs 5 & 6
The MS (Means of
Access) Regs
1988 (SI 1988
No 1637)*

1. Gangways must be carried on ships of 30 metres in length or over and accommodation ladders must be carried on ships of 120 metres in length or over, complying with the specifications below. Access equipment must be of good construction, sound material and adequate strength, free from patent defect and properly maintained. Rope ladders must comply with the requirements in Section 18.4 and paragraph 7 below.

2. Gangways and accommodation ladders must be clearly marked with the manufacturer's name, the model number, the maximum designed angle of use and the maximum safe loading both by numbers of persons and by total weight.

*BS MA 78:1978
Specification for
aluminium shore
gangways*

3. Gangways must comply with the specifications set out in standard BS MA 78: 1978 or equivalent, and must be fitted with suitable fencing along their entire length.

4. Gangways, accommodation ladders and winches used for lifting and/or access should be tested in the same way as all other lifting appliances and records maintained including any test certificates.

Accommodation ladders

*BS MA 89: 1980.
Accommodation
ladders (or an
equivalent
alternative
standard)*

5. Accommodation ladders must comply with the specifications set out in Standard BS MA 89: 1980 or after 1 January 2010 should meet applicable international standards such as ISO 5488:1979, Shipbuilding or of an equivalent standard,

6. The ladder should be designed so that :

- it rests firmly against the side of the ship;
- the angle of slope is no more than 55°.Treads and steps should provide a safe foothold at the angle at which the ladder is used;
- it is fitted with suitable fencing (preferably rigid handrails) along its entire length, except that fencing at the bottom platform may allow access



from the outboard side;

- the bottom platform is horizontal, and any intermediate platforms are self-levelling.
- it can easily be inspected and maintained.
- it is rigged as close to the working area but clear of any cargo operations as possible.
- it is marked with its safe working load at the top and bottom.

*BA MA 39, Part 2
1973. Ships
ladders. Steel,
sloping (or an
equivalent
alternative
standard).*

7. When a bulwark ladder is to be used it must comply with the specifications set out in the Shipbuilding Industry Standard No SIS 7, or BS MA 39: Part 2, Ships' ladders (steel sloping) or be of an equivalent standard.

Adequate fittings must be provided to enable the bulwark ladder to be properly and safely secured.

8. When an accommodation ladder is being rigged this should be completed with the ladder in the horizontal position so that those working on it can be safely attached with a safety line to the deck and the ladder secured to reduce any unnecessary movement.

9. Gangways, pilot hoists and accommodation ladders are to be considered as lifting equipment and should be tested and recorded as such.

Rope Ladders

10. A rope ladder must be of adequate width and length and so constructed that it can be efficiently secured to the ship.

- The steps must provide a slip-resistant foothold of not less than 400 mm × 115 mm × 25 mm and must be so secured that they are firmly held against twist, turnover or tilt.
- The steps must be horizontal and equally spaced at intervals of 310 mm (± 5mm).
- The side ropes, which should be a minimum of 18mm in diameter, should be equally spaced.
- There should be no shackles, knots or splices between rungs.
- Ladders of more than 1.5 metres in length must be fitted with spreaders not less than 1.8 metres long. The lowest spreader must be on the fifth



step from the bottom and the interval between spreaders must not exceed nine steps. The spreaders should not be lashed between steps.

Access for Pilots

SOLAS Chapter V
Reg 23 & MS
(Safety of
Navigation)
Regs SI 2002
No 1473

11. In addition to the standards above, every pilot ladder should be positioned and secured so that:

- it is clear of any possible discharges from the ship;
- it is, where practicable, within the mid-ship half-section of the ship (but see 18.8.4);
- it is firmly secured to the ship's side; and
- the person climbing it can safely and conveniently board the ship after climbing no more than 9 metres.

12. Where replacement steps are fitted, they should be secured in position by the method used in the original construction of the ladder. No pilot ladder should have more than two replacement steps secured in position by a different method. Where a replacement step is secured by means of grooves in the sides of the step, such grooves should be in the longer sides of the step.

13. Two man-ropes of not less than 28 mm in diameter, properly secured to the ship should be provided.

14. Safe, convenient and unobstructed access should be provided to anyone embarking or disembarking between the ship and the head of the pilot ladder.

15. Where access to the ship is by a gateway in the rails or bulkhead, adequate handholds should be provided. Shipside doors used for this purpose should not open outwards.

16. Where access is by bulwark ladder, the ladder should be securely attached to the bulwark rail or landing platform. Two handhold stanchions should be provided, between 700mm and 800mm apart, each of which should be rigidly secured to the ship's structure at or near its base and at another higher point. The stanchions should be at least 40mm in diameter and extend no less than 1.20 metres above the top of the bulwarks.

17. Where the freeboard of the ship is more than 9 metres, accommodation ladders must be provided on each side of the ship.



18. Such accommodation ladders should comply with the standards in paragraph 5 above, and in addition:

- the pilot ladder should extend at least 2 metres above the accommodation ladder's bottom platform;
- if a trap door is fitted in the bottom platform to allow access to the pilot ladder, the opening should be no less than 750mm square, and the after part of the bottom platform should be fenced as the rest of the ladder. In this case, the pilot ladder should extend above the lower platform to the height of the handrail.

Pilot hoists

19. Detailed construction standards for pilot hoists are contained in SOLAS Chapter V Annex 21. These have not been re-produced here as hoists must be of an approved design and are subject to annual survey as part of the annual and renewal survey for the vessel's safety equipment certificate.



ANNEX 18.2

CORROSION OF ACCOMMODATION LADDERS AND GANGWAYS

1. Aluminium alloys are highly susceptible to galvanic corrosion in a marine atmosphere if they are used in association with dissimilar metals. Great care should be exercised when connecting mild steel fittings, whether or not they are galvanised, to accommodation ladders and gangways constructed of aluminium.
2. Plugs and joints of neoprene, or other suitable material, should be used between mild steel fittings, washers, etc and aluminium. The plugs or joints should be significantly larger than the fittings or washers.
3. Repairs using mild steel doublers or bolts made of mild steel or brass or other unsuitable material should be considered as temporary. Permanent repairs, or the replacement of the means of access, should be undertaken at the earliest opportunity.
4. The manufacturer's instructions should give guidance on examination and testing of the equipment. However, close examination of certain parts of accommodation ladders and gangways is difficult due to their fittings and attachments. It is essential, therefore, that the fittings are removed periodically for a thorough examination of the parts most likely to be affected by corrosion. Accommodation ladders and gangways should be turned over to allow for a thorough examination of the underside. Particular attention should be paid to the immediate perimeter of the fittings; this area should be tested for corrosion with a wire probe or scribe. Where the corrosion appears to have reduced the thickness of the parent metal to 3 mm, back plates should be fitted inside the stringers of the accommodation ladder or gangways.



CHAPTER 19

MANUAL HANDLING

19.1 Introduction

19.1.1 Based on the findings of the risk assessment, appropriate control measures should be put into place to protect those who may be affected. This chapter highlights some areas which may require attention in respect of manual handling.

19.1.2 The assessment should take full account not only of the characteristics of the load and the physical effort required but also of the working environment (eg ship movement, confined space, high or low temperature, physical obstacles such as steps or gangways) and any other relevant factors (eg the age and health of the person, the frequency and duration of the work). A fuller list of factors to be considered is given in Annex 19.1.

19.2 General

19.2.1 The term "manual handling" is used to describe any operation which includes any transporting or supporting of a load, lifting, putting down, pushing, pulling, carrying or moving by hand or by bodily force. This guidance is generally concerned with preventing musculo-skeletal injury.

19.2.2 There may of course be other hazards to those handling loads, for example from leakage of a hazardous substance from a package being moved, but these are dealt with in other relevant chapters.

19.2.3 Musculo-skeletal injuries can occur as a result of accident, poor organisation or an unsatisfactory working method.



19.3 Role of Employers

MS and FV
(Manual
Handling
Operations)
S.I. 1998 No.
2857: Reg 5
MGN
90(M+F)

19.3.1 *So far as is reasonably practicable, the employer must take appropriate measures or provide the means to avoid the need for any manual handling operations which may cause injury to workers, for example by re-organisation of the work, or automating or mechanising the operation.*

Before instructing personnel to lift or carry by hand where there is a risk of injury, employers should consider whether alternative means of doing the same job would reduce the risk of injury.

19.3.2 *Where there is no practical alternative to manual handling, the employer must -*

- (a) *carry out an assessment of the manual handling operations, taking into account the factors and questions in Annex 19.1.*
- (b) *take appropriate steps to reduce the risk of injury,*
- (c) *provide workers with general indications, and where it is available, precise information on:*
 - *the weight of each load;*
 - *where the centre of gravity of any load is not positioned centrally, the heaviest side of the load;*
- (d) *provide workers with proper training and information on how to handle loads correctly and the risks to their health and safety from incorrect handling.*

19.3.3 *Means of reducing the risk of injury may include -*

- *re-organisation of work stations (to enable workers to maintain good posture while lifting or carrying); and*
- *taking account of an individual's capabilities when allocating tasks.*

There are often severe limitations in a ship on the improvements that can be made, but the employer should ensure that, as far as reasonably practicable, risks have been minimised.



19.3.4 Instruction for personnel may involve experienced and properly trained personnel demonstrating best practice especially to new recruits.

19.4 Advice to seafarers

Reg 6

19.4.1 *Workers must make full and proper use of any system of work provided by the employer.*

19.4.2 Personnel should:

- use any mechanical aids provided;
- follow instructions; and
- take sensible precautions to ensure that they are aware of any risk of injury from the load before picking it up.

19.4.3 In manual lifting and carrying, the proper procedure to be followed is:

- assess the load to be lifted, taking account of any information provided by the employer;
- look for sharp edges, protruding nails or splinters, for surfaces which are greasy or otherwise difficult to grip and for any other features which may prove awkward or dangerous - for example sacks of ship's stores may be difficult to get off the deck;
- ensure that the deck or area over which the load is to be moved is free from obstructions and not slippery.

19.4.4 The diagram (Annex 19.2 Fig 1) illustrates some important points in lifting techniques.

- (a) A firm and balanced stance should be taken close to the load with the feet a little apart, not too wide, so that the lift will be as straight as possible.
- (b) A crouching position should be adopted, knees bent and maintaining the natural curve of the back to ensure that the legs do the work. It helps to tuck in the chin while gripping the load and then raise the chin as the lift begins.



- (c) The load should be gripped with the whole of the hand - not fingers only. If there is insufficient room under a heavy load to do this a piece of wood should be put underneath first.
- (d) The size and shape of the load are not good guides to its weight or weight distribution. If this information is not available a careful trial lift should be made, and if there is any doubt whether the load can be managed by one person help should be provided.
- (e) The load should be lifted by straightening the legs, keeping it close to the body. The heaviest side should be kept closest to the trunk. The body should not be twisted as this will impose undue strain on the back and other parts of the body.
- (f) If the lift is to a high level, it may be necessary to do it in two stages; first raising the load onto a bench or other support and then completing the lift to the full height, using a fresh grip (Fig 2).

19.4.5 When two or more people are handling a load, it is preferable that they should be of similar stature. The actions of lifting, lowering and carrying should, as far as possible, be carried out in unison to prevent strain and any tendency for either person to overbalance (Fig 3).

19.4.6 The procedure for putting a load down is the reverse of that for lifting, the legs should do the work of lowering - knees bent, back straight and the load close to the body. Care should be taken not to trap fingers. The load should not be put down in a position where it is unstable. If precise positioning is necessary, the load should be put down first, then slid into the desired position.

19.4.7 A load should always be carried in such a way that it does not obscure vision, so allowing any obstruction to be seen.

19.4.8 The risk of injury may be reduced if lifting can be replaced by controlled pushing or pulling. For example, it may be possible to slide the



load or roll it along. However, uncontrolled sliding or rolling, particularly of large or heavy loads, may introduce fresh risks of injury. Particular care must be taken if:

- Stooping or stretching is likely;
- Your hands when on the load are not between waist and shoulder height;
- The deck area is insecure or slippery;
- Force is applied at an angle to your body;
- The load may make sudden or unexpected movements.

19.4.9 For pulling and pushing, a secure footing should be ensured, and the hands applied to the load at a height between waist and shoulder wherever possible. Wheels on barrows and trolleys should run smoothly, consult your employer or safety representative if the equipment provided is not suitable, or is in poor condition (Fig 4(i) - 4(iii)). A further option, where other safety considerations allow, is to push with the worker's back against the load, using the strong leg muscles to exert the force (Fig 5).

19.4.10 Even a gentle uphill slope dramatically increases the force needed to push an object, help may be necessary when moving a load up a slope or ramp. Care should be taken with unbraked trolleys and sack trucks on a moving/rolling deck, as sudden changes in the angle of deck and direction of the slope may cause whiplash neck injuries. If a trolley becomes loose, do not try to stop it by standing in its way, but get behind it and try to act as a brake.

19.4.11 Care must be taken with the laying out of heavy mooring ropes and wire ropes/hawsers (Fig 6). This duty requires a good technique initially in lifting the heavy eye of the rope, followed by a good pulling technique. Crews should make sure that there are enough people available to do the duty safely.



19.4.12 When moving a load such as a barrel or a drum, rolling the load may be a safer operation than lifting it (Fig 7). Care must still be taken with reference to paragraph 19.4.8, and the use of a trolley should be considered for heavy or large barrels or drums.

19.4.13 Suitable shoes or boots should be worn for the job. Protective toecaps help to guard toes from crushing if the load slips; they can sometimes also be useful when putting the load down to take the weight while hands are removed from underneath.

19.4.14 Clothing should be worn which does not catch in the load and which gives some body protection.

19.4.15 Where the work is very strenuous, for example due to load weight, repetitive effort over a period or environmental factors, such as a confined space or an extreme of temperature, rest should be taken at suitable intervals, to allow muscles, heart and lungs to recover; fatigue makes accidents more likely on work of this type.

19.4.16 Whenever possible, manual lifting and carrying should be organised in such a way that each person has some control over their own rate of work.



ANNEX 19.1

FACTORS TO BE CONSIDERED

The following are examples of the factors to which the employer should have regard and questions he should consider when making an assessment of manual handling operations or providing instruction for personnel.

Plain text gives the general factors and questions to be considered in the risk assessment carried out under the regulations.

Additional specific factors which may be found on board ship are included for guidance (text in italics).

Factors

1 The tasks

Questions

Do they involve:

- activity which is too strenuous?
- holding or manipulating loads at distance from trunk?
- unsatisfactory or unstable bodily movement or posture, especially:
 - twisting the trunk?*
 - stooping?*
 - reaching upward?*
- excessive movement of loads, especially:
 - excessive lifting or lowering distances?*
 - excessive carrying distances?*
- risk of sudden movement of loads?
- frequent or prolonged physical effort, particularly affecting the spine?
- insufficient rest or recovery periods?
- a rate of work imposed by a process?
- *climbing up or down stairs?*
- *handling while seated?*
- *use of special equipment?*
- *team handling?*

2 The loads

Are they:

- heavy?
- bulky or unwieldy, or difficult to grasp?



- unstable, or with contents likely to shift?
- likely, because of the contours and/or consistency, to injure workers, particularly if the individual collides with someone or something?
- *wet, slippery, very cold or hot and therefore difficult to hold?*
- *sharp?*
- *potentially damaging/dangerous if dropped?*

3 The working environment

Are there:

- space constraints preventing handling loads at a safe height or with good posture?
- uneven, slippery or unstable deck surface?
- variations in level of deck surfaces (eg door sills) or work surfaces?
- extremes of temperature or humidity?
- *has account been taken of the sea-state, wind speed and the unpredictable movement of the deck?*
- *are there steps, stairs or ladders or self-closing doors to be negotiated?*
- *is the area adequately lit?*
- *is movement or posture hindered by personal protective equipment or by clothing?*

4 Individual capability

Is the individual:

- physically unsuited to carry out the task, either because of the nature of the tasks or because of a need to protect an individual from a danger which specifically affects him?
- ie Does the job require unusual strength, height etc? Is there a hazard to those who might reasonably be considered unsuited to the task? Does it pose a risk to those who are pregnant or have a health problem?*
- wearing unsuitable clothing, footwear or other personal effects?
- inadequately experienced or trained?
- inadequately equipped?



Annex 19.2

Graphic illustrations of manual handling techniques

fig 1



fig 2



Graphic illustrations of manual handling techniques (continued)

fig 3

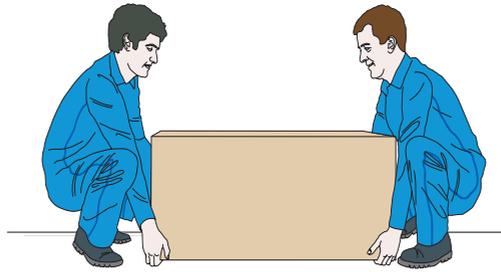


fig 4



Graphic illustrations of manual handling techniques (continued)

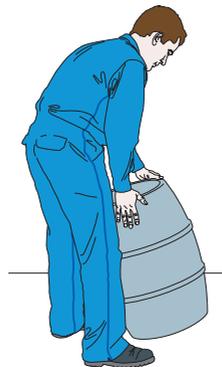
fig 5



fig 6



fig 7



CHAPTER 20

USE OF WORK EQUIPMENT

20.1 Introduction

Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006 SI 2006/2183

20.1.1 The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006 introduce measures intended to protect workers from risks arising from the provision and use of work equipment. Full guidance on the requirements of those regulations is given in Marine Guidance Note MGN 331 (M+F). Chapter 7 deals with the provision and care of work equipment whilst this chapter deals with its usage.

20.1.2 Based on the findings of the risk assessment required by the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997, appropriate control measures should be put into place to protect those who may be at risk whilst using work equipment. This chapter highlights some areas which may require attention in respect of use of work equipment.

20.2 Use of tools and equipment

20.2.1 This section gives general advice on the use of work equipment which is applicable to all kinds of equipment including both powered and hand tools. Some types of equipment which pose particular risks are covered by later sections. Lifting equipment, because of the serious hazards it presents, is dealt with in more detail in Chapter 21.

20.2.2 Tools should be used only for the purpose for which they were designed. Personnel should ensure that they use the correct tools or equipment for a task. Use of unsuitable tools or equipment may lead to accidents.



20.2.3 Loose clothing or jewellery should never be worn while using machinery, as there is a risk that it may become caught in moving parts. For the same reason, long hair should always be tied back and covered with a hair net or safety cap. Personal protective equipment should be provided and worn as required by the Merchant Shipping and Fishing Vessels (Personal Protective Equipment) Regulations 1999 and Merchant Shipping Notice MSN 1731 (M+F).

20.2.4 Only those competent to use equipment should do so. New recruits should always be trained in the proper use of any equipment they are required to use.

20.2.5 Incorrect use of tools and equipment can cause accidents, as well as damage to the equipment in question. Instructions for use should always be consulted and followed, where they are available.

20.2.6 When not in use equipment should be stowed in a tidy and correct manner. Any cutting edges should be protected.

20.3 Hand tools

20.3.1 Damaged or worn tools should not be used, and cutting edges should be kept sharp and clean. Repair and dressing of tools should be carried out by a competent person.

20.3.2 Wherever practicable, a tool in use should be directed away from the body, so that if it slips it does not cause injury. However when using a spanner more control is gained by pulling towards the body. When using a tool with a cutting edge, both hands should be kept behind the blade.

20.3.3 A chisel is best held between thumb and base of index finger with thumb and fingers straight, palm of hand facing towards the hammer blow.



20.3.4 A saw should not be forced through the material being cut, it should be pushed with a light, even movement.

20.4 Portable power operated tools and equipment

20.4.1 Power operated equipment may be dangerous unless properly maintained, handled and used and should only be used by competent persons. The flexible cables of electric tools should comply with the relevant British or International Standard. Before work begins, personnel should ensure that power supply leads and hoses are in good condition, laid safely clear of all potentially damaging obstructions and do not obstruct safe passage. Where they pass through doorways, the doors should be secured open.

20.4.2 The risk of electric shock is increased by perspiration and locations which are damp, humid or have large conductive surfaces. In such conditions power tools should be operated from low voltage supplies - i.e. no more than 50 volts AC with a maximum of 30 volts to earth or 50 volts DC.

20.4.3 Where it is not practicable to use low voltages, other precautions such as a local isolating transformer supplying one appliance only or a high sensitivity earth leakage circuit breaker (also known as a residual current device) should be used.

20.4.4 The risk associated with portable electric tools also applies to portable electric lamps. The supply to these should not exceed 24 volts.

20.4.5 Double insulated tools are not recommended for use on ships because water can provide a contact between live parts and the casing, increasing the risk of a fatal shock. An earth leakage circuit breaker may also fail to operate when used with such tools as there may be no earth wire in the power supply cable fitted to the tool



20.4.6 Chain linkages or similar devices should be fitted between sections of pneumatic hose to prevent whip-lash in the event of breakage. Alternatively, safety valves can be used which close off the lines.

20.4.7 Accessories and tool pieces (drill bit, chisel etc) should be absolutely secure in the tool. In particular, retaining springs, clamps, locking levers and other built-in safety devices on pneumatic tools should be replaced after the toolpiece is changed. Accessories and tool pieces should not be changed while the tool is connected to a source of power.

20.4.8 Correct safety guards should be securely fixed to appliances requiring them and should be checked for security before starting any operation. Such guards should only be removed when the equipment is not operating. If removal whilst operating is essential for maintenance or examination of the equipment, the following precautions should be taken:

- removal should be authorised by a responsible person, and only a competent person should carry out the work or examination;
- there should be adequate clear space and lighting for the work to be done;
- anyone working close to the machinery should be told what the risks are and instructed in a safe system of work and precautions to take;
- a warning notice should be conspicuously posted.

20.4.9 During temporary interruptions to work e.g. meal breaks, and on completion of a task, equipment should be isolated from power sources and left safely or stowed away correctly.

20.4.10 Where a work operation causes high noise levels, hearing protection should be worn. Where flying particles may be produced, the face and eyes should be protected (see Chapter 4 Personal Protective Equipment).



20.4.11 The vibration caused by reciprocating tools (pneumatic drills, hammers, chisels etc) or high speed rotating tools can give rise to a permanent disablement of the hands known as “dead” or “white” fingers. In its initial stages, this appears as a numbness of the fingers and an increasing sensitivity to cold, but in more advanced stages, the hands become blue and the fingertips swollen. Workers subject to the symptoms described should not use such equipment. Other workers should be advised not to use them for more than 30 minutes without a break, unless the risk assessment indicates a lesser period of use.

20.5 Workshop and Bench Machines (Fixed installations)

*MS & FV
(Provision
and Use of
Work
Equipment)
Regulations
2006 (SI
2006/
2183)*

20.5.1 Fixed installations should only be operated by competent personnel. The operator should check a machine every time before use, and ensure that all safety guards and devices are in position and operative, that all tool pieces (drill bits, cutting blades, etc) are in good condition, and that the work area is adequately lit and free from clutter.

20.5.2 No machine should be used when a guard or safety device is missing, incorrectly adjusted or defective or when it is itself in any way faulty (see also advice in 20.4.8 above). If any defect is identified, the machine should be isolated from its source of power until it has been repaired.

20.5.3 During operations, personnel should ensure that work pieces are correctly secured in position; machine residues (swarf, sandings etc) do not build up excessively, and are disposed of in a correct and safe manner.

20.5.4 Whenever machinery is left unattended, even if only briefly, the power supply should be switched off and isolated, and the machinery and any safety guards should be rechecked before resuming work.

20.6 Abrasive wheels

20.6.1 Abrasive wheels should be selected, mounted and used only by



competent persons and in accordance with manufacturers' instructions. They are relatively fragile and should be stored and handled with care.

20.6.2 Manufacturers' instructions should be followed on the selection of the correct type of wheel for the job in hand. Generally, soft wheels are more suitable for hard material and hard wheels for soft material.

20.6.3 Before a wheel is mounted, it should be brushed clean and closely inspected to ensure that it has not been damaged in storage or transit. The soundness of a vitrified wheel can be further checked by suspending it vertically and tapping it gently. If the wheel sounds dead it is probably cracked, and should not be used.

20.6.4 A wheel should not be mounted on a machine for which it is unsuitable. It should fit freely but not loosely to the spindle; if the fit is unduly tight, the wheel may crack as the heat of the operation causes the spindle to expand.

20.6.5 The clamping nut should be tightened only sufficiently to hold the wheel firmly. When the flanges are clamped by a series of screws, the screws should be first screwed home with the fingers and diametrically opposite pairs tightened in sequence.

20.6.6 The speed of the spindle should not exceed the stated maximum permissible speed of the wheel.

20.6.7 A strong guard, enclosing as much of the wheel as possible, should be provided and kept in position at every abrasive wheel (unless the nature of the work absolutely precludes its use) both to contain wheel parts in the event of a burst and to prevent an operator having contact with the wheel. (See also 20.4.8 above)



20.6.8 Where a work rest is provided, it should be properly secured to the machine and should be adjusted as close as practicable to the wheel, the gap normally being not more than 1.5 mm (1/16 inch).

20.6.9 The side of a wheel should not be used for grinding; it is particularly dangerous when the wheel is appreciably worn.

20.6.10 The work piece should never be held in a cloth or pliers.

20.6.11 When dry grinding operations are being carried on or when an abrasive wheel is being trued or dressed, suitable transparent screens should be fitted in front of the exposed part of the wheel or operators should wear properly fitting eye protectors.

20.7 Hydraulic/Pneumatic/High Pressure Jetting Equipment

20.7.1 Workers using hydraulic/pneumatic/high pressure systems should have received adequate training and be competent to use such equipment. Manufacturers' operating guidelines should be followed at all times. Equipment should not be operated at pressures which exceed manufacturers' recommendations.

20.7.2 Before starting work, workers should ensure that the equipment and supply systems are in sound condition, and that incorporated safety devices are in place and functioning correctly. Where equipment is defective or suspect, systems should be shut down, isolated and depressurised to allow effective change out or repair. Such repairs should only be carried out by authorised competent personnel using approved components.

20.7.3 Before activating a pressure system, and also when closing it down, the recommended checks should be made to ensure that no air pockets or trapped pressure are in the system, as these may cause erratic action of the equipment.



20.7.4 When handling hydraulic fluid, personnel should ensure the following:

- (a) that the correct grade is used, when topping up systems;
- (b) that spillages are cleaned up immediately;
- (c) that any splashes of such fluid onto skin areas are cleaned off immediately - many such fluids are mineral based;
- (d) that naked lights are kept away from equipment during service/test periods - hydraulic fluids may give off vapours which may be flammable.

20.7.5 Workers using high pressure jetting equipment should wear the correct protective equipment. Such systems may involve use of a heated supply source and operators should therefore guard against splashing and scalding. Warning notices should be displayed on approaches to areas where such work is being undertaken to warn other workers of the use of such high pressure system in the area. Finally, workers should take great care in ensuring that the direction of such jetting is safe.

20.7.6 When compressed air is used, the pressure should be kept no higher than is necessary to undertake the work satisfactorily.

20.7.7 Compressed air should not be used to clean the working space, and in no circumstances should it be directed at any part of a person's body.

20.8 Hydraulic jacks

20.8.1 Jacks should be inspected before use to ensure that they are in a sound condition and that the oil in the reservoir reaches the minimum recommended level.

20.8.2 Before a jack is operated, care should be taken to ensure that it has an adequate lifting capability for the work for which it is to be used and that its foundation is level and of adequate strength.



20.8.3 Jacks should be applied only to the recommended or safe jacking points on equipment.

20.8.4 Equipment under which workers are required to work should be properly supported with chocks, wedges or by other safe means - never by jacks alone.

20.8.5 Jack operating handles should be removed if possible when not required to be in position for raising or lowering the jack.

20.9 Ropes

20.9.1 The safety of the ship or an individual crew member is often dependent on the rope that is being used.

20.9.2 Many types of rope of both man-made and natural fibre are available, each with different properties and with different resistance to contamination by substances in use about the ship which may seriously weaken the rope. The following table is a guide to the resistance of the main rope types but is indicative only of the possible extent of deterioration of rope; in practice, much depends on the precise formulation of the material, the amount of contamination the rope receives and the length of time and the temperature at which it is exposed to contamination. In some cases, damage may not be apparent even on close visual inspection.



Substance	Resistance to chemicals of rope made of			
	Manila or Sisal	Polyamide (nylon)	Polyester	Poly-propylene
Sulphuric (battery) acid	None	Poor	Good	V Good
Hydrochloric acid	None	Poor	Good	V Good
Typical rust remover	Poor	Fair	Good	V Good
Caustic Soda	None	Good	Fair	V Good
Liquid Bleach	None	Good	V Good	V Good
Creosote, crude oil	Fair	None	Good	V Good
Phenols, Crude tar	Good	Fair	Good	Good
Diesel Oil	Good	Good	Good	Good
Synthetic detergents	Poor	Good	Good	Good
Chlorinated solvents, eg trichloroethylene (used in some paint and varnish removers)	Poor	Fair	Good	Poor
Other organic solvents	Good	Good	Good	Good

20.9.3 Ropes should be stored away from heat and sunlight, if possible in a separate compartment which is dry and well ventilated, away from containers of chemicals, detergents, rust removers, paint strippers and other substances capable of damaging them. Mooring ropes should be covered by tarpaulins or, if the ship is on a long voyage, stowed away. Any accidental contamination should be reported immediately for cleansing or other action.

20.9.4 Man-made fibre ropes have high durability and low water absorption and are resistant to rot. Mildew does not attack man-made fibre ropes but moulds can form on them. This will not normally affect their strength.

20.9.5 Polypropylene ropes which have the best all round resistance to attack from harmful substances are generally preferred. However they may be subject to degradation in strong sunlight ("actinic degradation"), and should not be exposed for long periods. They should also be of a type providing grip comparable to that of manila or sisal ropes.

20.9.6 New rope, 3-strand fibre rope and wire should be taken out of a coil in such a fashion as to avoid disturbing the lay of the rope.



20.9.7 Rope should be inspected internally and externally before use for signs of deterioration, undue wear or damage.

20.9.8 When using steel wire ropes it is important that they are properly installed, maintained and lubricated as appropriate to their use.

Manufacturer's guidelines and recommendations for use should be followed.

Where eyes are formed they should be made by eye splicing or using appropriate compression fittings (using swages or ferrules). The use of Bulldog grips is discouraged, and they must not be used on lifting wires and mooring wires. Annex 20.1 gives further information regarding bulldog grips.

20.10 Characteristics of man-made fibre ropes

20.10.1 Safe handling of man-made fibre ropes requires techniques which differ from those for handling natural fibre ropes.

20.10.2 Man-made fibre ropes are relatively stronger than those of natural fibre and so for any given breaking strain have appreciably smaller circumferences, but wear or damage will diminish strength to a greater extent than would the same amount of wear or damage on a natural fibre rope.

Recommendations for substitution of natural fibre ropes by man-made fibre ropes are given in the following table:

Manila		Polyamide (Nylon etc)		Polyester (Terylene etc)		Polypropylene	
Dia	Size	Dia	Size	Dia	Size	Dia	Size
48mm	(6)	48mm	(6)	48mm	(6)	48mm	(6)
56mm	(7)	48mm	(6)	48mm	(6)	52mm	(6.5)
64mm	(8)	52mm	(6.5)	52mm	(6.5)	56mm	(7)
72mm	(9)	60mm	(7.5)	60mm	(7.5)	64mm	(8)
80mm	(10)	64mm	(8)	64mm	(8)	72mm	(9)
88mm	(11)	72mm	(9)	72mm	(9)	80mm	(10)
96mm	(12)	80mm	(10)	80mm	(10)	88mm	(11)
112mm	(14)	88mm	(11)	88mm	(11)	96mm	(12)

Diameter given for 3-strand, size no for 8-strand plaited.



20.10.3 Careful inspection of man-made fibre ropes for wear externally and internally is necessary. A high degree of powdering between strands indicates excessive wear and reduced strength. Ropes with high stretch suffer greater inter-strand wear than others. Hardness and stiffness in some ropes, polyamide (nylon) in particular, may also indicate overworking.

20.10.4 Unlike natural fibre ropes, man-made fibre ropes give little or no audible warning of approaching breaking point.

20.10.5 Rope of man-made material stretches under load to an extent which varies according to the material. Polyamide rope stretches the most. Stretch imparted to man-made fibre rope, which may be up to double that of natural fibre rope, is usually recovered almost instantaneously when tension is released. A break in the rope may therefore result in a dangerous back-lash and an item of running gear breaking loose may be projected with lethal force. Snatching of such ropes should be avoided; where it may occur inadvertently, personnel should stand well clear of the danger areas. The possibility of a mooring or towing rope parting under the load is reduced by proper care, inspection and maintenance and by its proper use in service, but it can nevertheless still happen without warning.

20.10.6 Man-made fibre ropes may easily be damaged by melting if frictional heat is generated during use. Too much friction on a warping drum may fuse the rope with the consequential sticking and jumping of turns, which can be dangerous. Polypropylene is more liable to soften than other material. To avoid fusing, ropes should not be surged unnecessarily on winch barrels. For this reason, a minimum of turns should be used on the winch barrel; three turns are usually enough but on whelped drums one or two extra turns may be needed to ensure a good grip; these should be removed as soon as practicable.



20.10.7 The method of making eye splices in ropes of man-made fibres should be chosen according to the material of the rope.

- (a) Polyamide (nylon) and polyester fibre ropes need four full tucks in the splice each with the completed strands of the rope followed by two tapered tucks for which the strands are halved and quartered for one tuck each respectively. The length of the splicing tail from the finished splice should be equal to at least three rope diameters. The portions of the splice containing the tucks with the reduced number of filaments should be securely wrapped with adhesive tape or other suitable material.
- (b) Polypropylene ropes should have at least three but not more than four full tucks in the splice. The protruding spliced tails should be equal to three rope diameters at least.
- (c) Polythene ropes should have four full tucks in the splice with protruding tails of three rope diameters at least.

20.10.8 Mechanical fastenings should not be used in lieu of splices on man-made fibre ropes because strands may be damaged during application of the mechanical fastening and the grip of the fastenings may be much affected by slight unavoidable fluctuations in the diameter of the strands.

20.10.9 Man-made fibre stoppers of like material (but not polyamide) should be used on man-made fibre mooring lines, preferably using the 'West Country' method (double and reverse stoppering).

20.11 Work with visual display units (VDUs)

20.11.1 Workers should be given adequate individual training in the use and capabilities of VDUs. This training should be adapted to the needs and ability of the person and the type of equipment.

20.11.2 Any worker using VDUs regularly or frequently and for lengthy periods should be given an eye test by a qualified person before beginning



such work and at regular intervals thereafter. If either the eye test or examination by an ophthalmologist shows that the person needs special glasses for this work these should be provided.

20.11.3 VDUs should be so positioned that there is sufficient room to move, as necessary, around the equipment. Care should be taken to ensure that cables and wiring do not cause a hazard by obstructing movement.

20.11.4 Lighting should be adequate for the task, with glare and reflection cut to a minimum, and the display on screen should be clear and easy to read. The operator should adjust the brightness and contrast to suit the lighting. When appropriate the operator should be given short rest periods away from the equipment.

20.11.5 There should be adequate leg room and the chair should be comfortable and stable, with adjustable seat height and back rest. The chair should be adjusted by each user to a comfortable position for working - arms approximately horizontal and eyes at the same level as the top of the screen. The keyboard and screen should be adjusted to a comfortable position for keying and viewing.

20.11.6 Certain forms of medication may impair working efficiency on a VDU. Personnel should be aware of this possibility and should seek medical advice if necessary.

20.11.7 Further guidance on the safe use of VDUs can be obtained from the Health and Safety Executive who produce various leaflets including "Working with Visual Display Units". Leaflets are obtainable from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA Tel: 01787 881165 Fax: 01787 313995 Website: www.hsebooks.co.uk (HSE priced publications are also available from bookshops and free leaflets can be downloaded from HSE's website: www.hse.gov.uk). In addition various publications relating to the safe use of VDUs can be obtained from The Stationery Office.



20.12 Laundry equipment

20.12.1 All workers required to work in a laundry, or use any part of the equipment there, must be fully instructed on the proper operation of the machinery. Where a worker is under 18 years of age they should not work on industrial washing machines, hydro-extractors, calenders or garment presses unless they have been fully trained in the operation of the machine and the precautions to be observed, and if appropriate are closely supervised by a competent person.

20.12.2 Equipment should be inspected before use for faults and damage. Particular attention should be paid to the automatic cut-off or interlocking arrangements on washing machines, hydro-extractors etc and the guards and emergency stops on presses, calenders, mangling and wringing machines. Any defect or irregularity found during inspection, or apparent during operation of the equipment, should be reported immediately and the use of the machine discontinued until such time as any necessary repairs or adjustments have been carried out. A notice warning against use should be displayed prominently on the defective machine.

20.12.3 Frequent and regular inspection, with thorough checking of all electrical equipment and apparatus, is also necessary to ensure the standard of maintenance essential for laundries.

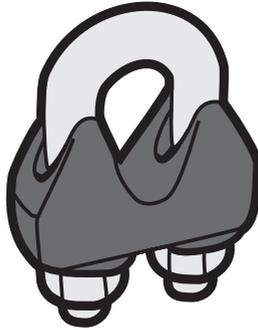
20.12.4 Machines should not be overloaded and loads should be distributed uniformly.

20.12.5 Reliance should not be placed entirely on interlocking or cut-off arrangements on the doors of washing machines, hydro-extractors and drying tumblers etc; doors should not be opened until all movement has ceased.



ANNEX 20.1

BULLDOG GRIPS



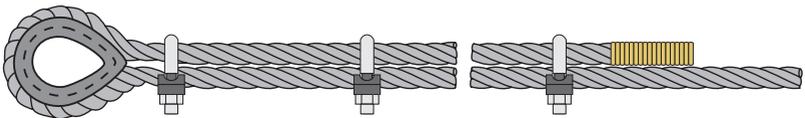
1.1 The use of Bulldog grips is discouraged, and they must not be used on lifting wires or mooring wires.

1.2 Do not use where the rope is likely to be subjected to very strong vibrations.

1.3 Do not use with plastic coated wire rope.

1.4 It is important that where they are used, they are installed correctly as per the manufacturer's instructions.

1.5 The "U" of the grip must be placed on the dead end of the rope as illustrated, and the distance between grips being approximately 6 rope diameters. The minimum number of grips is dependant on the rope diameter; after being in service for several hours the grips should be re-tightened, and re-checked for tightness periodically. Correctly fitted grips would be expected to hold at least 80% of the minimum breaking load of the rope.



CHAPTER 21

PROVISION AND CARE OF LIFTING PLANT AND CARRYING OUT OF LIFTING OPERATIONS

21.1 Introduction

*MS & FV
(Lifting
Operations
and Lifting
Equipment)
Regulations
2006 (SI
2006/
2184)*

21.1.1 The Merchant Shipping and Fishing Vessels (Lifting Operations and Lifting Equipment) Regulations 2006 introduce measures intended to protect workers from risks arising from the provision and use of lifting equipment. Full guidance is given in Marine Guidance Note MGN 332 (M+F)

21.1.2 The general principles on provision and care of work equipment, set out in Chapter 7, and those on the safe use of work equipment, set out in Chapter 20, are also applicable to lifting plant, as are the provisions of the Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006. (Full guidance on those Regulations is given in Marine Guidance Note MGN 331 (M+F).) Where there is any overlap, the more stringent regulations will apply.

21.2 General requirements

Reg 6

Lifting Equipment

21.2.1 Lifting equipment is required to be:-

- (a) of adequate strength and stability for each load, having regard in particular to the stress induced at its mounting or fixing points; and,
- (b) securely anchored, or
- (c) adequately ballasted or counterbalanced, or



(d) supported by outriggers,
as necessary to ensure its stability when lifting.

21.2.2 Lifting equipment should be of steel or other acceptable material and securely fastened to the vessel's structure. The maximum Safe Working Load (SWL) and maximum radius of operation of all derricks and lifting appliances are required to be part of the specification on all new constructions with associated ropes, wires and guys, eye-plates, shackles and blocks designed to meet these loads.

21.2.3 The vessel's structure, crane, derrick or other lifting device and the supporting structure should be of sufficient strength to withstand the loads that will be imposed when operating at its maximum load moment.

21.2.4 In addition to the strength and stability of the lifting equipment, consideration should also be given to the stability, angle of heel and potential down-flooding of any vessel as a result of the use of a crane, derrick or other lifting device fitted on it. This is especially important where a crane is to be fitted on a work boat or other small vessel and it is recommended that advice should be sought from the crane manufacturer in such cases prior to the crane being fitted. Similarly it is recommended that a check of the vessel's stability should be carried out by a suitably qualified person, prior to installation of a crane to ensure that the vessel is capable of operating safely with the crane fitted and in use. Failure to do this could have serious consequences for the safety of the vessel and the workers on it.

21.2.5 Any welding of material should be to an approved, acceptable standard as any fitting is only as strong as the weld that connects it to the vessel's structure.

21.2.6 If counterbalance weights are moveable, effective precautions



should be taken to ensure that the lifting appliance is not used for lifting in an unstable condition. In particular all weights should be correctly installed and positioned.

21.2.7 Lifting equipment with pneumatic tyres should not be used unless the tyres are in a safe condition and inflated to the correct pressures. Means to check this should be provided.

21.2.8 The operator should check safety devices fitted to lifting appliances before work starts and at regular intervals thereafter to ensure that they are working properly.

Accessories for Lifting etc.

21.2.9 Every part of a load that is used in lifting it, as well as anything attached to the load and used for that purpose should be of good construction, of adequate strength for the purpose for which it is to be used and free from defects.

21.2.10 When selecting accessories for lifting, the following should be taken into account:-

- (a) the loads to be handled;
- (b) the gripping points;
- (c) the loose gear for attaching the load, and for attaching the accessories to the lifting equipment;
- (d) the atmospheric conditions;
- (e) the mode and configuration of slinging.

21.2.11 Accessories for lifting should be stored in conditions which will not result in damage or degradation.

21.3 Register of Lifting Appliances

21.3.1 All vessels are required to maintain a register of lifting appliances



and loose gear in a form based on the model recommended by the International Labour Organization and shown at Annex 21.2

21.4 Regular Maintenance

21.4.1 In order to ensure that all parts of lifting equipment and related equipment are kept in good repair and working order, regular preventative maintenance should be carried out. Maintenance should include regular examinations by a competent person. Such examinations should be carried out as required by the Regulations but in any event at least once annually. Checks should look for general material defects such as cracks, distortion, corrosion and wear and tear that could affect safe working load and overall strength.

21.4.2 When there is any suspicion that any appliance or item of equipment may have been subjected to excessive loads, exceeding the Safe Working Load (SWL), or subjected to treatment likely to cause damage, it should be taken out of service until it can be subjected to a thorough examination by a competent person.

21.4.3 Listed below are some suggested maintenance items:-

- Greasing should be thorough and frequent, as dry bearings impose additional loads that can lead to failure.
- The condition of all ropes and chains should be checked regularly for wear, damage and corrosion and replaced as necessary.
- Shackles, links and rings should be renewed when wear or damage is evident.
- Structures should be examined frequently for corrosion, cracks, distortion and wear of bearings, securing points etc.
- Hollow structures such as gantries or masts should be checked for trapped water inside. If water is found, the structure should be drained, appropriately treated and then sealed.
- Regular function tests of controls, stops, brakes, safety devices for



hoisting gear etc, should be carried out preferably before the start of operations.

The list is illustrative only and additional items may be appropriate dependant upon the equipment fitted to an individual vessel.

21.4.4 Any replacement parts must be in accordance with the manufacturer's instructions and be of an equivalent construction to the original part if instructions are not available. This is because replacement with incorrect parts or parts of inferior quality can seriously affect the safety of the lifting appliance.

21.4.5 After any repairs or alterations are made to any lifting appliance it should undergo a thorough examination and be retested if appropriate. Also if any significant changes are made or noticed to the general condition of the appliance the above applies.

21.5 Testing

21.5.1 No lifting equipment, accessory for lifting or loose gear is to be used after manufacture or installation, or after any repair or modification which is likely to alter the safe working load or affect the strength or stability of the equipment, without having been first tested by a competent person.

21.5.2 Upon the completion of any test of lifting equipment, accessory for lifting or item of loose gear carried out in accordance with 21.5.1, the equipment, accessory or gear shall be thoroughly examined and certified for use by the person carrying out the test.

21.5.3 The format for the "Certificate of Test and Thorough examination of Lifting Appliances" is set out in Annex 21.1.1

21.5.4 Ship's lifting equipment is not to be used unless it has been tested by a competent person within the preceding five years.



21.6 Thorough examination and inspection

21.6.1 Where the safety of lifting equipment depends on the installation conditions, it should be inspected by a competent person before it is used for the first time. Such inspections should be undertaken on initial installation or after re-assembly at another location, to ensure that it has been installed correctly, in accordance with any manufacturer's instructions, and is safe for workers to operate as well as being able to function safely.

21.6.2 Any lifting equipment or accessory for lifting which is, or has been, exposed to conditions which could cause deterioration in its condition should be:-

- (a) thoroughly examined
 - (i) in the case of lifting equipment for lifting persons or an accessory for lifting, at least every 6 months;
 - (ii) in the case of other lifting equipment, at least every 12 months; or
 - (iii) in either case, in accordance with an examination scheme; and
 - (iv) whenever exceptional circumstances which are liable to jeopardise the safety of the lifting equipment have occurred; and
- (b) where appropriate, inspected by a competent person at suitable intervals,

21.6.3 No accessories for lifting, other than those which are subject to paragraph 21.6.2(a), should be used unless they have been thoroughly examined within the 12 months immediately prior to such use.

21.7 Certificates

21.7.1 The employer is required to ensure that a certificate in the form set out in Annex 21.1.1 to 21.1.4 is obtained no later than 28 days after the carrying out of any test and thorough examination of any lifting equipment.

21.7.2 The period of 28 days should however be regarded as the absolute maximum. Whenever possible the certificate, or at least a "provisional certificate", should be provided at the time of test. Absence of a



valid certificate could delay operations if a port operator, or a statutory body, requests production of a valid certificate before allowing work, such as unloading, to proceed.

21.8 Reports, Records and marking of Lifting Equipment

Reg 9

21.8.1 Full details of the inspection requirements for reporting on the examination of any lifting equipment, reporting of defects and marking of equipment are contained within MGN 332 (M+F)

21.9 Controls

21.9.1 Controls of lifting appliances should be permanently and legibly marked with their function and their operating directions shown by arrows or other simple means, indicating the position or direction of movement for hoisting or lowering, slewing or luffing, etc.

21.9.2 Make-shift extensions should not be fitted to controls nor any unauthorised alterations made to them. Foot-operated controls should have slip resistant surfaces.

21.9.3 No lifting device should be used with any locking pawl, safety attachment or device rendered inoperative. If, exceptionally, limit switches need to be isolated in order to lower a crane to its stowage position, the utmost care should be taken to ensure the operation is completed safely.

21.10 Safety measures

Reg 10

21.10.1 A powered appliance should always have a person at the controls while it is in operation; it should never be left to run with a control secured in the "ON" position.

21.10.2 If any powered appliance is to be left unattended with the power on, loads should be taken off and controls put in "NEUTRAL" or "OFF" positions. Where practical, controls should be locked or otherwise



inactivated to prevent accidental restarting. When work is completed, power should be shut off.

21.10.3 The person operating any lifting appliance should have no other duties which might interfere with their primary task. They should be in a proper and protected position, facing controls and, so far as is practicable, with a clear view of the whole operation.

21.10.4 Where the operator of the lifting appliance does not have a clear view of the whole of the path of travel of any load carried by that appliance, appropriate precautions should be taken to prevent danger. Generally this requirement should be met by the employment of a competent and properly trained signaller designated to give instructions to the operator. A signaller includes any person who gives directional instructions to an operator while they are moving a load, whether by manual signals, by radio or otherwise.

21.10.5 The signaller should have a clear view of the path of travel of the load where the operator of the lifting appliance cannot see it.

21.10.6 Where necessary, additional signallers should be employed to give instructions to the first signaller:

21.10.7 Every signaller should be in a position that is:-

- (a) safe; and
- (b) in plain view of the person to whom they are signalling unless an effective system of radio or other contact is in use.

21.10.8 All signallers should be instructed in and should follow a clear code of signals, agreed in advance and understood by all concerned in the operation. Examples of hand signals recommended for use with lifting appliances on ships are shown in Annex 21.1 Code of hand signals.



21.10.9 If a load can be guided by fixed guides, or by electronic means, or in some other way, so that it is as safely moved as if it was being controlled by a competent team of driver and signallers, signallers will not be necessary.

21.11 Positioning and installation

Reg 8

21.11.1 Permanently installed lifting equipment should not be used unless it has been positioned or installed in such a way as to minimise the risk of any of the following occurrences-

- (a) the equipment or a load striking a worker;
- (b) a load drifting dangerously or falling freely;
- (c) a load being released unintentionally.

21.12 Lifting Operations

21.12.1 Every lifting operation must be -

- (a) properly planned;
- (b) appropriately supervised; and
- (c) carried out in a safe manner.

21.12.2 No lifting operation should be begun using equipment which is mobile or can be dismantled unless the employer is satisfied that the lifting equipment will remain stable during use under all foreseeable conditions taking into account the nature of the surface on which it stands.

21.12.3 All lifting operations must be properly planned, appropriately supervised and carried out to protect the safety of workers. Whilst this applies to all vessels, it is particularly important where cranes are being used on work boats and other small vessels as overloading of the crane, or attempting to lift at the wrong angle could, in some circumstances, result in the vessel sinking.

21.12.4 No person should be lifted except where the equipment is designed or specially adapted and equipped for the purpose or for rescue or in emergencies.



21.12.5 Contact with bare ropes and warps with moving parts of the equipment should be minimised by the installation of appropriate protective devices.

21.12.6 Weather conditions can play a significant part in the carrying out of lifting operations whether in the open air or within the vessel. In the former case high winds or wave action can for example cause suspended loads to swing dangerously or cause mobile equipment to topple. Movement of the ship due to wind or wave action can also have a similar effect in relation to lifting operations inside the ship. Consideration should be given to the effects of weather conditions on all lifting operations whether inside the ship or outside on deck, and such operations should be suspended before conditions deteriorate to the extent that lifting becomes dangerous.

21.12.7 Loads should if possible not be lifted over a person or any access way, and personnel should avoid passing under a load which is being lifted.

21.12.8 All loads should be properly slung and properly attached to lifting gear, and all gear properly attached to appliances.

21.12.9 The use of lifting appliances to drag heavy loads with the fall at an angle to the vertical is inadvisable because of the friction and other factors involved and should only take place in exceptional circumstances where the angle is small, there is ample margin between the loads handled and the safe working load of the appliance, and particular care is taken. In all other cases winches should be used instead. Derricks should never be used in union purchase for such work.

21.12.10 Any lifts by two or more appliances simultaneously can create hazardous situations and should only be carried out where unavoidable. They should be properly conducted under the close



supervision of a responsible person, after thorough planning of the operation.

21.12.11 Lifting appliances should not be used in a manner likely to subject them to excessive over-turning moments.

21.12.12 Ropes, chains and slings should not be knotted.

21.12.13 A thimble or loop splice in any wire rope should have at least three tucks with a whole strand of rope and two tucks with one half of the wires cut out of each strand. The strands in all cases should be tucked against the lay of the rope. Any other form of splice which can be shown as efficient as the above can also be used.

21.12.14 Lifting gear should not be passed around edges liable to cause damage without appropriate packing.

21.12.15 Where a particular type of load is normally lifted by special gear, such as plate clamps, other arrangements should only be substituted if they are equally safe.

21.12.16 The manner of use of natural and man-made fibre ropes, magnetic and vacuum lifting devices and other gear should take proper account of the particular limitations of the gear and the nature of the load to be lifted.

21.12.17 Wire ropes should be regularly inspected and treated with suitable lubricants. These should be thoroughly applied so as to prevent internal corrosion as well as corrosion on the outside. The ropes should never be allowed to dry out.



21.12.18 Cargo handling equipment that is lifted onto or off ships by crane or derrick should be provided with suitable points for the attachment of lifting gear, so designed as to be safe in use. The equipment should also be marked with its own gross weight and safe working load.

21.12.19 Before any attempt is made to free equipment that has become jammed under load, every effort should first be made to take off the load safely. Precautions should be taken to guard against sudden or unexpected freeing. Others not directly engaged in the operation should keep in safe or protected positions.

21.12.20 When machinery and, in particular, pistons are to be lifted by means of screw-in eye bolts, the eye-bolts should be checked to ensure that they have collars, that the threads are in good condition and that the bolts are screwed hard down on to their collars. Screw holds for lifting bolts in piston heads should be cleaned and the threads checked to see that they are not wasted before the bolts are inserted.

21.13 Safe Working Load (SWL)

21.13.1 A load greater than the safe working load should not be lifted unless:

- (a) a test is required by regulation; and
- (b) the weight of the load is known and is the appropriate proof load; and
- (c) the lift is a straight lift by a single appliance; and
- (d) the lift is supervised by the competent person who would normally supervise a test and carry out a thorough inspection; and
- (e) the competent person specifies in writing that the lift is appropriate in weight and other respects to act as a test of the plant, and agrees to the detailed plan of the lift; and
- (f) no person is exposed to danger thereby.

21.13.2 Any grab fitted to a lifting appliance should be of an appropriate size, taking into account the safe working load of the appliance, the



additional stresses on the appliance likely to result from the operation, and the material being lifted.

21.13.3 In the case of a single sheave block used in double purchase the working load applied to the wire should be assumed to equal half the load suspended from the block.

21.13.4 The safe working load of a lift truck means its actual lifting capacity, which relates the load which can be lifted to, in the case of a fork lift truck, the distance from the centre of gravity of the load from the heels of the forks. It may also specify lower capacities in certain situations, eg for lifts beyond a certain height.

21.14 Use of winches and cranes

21.14.1 The drum end of wire runners or falls should be secured to winch barrels or crane drums by proper clamps or U-bolts. The runner or fall should be long enough to leave at least three turns on the barrel or drum at maximum normal extension. Slack turns of wire or rope on a barrel or drum should be avoided as they are likely to pull out suddenly under load.

21.14.2 When a winch is changed from single to double gear or vice versa, any load should first be released and the clutch should be secured so that it cannot become disengaged when the winch is working.

21.14.3 Steam winches should be so maintained that the operator is not exposed to the risk of scalding by leaks of hot water and steam.

21.14.4 Before a steam winch is operated, the cylinders and steam pipes should be cleared of water by opening the appropriate drain cocks. The stop valve between winch and deck steam line should be kept unobstructed. Adequate measures should be taken to prevent steam obscuring the driver's vision in any part of a working area.



21.14.5 Ships' cranes should be properly operated and maintained in accordance with manufacturers' instructions. Companies, employers and masters, as appropriate, should ensure that sufficient technical information is available including the following information:-

- (a) Length, size and safe working load of falls and topping lifts.
- (b) Safe working load of all fittings;
- (c) Boom limiting angles;
- (d) Manufacturers' instructions for replacing wires, topping up hydraulics and other maintenance as appropriate.

21.14.6 Power operated rail mounted cranes should have the following facilities incorporated in their control systems:-

- (a) facilities to prevent unauthorised startup;
- (b) an efficient braking mechanism which will arrest the motion along the rails, and where safety constraints require, emergency facilities operated by readily accessible controls or automatic systems should be available for braking or stopping equipment in the event of failure of the main facility;
- (c) guards which reduce as far as possible the risk of the wheels running over persons' feet, and which will remove loose materials from the rails.

21.14.7 When a travelling crane is moved, any necessary holding bolts or clamps should be replaced before operations are resumed.

21.14.8 Access to a crane should be always by the proper means provided. Cranes should be stationary while accessing.

21.15 Use of derricks

21.15.1 Ships' derricks should be properly rigged and employers and masters should ensure that rigging plans are available containing the following information:-

- (a) position and size of deck eye-plates;



- (b) position of inboard and outboard booms;
- (c) maximum headroom (i.e. permissible height of cargo hook above hatch coaming);
- (d) maximum angle between runners;
- (e) position, size and safe working load of blocks;
- (f) length, size and safe working load of runners, topping lifts, guys and preventers;
- (g) safe working load of shackles;
- (h) position of derricks producing maximum forces
- (i) optimum position for guy and preventers to resist maximum forces as at (h);
- (j) combined load diagrams showing forces for a load of 1 tonne or the safe working load;
- (k) guidance on the maintenance of the derrick rig.

21.15.2 The operational guidance in the remainder of this section applies generally to the conventional type of ship's derrick. For other types, such as the "Hallen" and "Stulken" derricks, manufacturers' instructions should be followed.

21.15.3 Runner guides should be fitted to all derricks so that when the runner is slack, the bight is not a hazard to persons walking along the decks. Where rollers are fitted to runner guides, they should rotate freely.

21.15.4 Before a derrick is raised or lowered, all persons on deck in the vicinity should be warned so that no person stands in, or is in danger from, bights of wire and other ropes. All necessary wires should be flaked out.

21.15.5 When a single span derrick is being raised, lowered or adjusted, the hauling part of the topping lift or bull-wire (i.e. winch end whip) should be adequately secured to the drum end.



21.15.6 The winch driver should raise or lower the derrick at a speed consistent with the safe handling of the guys.

21.15.7 Before a derrick is raised, lowered or adjusted with a topping lift purchase, the hauling part of the span should be flaked out for its entire length in a safe manner. Someone should be available to assist the person controlling the wire on the drum and keeping the wire clear of turns and in making fast to the bitts or cleats. Where the hauling part of a topping lift purchase is led to a derrick span winch, the bull-wire should be handled in the same way.

21.15.8 To fasten the derrick in its final position, the topping lift purchase should be secured to bitts or cleats by first putting on three complete turns followed by four crossing turns and finally securing the whole with a lashing to prevent the turns jumping off due to the wire's natural springiness.

21.15.9 When a derrick is lowered on a topping lift purchase, someone should be detailed for lifting and holding the pawl bar, ready to release it should the need arise; the pawl should be fully engaged before the topping lift purchase or bull-wire is released. The person employed on this duty should not attempt or be given any other task until this operation is complete; in no circumstances should the pawl bar be wedged or lashed up.

21.15.10 A derrick with a topping winch, and particularly one that is self-powered, should not be topped hard against the mast, table or clamp in such a way that the initial heave required to free the pawl bar prior to lowering the derrick cannot be achieved without putting an undue strain on the topping lift purchase and its attachments.

21.15.11 A heel block should be secured additionally by means of a chain or wire so that the block will be pulled into position under load but does not drop when the load is released.



21.15.12 The derrick should be lowered to the deck or crutch and properly secured whenever repairs or changes to the rig are to be carried out.

21.15.13 If heavy cargo is to be dragged under deck with ship's winches, the runner should be led directly from the heel block to avoid overloading the derrick boom and rigging. Where a heavy load is to be removed, a snatch block or bull wire should be used to provide a fair-lead for the runner and to keep the load clear of obstructions.

21.16 Use of derricks in union purchase

21.16.1 When using union purchase the following precautions should be strictly taken to avoid excessive tensions:-

- (a) the angle between the married runners should not normally exceed 90° and an angle of 120° should never be exceeded;
- (b) the cargo sling should be kept as short as possible so as to clear the bulwarks without the angle between the runners exceeding 90° (or 120° in special circumstances);
- (c) derricks should be topped as high as practicable consistent with safe working;
- (d) the derricks should not be rigged further apart than is absolutely necessary.

21.16.2 The following examples will show how rapidly loads increase on derricks, runners and attachments as the angle between runners increases:

- At 60° included angle, the tension in each runner would be just over half the load;
- At 90° the tension would be nearly three-quarters of the load;
- At 195° the tension would be nearly 12 times the load.

21.16.3 When using union purchase, winch operators should wind in and pay out in step, otherwise dangerous tensions may develop in the rig.



21.16.4 An adequate preventer guy should always be rigged on the outboard side of each derrick when used in union purchase. The preventer guy should be looped over the head of the derrick, and as close to and parallel with the outboard guy as available fittings permit. Each guy should be secured to individual and adequate deck or other fastenings.

21.16.5 Narrow angles between derricks and outboard guys and between outboard guys and the vertical should be avoided in union purchase as these materially increase the loading on the guys. The angle between the outboard derrick and its outboard guy and preventer should not be too large and may cause the outboard derrick to jack-knife. In general, the inboard derrick guys and preventer should be secured as nearly as possible at an angle of 90° to the derrick.

21.17 Use of stoppers

21.17.1 Where fitted, mechanical topping lift stoppers should be used. Where chain stoppers are used, they should ALWAYS be applied by two half-hitches in the form of a cow hitch suitably spaced with the remaining chain and rope tail backed round the wire and held taut to the wire.

21.17.2 A chain stopper should be shackled as near as possible in line with the span downhaul and always to an eyeplate, not passed round on a bight which would induce bending stresses similar to those in a knotted chain.

21.17.3 No stopper should be shackled to the same eyeplate as the lead block for the span downhaul; this is particularly hazardous when the lead block has to be turned to take the downhaul to the winch or secure it to bitts or cleats.

21.17.4 The span downhaul should always be eased to a stopper and the stopper should take the weight before turns are removed from the winch, bitts or cleats.



21.18 Overhaul of cargo gear

21.18.1 When a cargo block or shackle is replaced, care should be taken to ensure that the replacement is of the correct type, size and safe working load necessary for its intended use.

21.18.2 All shackles should have their pins effectively secured or seized with wire.

21.18.3 A special check should be made on completion of the work to ensure that all the split pins in blocks etc. have been replaced and secured.

21.18.4 On completion of the gear overhaul, all working places should be cleaned of oil or grease.

21.19 Trucks and other vehicles/appliances

21.19.1 Where vehicles/work-trucks or other mechanical appliances are used aboard the vessel to carry personnel, they should where possible be constructed so as to prevent them overturning, or should be equipped or adapted to limit the risk to those carried by one or more of the following protection measures:

- (a) an enclosure for the driver;
- (b) a structure ensuring that, should the vehicle overturn, safe clearance remains between the ground and the parts of the vehicle where people are located when it is in use;
- (c) a structure restraining the workers on the driving seat so as to prevent them from being crushed. These protection structures may be an integral part of the vehicle/work equipment. They are not required when the work equipment is stabilised or where the equipment design makes roll-over impossible.

21.19.2 Personnel other than the driver should not be carried on a truck unless it is constructed or adapted for the purpose. Riding on the forks of a



truck is particularly dangerous. The driver should be careful to keep all parts of the body within the limits of the width of the truck or load.

21.19.3 Trucks for lifting and transporting should be used only by competent persons and only when the ship is in still water; they should never be used when vessels are in a seaway.

21.19.4 Appliances powered by internal combustion engines should not be used in enclosed spaces unless the spaces are adequately ventilated. The engine should not be left running when the truck is idle.

21.19.5 When not in use or left unattended whilst the vessel is in port, trucks for lifting and transporting should be aligned along the length of the ship with brakes on, operating controls locked and, where applicable, the forks tilted forward flush with the deck and clear of the passageway. If the trucks are on an incline, their wheels should be chocked. If not to be used for some time, and at all times whilst at sea, appliances should be properly secured to prevent movement.

21.19.6 No attempt should be made to handle a heavy load by the simultaneous use of two trucks. A truck should not be used to handle a load greater than its marked capacity or to move insecure or unsafe loads.

21.19.7 Tank containers should not be lifted directly with the forks of fork lift trucks, because of the risks of instability and of damaging the container with the ends of the forks. Tank containers may be lifted using fork lift trucks fitted with suitably designed side



or top lifting attachments but care should be exercised due to the risk of surge in partly filled tanks.

21.20 Defect reporting and testing - Advice to competent person

21.20.1 There is a legal requirement for lifting plant to be tested every five years. This section provides advice to the competent person carrying out the test.

21.20.2 The requirements for testing a lifting plant will be met if before use one of the following appropriate tests is carried out:-

- (a) proof loading the plant concerned; or
- (b) in appropriate cases by testing a sample to destruction; or
- (c) in the case of re-testing after repairs or modifications, such a test that satisfies the competent person who subsequently examines the plant (the re-testing of ships' lifting appliances may be effected by means of a static test eg by dynamometer where appropriate; or
- (d) in the case of a lift truck, the test should be a functional test to verify that the truck is able to perform the task for which it was designed. This test should include a check to ensure that all controls function correctly and that all identification and capacity plates are fitted and contain correct information. A dynamic test should include travelling and manoeuvring, stacking, a lowering speed check and tilt leakage test with the rated load including relevant attachments where appropriate. Following the test the truck should be examined to ensure that it has no defects which would render it unsuitable for use.

21.20.3 Where proof loading is part of a test the test load applied should exceed the safe working load as specified in the relevant Standard, or in other cases by at least the following:-



Proof Load (Tonnes)

SWL (Tonnes)	Lifting Appliances	Single Sheave Cargo and Pulley Blocks	Multi-Sheave Cargo and Pulley Blocks	Lifting Beams and Frames, etc	Other Lifting Gear
0-10	SWL x 1.25	SWL x 4	SWL x 2	SWL x 2	SWL x 2
11-20	SWL x 1.25	SWL x 4	SWL x 2	SWL x 1.04 + 9.6	SWL x 2
21-25	SWL + 5	SWL x 4	SWL x 2	SWL x 1.04 + 9.6	SWL x 2
26-50	SWL + 5	SWL x 4	SWL x 0.933 + 27	SWL x 1.04 + 9.6	SWL x 1.22 + 20
51-160	SWL x 1.1	SWL x 4	SWL x 0.933 + 27	SWL x 1.04 + 9.6	SWL x 1.22 + 20
161+	SWL x 1.1	SWL x 4	SWL x 1.1	SWL x 1.1	SWL x 1.22 + 20

Note: Where a lifting appliance is normally used with a specific removable attachment and the weight of that attachment is not included in the marked safe working load as allowed in 7.7.7 of this code then for the purposes of using the above table the safe working load of that appliance should be taken as being the marked safe working load plus the weight of the attachment.

21.20.4 Any defect found in any lifting plant, including plant provided by a shore authority, should be reported immediately to the master or to another responsible person who should take appropriate action.

21.20.5 Similar principles apply to cargo securing devices as to lifting equipment. The crew and persons employed for the securing of cargoes should be instructed in the correct application and use of the cargo securing gear on board the ship. For guidance on the securing of cargoes and handling of security devices refer to the ship's approved Cargo Securing Manual.

21.21 Personnel Lifting Equipment, Lifts and Lift Machinery Personnel Lifting Equipment

21.21.1 Except under the conditions required by paragraph 21.21.2, no lifting equipment shall be used for lifting persons unless it is designed for the purpose.

21.21.2 If in exceptional circumstances it is necessary to use lifting equipment, which has not been specifically designed for the purpose, to lift persons: -

- (a) the control position of the lifting equipment must be manned at all times; and
- (b) the persons being lifted must have a reliable means of communication, whether direct or indirect, with the operator of the lifting equipment.



21.21.3 Lifting equipment which is designed for lifting persons must not be used for that purpose unless it has been constructed, maintained and operated such that a worker may use it or carry out work activities from the carrier without risk to his health and safety, and in particular -

- (a) that the worker will not be crushed, trapped or struck, in particular through inadvertent contact with objects;
- (b) that the lifting equipment is so designed or has suitable devices -
 - (i) to prevent any carrier falling or, if that cannot be prevented for reasons inherent in the site and height differences, the carrier has an enhanced safety co-efficient suspension rope or chain;
 - (ii) to prevent the risk of any person falling from the carrier, and
- (c) that any person trapped in the carrier in the event of an incident is not thereby exposed to danger and can be freed.

21.21.4 Any rope or chain provided under sub-paragraph 21.21.3(b)(i) is to be inspected by a competent person every working day.

21.21.5 Guidelines on the transfer of Personnel is contained in Chapter 31.6 of this Code and in Annex 2 - [Safety Notice (SN 10/80) produced by the offshore safety division of the Health and Safety Executive] of MGN 332 (M+F).

21.22 Maintenance and Testing of Lifts

21.22.1 Before a lift is put into normal service it must be tested and examined by a competent person and a certificate or report issued.

21.22.2 Regular examination must be carried out by a competent person at intervals not exceeding six months and a certificate or report issued. More detailed examination and testing of parts of the lift installation must be carried out at periodic intervals.

21.22.3 A person chosen to act as a competent person must be over 18



and have such practical and theoretical knowledge and actual experience of the type of lift which they have to examine, as will enable them to detect defects or weaknesses and to assess their importance in relation to the safety of the lift.

21.22.4 Details of the tests and examinations required for the issue of a certificate are given in British Standards and other equivalent Standards. Guidance on the Thorough Examination and Testing of Lifts is also available from the Health and Safety Executive.

21.22.5 An initial risk assessment must be made to identify hazards associated with work on each lift installation, including work requiring access to the lift trunk. Safe working procedures must be drawn up for each lift installation. Persons who are to be authorised to carry out work on or inspection of the lift installation must comply with these procedures.

21.22.6 The specific areas that the risk assessment should address should include, as appropriate:

- (a) whether there are safe clearances above and below the car at the extent of its travel;
- (b) whether a car top control station is fitted and its means of operation;
- (c) the working conditions in the machine and pulley rooms.

21.22.7 Based on the findings of the risk assessment, it is recommended that a permit-to-work system, as described in Chapter 16, is adopted when it is necessary for personnel to enter the lift trunk or to override the control safety systems. It is strongly recommended that no person should work alone on lifts.

21.22.8 Any work carried out on lifts must only be performed by authorised persons familiar with the work and the appropriate safe working procedures. These procedures must include provision for both the safety of



persons working on the lift and others who may also be at risk such as intending passengers.

21.22.9 Appropriate safety signs must be prominently displayed in the area and also on control equipment such as call lift buttons. Barriers must be used when it is necessary for lift landing doors to remain open to the lift trunk.

21.22.10 Experience indicates that the most important single factor in minimising risk of accidents is the avoidance of misunderstandings between personnel. A means of communication to the authorising officer and between those involved in working on the lift must be established and maintained at all times. This might be by telephone, portable-hand held radio or a person-to person chain. Whatever the arrangement, action should only be taken as a result of the positive receipt of confirmation that the message is understood.

21.22.11 Before attempting to gain access to the trunk, whenever possible the mains switch should be locked in the OFF position (or alternatively the fuses should be withdrawn and retained in a safe place) and an appropriate safety sign must be positioned at the point of such isolation. This should include both main and emergency supplies. In addition, the landing doors should not be allowed to remain open longer than necessary; the machine room should be protected against unauthorised entry and after completion of work a check must be made to ensure that all equipment used in the operation has been cleared from the well.

21.22.12 When it is necessary for personnel to travel on top of a car, safety can be enhanced considerably by the use of the car top control station (comprising a stopping device and an inspection switch/control device) required by British Standard or an equivalent Standard. Account should be taken of the arrangement and location of the control station i.e. whether the stopping device can be operated before stepping on to the car



top. Persons must not travel on the top of the lift car if no stopping device is fitted.



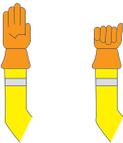
Annex 21.1

Coded signs to be used

Preliminary remark:

The following sets of coded signals are examples of those implemented by the EU Directive 92/58/EEC, but where there are accepted national signals in common use (as indicated *) these too are acceptable. Visit the HSE website on the link below to see these signs demonstrated in a video clip.

<http://www.hse.gov.uk/workplacetransport/safetysigns/banksman/banksman.htm>

Meaning	Description	Illustration
A. General hand signals		
START Attention Start of Command	both arms are extended horizontally with the palms facing forward.	
TAKING THE STRAIN or INCHING THE LOAD	the right arm points upwards with the palm facing forwards. The fingers clenched and then unclenched.	 *
STOP Interruption End of movement	the right arm points upwards with the palm facing forwards.	
END of the operation (operations cease)	both hands are clasped at chest height.	
	OR	
	both arms extended at 45° downwards and lower arms crossed back and forth sharply across torso.	 *

B. Vertical movements

RAISE

the right arm points upwards with the palm facing forward and slowly makes a circle.



LOWER

the right arm points downwards with the palm facing inwards and slowly makes a circle.



DERRICKING THE JIB

signal with one hand. Other hand on head



*

Jib up



*

Jib down

TELESCOPING THE JIB

signal with one hand. Other hand on head



*

Extend jib



*

Retract jib

VERTICAL DISTANCE

the hands indicate the relevant distance.



C. Horizontal movements

MOVE FORWARDS
(Travel to me)

both arms are bent with the palms facing upwards and the forearms make slow movements towards the body



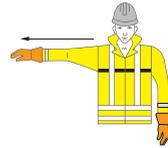
MOVE BACKWARDS
(Travel from me)

both arms are bent with the palms facing downwards and the forearms make slow movements away from the body.



RIGHT
to the signalman's
(in the direction
indicated)

the right arm is extended more or less horizontally with the palm facing downwards and slowly makes small movements to the right.



LEFT
to the signalman's
(in the direction
indicated)

the left arm is extended more or less horizontally with the palm facing downwards and slowly makes small movements to the left.



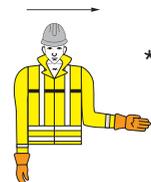
HORIZONTAL
DISTANCE

the hands indicate the relevant distance.



SLEWING
(In direction indicated)

both arms close to side extending one arm 90° from elbow.



DANGER EMERGENCY STOP	D. Danger both arms point upwards with the palms facing forwards.		
SECURE Secure the Load	E. Other both arms are crossed closely to the chest with hands clenched.		*
TWISTLOCKS Twistlocks on/off	the left arm points upwards. Rotate wrist of left hand clockwise signalling twist on, and anticlockwise for signalling twist off.		*

E. Operating instructions

QUICK	all movements faster.
SLOW	all movements slower.



Annex 21.1.1

CERTIFICATE OF TEST AND THOROUGH EXAMINATION OF LIFTING APPLIANCES

Name of Ship

Certificate No.

Official Number

Call sign

Port of Registry

Name of Owner

(1) Situation and description of lifting application (with distinguishing numbers or marks, if any) which have been tested and thoroughly examined

(2) Angle to the horizontal or radius at which test load applied

(3) Test load (tonnes)

(4) Safe working load (SWL) at angle or radius shown in column (2) (tonnes)

Name and address of the firm or competent person who witnessed testing and carried out thorough examination

.....
.....
.....

I certify that on the date to which I have appended my signature, the gear shown in column (1) was tested and thoroughly examined and no defects or permanent deformation were found; and that the safe working load is as shown.

Date:

Signature:

Place:

Note: This certificate is the standard international form as recommended by the International Labour Office in accordance with ILO Convention No. 152.



Annex 21.1.2

CERTIFICATE OF TEST AND THOROUGH EXAMINATION OF DERRICKS USED IN UNION PURCHASE

Name of Ship

Certificate No.

Official Number

Call sign

Port of Registry

Name of Owner

(1)	(2)	(3)	(4)
Situation and description of derricks used in union purchase (with distinguishing numbers or marks, if any) which have been tested and thoroughly examined	Maximum height of triangle plate above hatch coaming (m) or maximum angle between runners	Test load (tonnes)	Safe working load, SWL (U), when operating in union purchase (tonnes)

Position of outboard preventer guy attachments:	(a) forward/aft* of mast	(m)
	and	
Position of inboard preventer guy attachments:	(b) from ship's centre line	(m)
	(a) forward/aft* of mast	(m)
	and	
	(b) from ship's centre line	(m)

* Delete as appropriate

Name and address of the firm or competent person who witnessed testing and carried out thorough examination
.....
.....
.....

I certify that on the date to which I have appended my signature, the gear shown in column (1) was tested and thoroughly examined and no defects or permanent deformation were found; and that the safe working load is as shown.

Date:

Signature:

Place:

Note: This certificate is the standard international form as recommended by the International Labour Office in accordance with ILO Convention No. 152.



Annex 21.1.3

CERTIFICATE OF TEST AND THOROUGH EXAMINATION OF LOOSE GEAR

Name of Ship _____ Certificate No.

Official Number _____

Call sign _____

Port of Registry _____

Name of Owner _____

Distinguishing number or mark	Description of loose gear	Number tested	Date of test	Test loaded (tonnes)	Safe working load (SWL) (tonnes)
-------------------------------	---------------------------	---------------	--------------	----------------------	----------------------------------

Name and address of makers or suppliers:

Name and address of the firm or competent person who witnessed testing and carried out thorough examination

I certify that the above items of loose gear were tested and thoroughly examined and no defects affecting their SWL were found.

Date: Signature:

Place:

Note: This certificate is the standard international form as recommended by the International Labour Office in accordance with ILO Convention No. 152.



Annex 21.1.4

CERTIFICATE OF TEST AND THOROUGH EXAMINATION OF WIRE ROPE

Name of Ship

Certificate No.

Official Number

Call sign

Port of Registry

Name of Owner

Name and address of maker or supplier

Nominal diameter of rope (mm)

Number of strands

Number of wires per strand

Core

Lay

Quality of wire (N/mm²)

Date of test of sample

Load at which sample broke (tonnes)

Safe working load of rope (tonnes)

Intended use

Name and address of the firm or competent person
who witnessed testing and carried out thorough
examination

.....
.....
.....

I certify that the above particulars are correct, and that the rope was tested and thoroughly examined and no defects affecting its SWL were found.

Date:

Signature:

Place:

Note: This certificate is the standard international form as recommended by the International Labour Office in accordance with ILO Convention No. 152.



Annex 21.2

REGISTER OF SHIPS' LIFTING APPLIANCES AND CARGO HANDLING GEAR

Name of Ship
Official Number
Call sign
Port of Registry
Name of Owner

Certificate No.

Register Number
Date of Issue
Issued by
Signature and Stamp

Note: This Register is the standard international form as recommended by the International Labour Office in accordance with ILO Convention No. 152:



Annex 21.2 contd.

PART I - Thorough examination of lifting appliances and loose gear

(1) Situation and description of lifting appliances and loose gear with distinguishing numbers or marks, if any) which have been thoroughly examined (see note 1)	(2) Certificate Nos.	(3) Examination performed (see note 2)	(4) I certify that on the date to which I have appended my signature, the gear shown in column (1) was thoroughly examined and no defects affecting its safe working condition were found other than those shown in column (5) (Date and signature)	(5) Remarks (To be dated and signed)

Note 1: If all the lifting appliances are thoroughly examined on the same date it will be sufficient to enter in column (1) "All the lifting appliances and loose gear". If not, the parts which have been thoroughly examined on the dates stated must be clearly indicated.

Note 2: The thorough examinations to be indicated in column (3) include:

- (a) Initial.
- (b) 12 monthly.
- (c) Five yearly.
- (d) Repair/damage.
- (e) Other thorough examinations including those associated with heat treatment.



Annex 21.2 contd.

PART 2 - Regular inspections of loose gear

(1) Situation and description of loose gear (with distinguishing numbers or marks, if any) which has been inspected (see Note 1)	(2) Signature and date of the responsible person carrying out the inspection	(3) Remarks (To be dated and signed)

Note 1: All loose gear should be inspected before use. However, entries need only be made when the inspection discloses a defect.



Annex 21.3

Certificate of thorough examination of lifting appliance*/ Derricks used in union purchase*/loose gear*/wire rope* as required by regulation 11 of the merchant shipping (lifting operations and lifting equipment) regulations 2006

(* Delete as appropriate)

Name of Ship Certificate No.

Official Number

Call sign

Port of Registry

Name of Employer

Name of Equipment Owner

(if different to Employer)

Description

(State here the location, type and full description (including any distinguishing numbers or marks) of the lifting appliance, derrick, loose gear, wire rope etc which was thoroughly examined for the issue of this certificate)

Name and address of company or Competent
Person carrying out the Thorough Examination

I certify that on (**insert date**) I carried out a Thorough Examination of the Lifting Appliance*/Derricks Used in Union Purchase*/Loose Gear*/Wire Rope (*Delete as appropriate), referred to above, as required by Regulation 11 of the Merchant Shipping (Lifting Operations and Lifting Equipment) Regulations 2006 and:-

- (a) * Found no defects and/or deficiencies
or
(b) * Found the following defects and/or deficiencies which are/are not considered to be, or have the potential to become, a danger to person:-

Signature: Name (in capitals):

Date: Place:

Notes:

1. A copy of this certificate shall be provided to the employer and, where the employer is not the owner of the equipment etc e.g. because it is hired or leased, to the person from whom the equipment etc has been hired or leased.
2. Where the person carrying out the Thorough Examination identifies any defects and/or deficiencies in the equipment etc which in his opinion are or could become a danger to persons he shall forthwith make a report to the employer and, where appropriate, to any person from whom the equipment etc has been hired or leased, and
3. Send a copy of the report as soon as is practicable to the relevant enforcing authority as indicated in Regulation 11.
4. Where an employer or the owner of any equipment etc has been notified of any deficiency under paragraph (2) or (4), he shall ensure that any condition liable to result in a dangerous situation is remedied in good time, and that any lifting equipment is not used unless and until the defect and/or deficiency is rectified.



CHAPTER 22

MAINTENANCE

22.1 Introduction

22.1.1 Based on the findings of the risk assessment, appropriate control measures should be put into place to protect those who may be affected. This chapter highlights some areas which may require attention in respect of maintenance.

22.2 General

22.2.1 No maintenance work or repair which might affect the supply of water to the fire main or sprinkler system should be started without the prior permission of the master and chief engineer:

22.2.2 No alarm system should be isolated without the permission of the master and chief engineer:

22.2.3 Means of access to fire fighting equipment, emergency escape routes and watertight doors should never be obstructed.

22.2.4 Safety guards on machinery or equipment should only be removed when the machinery is not operating. If removal is essential for maintenance or examination of the equipment, the following precautions should be taken:

- removal should be authorised by a responsible person, and only a competent person should carry out the work or examination;
- there should be adequate clear space and lighting for the work to be done;
- anyone working close to the machinery should be told what the risks are and instructed in safe systems of work and precautions to take;
- a warning notice should be conspicuously posted.

22.2.5 Solvents used for cleaning can be toxic, and should always be used in accordance with the manufacturers' instructions. The area should be well



ventilated, and in confined spaces, smoking should be prohibited.

22.3 Floor plates and handrails

22.3.1 Lifting handles should be used when a floor plate is removed or replaced. When lifting handles are not provided, the plate should be levered up with a suitable tool and a chock inserted before lifting. On no account should fingers be used to prise up the edges.

22.3.2 Whenever floor plates or handrails are removed, warning notices should be posted, the openings should be effectively fenced or guarded and the area well-illuminated.

22.4 Maintenance of machinery

22.4.1 Before machinery is serviced or repaired, measures should be taken to prevent it being turned on or started automatically or from a remote control system.

- Electrically-operated machinery should be isolated from the power supply.
- Steam-operated machinery should have both steam and exhaust valves securely closed and, where possible, the valves locked or tied shut or some other means employed to indicate that the valves should not be opened. The same care is required when dealing with heated water under pressure as is required when working on steam-operated machinery or pipework.
- In all cases, warning notices should be posted at or near the controls giving warning that the machinery concerned is not to be used.

22.4.2 Where valves or filter covers have to be removed or similar operations have to be performed on pressurised systems, that part of the system should be isolated by closing the appropriate valves. Drain cocks should be opened to ensure that pressure is off the system.

22.4.3 When joints of pipes, fittings etc are being broken, the fastenings should not be completely removed until the joint has been broken and it has



been established that no pressure remains within.

22.4.4 Before a section of the steam pipe system is opened to the steam supply, all drains should be opened. Steam should be admitted very slowly and the drains kept open until all the water has been expelled.

22.4.5 Maintenance or repairs to, or immediately adjacent to, moving machinery should be permitted only in circumstances where no danger exists or where it is impracticable for the machinery to be stopped. Close-fitting clothing should be worn and long hair should be covered (see 4.5.5). The officer in charge should consider whether it is necessary in the interests of safety for a second person to be in close attendance whilst the work is being carried out.

22.4.6 Heavy parts of dismantled machinery temporarily put aside should be firmly secured against movement in a seaway and, as far as practicable, be clear of walkways. Sharp projections on them should be covered when reasonably practicable.

22.4.7 Spare gear, tools and other equipment or material should never be left lying around, especially near to stabiliser or steering gear rams and switchboards.

22.4.8 A marlin spike, steel rod, or other suitable device should be used to align holes in machinery being reassembled or mounted; fingers should never be used.

22.4.9 When guards or other safety devices have been removed from machinery, they should be replaced immediately the work is completed and before the machinery or equipment is tested.

22.4.10 An approved safety lamp should always be used for illuminating spaces where oil or oil vapour is present. Vapour should be dispersed by



ventilation before work is done.

22.5 Boilers

22.5.1 Boilers should be opened only under the direction of an engineering officer. Care should be taken to check, after emptying, that the vacuum is broken before manhole doors are removed. Even if an air cock has been opened to break the vacuum, the practice should always be to loosen the manhole door nuts and break the joint before the removal of the dogs and knocking in the doors. The top manhole doors should be removed first. Personnel should stand clear of hot vapour when doors are opened.

22.5.2 Workers should not enter any boiler, boiler furnace or boiler flue until it has cooled sufficiently to make work in such places safe.

22.5.3 Before entry is permitted to a boiler which is part of a range of two or more boilers, the engineer officer in charge should ensure that either:

(a) all inlets through which steam or water might enter the boiler from any other part of the range have been disconnected, drained and left open to atmosphere;

or, where that is not practicable;

(b) all valves or cocks, including blowdown valves controlling entry of steam or water, have been closed and securely locked, and notices posted to prevent them being opened again until authorisation is given.

The above precautions should be maintained whilst personnel remain in the boiler.

22.5.4 Workers cleaning tubes, scaling boilers, and cleaning backends, should wear appropriate protective clothing and equipment including clothing and respirators. Employers should also ensure that Workers familiarise themselves with the accompanying data sheet to any chemical agents they may use in the course of their work. They should also be aware of the potentially hazardous gaseous by-products which may be produced from the reaction of the cleaner/de-scaling product and the object itself or products



used together, as this may result in an asphyxiating, explosive or other hazardous atmosphere.

22.5.5 A boiler is a confined space, and therefore potentially a dangerous space. Special care should be exercised before a boiler is entered which has not been in use for some time or where chemicals have been used to prevent rust forming. The atmosphere may be deficient in oxygen and tests should be carried out before any person is allowed to enter. See Chapter 17 for advice on entering enclosed spaces.

22.6 Auxiliary machinery and equipment

22.6.1 Before work is started on an electric generator or auxiliary machine, the machine should be stopped and the starting air valve or similar device should be secured so that it cannot be operated. A notice should be posted warning that the machine is not to be started nor the turning gear used. To avoid the danger of motoring and electric shock to any person working on the machine, it should be isolated electrically from the switchboard or starter before work is commenced. The circuit-breaker should be opened and a notice posted at the switchboard warning personnel that the breaker is NOT to be closed. Where practicable, the circuit-breaker should be locked open.

22.6.2 No attempt should be made to start a diesel engine without first barring round with the indicator cocks open. The barring gear should then be disengaged before starting the engine.

22.6.3 Oily deposits of flammable material should never be allowed to build up in the way of diesel engine relief valves, crankcase explosion doors or scavenge belt safety discs.

22.6.4 Flammable coatings should never be applied to the internal surfaces of air starting reservoirs.



22.6.5 When testing a diesel engine fuel injector, or other high pressure parts of injection equipment, jets should not be allowed to spray unprotected skin.

22.6.6 Oxygen should on no account be used for starting engines. To do so would probably cause a violent explosion.

22.7 Main engines

22.7.1 Where necessary, suitable staging, adequately secured, should be used to provide a working platform.

22.7.2 Before anyone is allowed to enter or work in the main engine crankcase or gear case, the turning gear should be engaged and a warning notice posted at the start position. The spaces should be well ventilated and the atmosphere tested.

22.7.3 Before the main engine turning gear is used, a check should be made to ensure that all personnel are clear of the crankcase and any moving part of the main engine, and that the duty deck officer has confirmed that the propeller is clear.

22.7.4 If a hot bearing has been detected in a closed crankcase, the crankcase should not be opened until sufficient time has been allowed for the bearing to cool down, otherwise the entry of air could create an explosive air/oil vapour mixture.

22.7.5 The opened crankcase or gear case should be well-ventilated to expel all flammable gases before any source of ignition, such as a portable lamp (unless of an approved safety type) is brought near to it.

22.7.6 Before the main engine is restarted, a responsible engineer officer should check that the shaft is clear and inform the duty deck officer who should confirm that the propeller is clear.



22.8 Refrigeration machinery and refrigerated compartments

22.8.1 No one should enter a refrigerated chamber without first informing a responsible officer (see section 15.10). Should it be known or suspected that the refrigerant has leaked into any compartment, no attempt should be made to enter that compartment without appropriate precautions being taken.

22.8.2 Personnel charging or repairing refrigeration plants should fully understand the precautions to be observed when handling the refrigerant.

22.8.3 When refrigerant plants are being charged through a charging connection in the compressor suction line, it is sometimes the practice to heat the cylinder to evaporate the last of the liquid refrigerant. This should be done only by placing the cylinder in hot water or some similar indirect method and never by heating the cylinder directly with a blow lamp or other flame. Advice on the handling and storage of gas cylinders is given in section 23.8.

22.8.4 If it is necessary for repair or maintenance to apply heat to vessels containing refrigerant, appropriate valves should be opened to prevent build-up of pressure within the vessels.

22.8.5 Further advice on working with refrigeration plant is given in section 15.10.

22.9 Steering gear

22.9.1 Generally, work should not be done on steering gear when a ship is under way. If it is necessary to work on steering gear when the vessel is at sea, the ship should be stopped and suitable steps taken to immobilise the rudder by closing the valves on the hydraulic cylinders or by other appropriate and effective means.



22.10 Hydraulic and pneumatic equipment

22.10.1 Before repairs to or maintenance of hydraulic and pneumatic equipment is undertaken any load should be removed, or if this is not practical, adequately supported by other means. All pressure in the system should be released. The part being worked upon should be isolated from the power source and a warning notice displayed by the isolating valve, which should be locked.

22.10.2 Precautions should be taken against the possibility of residual pressure being released when unions or joints are broken.

22.10.3 Absolute cleanliness is essential to the proper and safe operation of hydraulic and pneumatic system; the working area and tools, as well as the system and its components, should be kept clean during servicing work. Care should also be taken to ensure that replacement units are clean and free from any contamination, especially fluid passages.

22.10.4 Only replacement components which comply with manufacturers' recommendations should be used. Any renewed or replacement item of equipment should be properly inspected or tested before being put into operation within the system.

22.10.5 Since vapours from hydraulic fluid may be flammable, naked lights should be kept away from hydraulic equipment being tested or serviced.

22.10.6 A jet of hydraulic fluid under pressure should never be allowed to spray onto unprotected skin. Any hydraulic fluid spilt on the skin should be thoroughly washed off.

22.11 Electrical equipment

22.11.1 The risks of electric shock are much greater on board ship than they are normally ashore because wetness, high humidity and high



temperature (including sweating) reduce the contact resistance of the body. In those conditions, severe and even fatal shocks may be caused at voltages as low as 60V. It should also be borne in mind that cuts and abrasions significantly reduce skin resistance.

22.11.2 A notice of instructions on the treatment of electric shock should be posted in every place containing electrical equipment and switchgear: Immediate on the spot treatment of an unconscious patient is essential.

22.11.3 Before any work is done on electrical equipment, fuses should be removed or circuit breakers opened to ensure that all related circuits are dead. If possible, switches and circuit breakers should be locked open or, alternatively, a 'not to be closed' notice attached (see section 22.6). Where a fuse has been removed, it should be retained by the person working on the equipment until the job is finished. A check should be made that any interlocks or other safety devices are operative. Additional precautions are necessary to ensure safety when work is to be undertaken on high voltage equipment (designed to operate at a nominal system voltage in excess of 1kV). The work should be carried out by, or under the direct supervision of, a competent person with sufficient technical knowledge and a permit-to-work system should be operated.

22.11.4 Some parts of certain types of equipment may remain live even when the equipment is switched off. Power should always be cut off at the mains.

22.11.5 Flammable materials should never be left or stored near switchboards.

22.11.6 Work on or near live equipment should be avoided if possible but when it is essential for the safety of the ship or for testing purposes, the following precautions should be taken:



- A second person, who should be competent in the treatment of electric shock, should be continually in attendance.
- The working position adopted should be safe and secure to avoid accidental contact with the live parts. Insulated gloves should be worn where practicable.
- Contact with the deck, particularly if it is wet, should be avoided. Footwear may give inadequate insulation if it is damp or has metal studs or rivets. The use of a dry insulating mat at all times is recommended.
- Contact with bare metal should be avoided. A hand-to-hand shock is especially dangerous. To minimise the risk of a second contact should the working hand accidentally touch a live part, one hand should be kept in a trouser pocket whenever practicable.
- Wrist watches, metal identity bracelets and rings should be removed. They provide low resistance contacts with the skin. Metal fittings on clothing or footwear are also dangerous.

22.11.7 Meter probes should have only minimum amounts of metal exposed and insulation of both probes should be in good condition. Care should be taken that the probes do not short circuit adjacent connections. When measuring voltages that are greater than 250V, the probe should be attached and removed with the circuit dead.

22.12 Main switchboards

22.12.1 The internal cleaning and maintenance of the Main Switchboard must only be carried out while it is in a “dead” condition; after a full **Risk Assessment** has been carried out, as described in **Chapter 1**; and, a formal **Permit-To-Work** issued, as described in **Chapter 16**.

22.12.2 The Risk Assessment will identify the actions and checks required to make the Switchboard safe, and these actions and checks will be identified in the Permit-To-Work. The major checks to be listed on the Permit-To-Work will identify and verify that the necessary Inter-Connections to and from; and/



or within, the Main Switchboard are disconnected. These will include but are not limited to:

- (a) the Shore Power Supply,
- (b) the Emergency Generator,
- (c) the Emergency Power Supply,

22.12.3 The internal cleaning and internal maintenance of the Main Switchboard would, in general, be an integral part of a ship's dry-dock programme or that of an extended maintenance programme.

22.12.4 Further safety guidance on working on electrical equipment is to be found in **22.11**.

22.13 Distribution switchboards

22.13.1 Safety guidance on working on electrical distribution switchboards is to be found in **22.11**.

22.14 Electrical machinery

22.14.1 Safety guidance on working on electrical machinery is to be found in **22.11**.

22.15 High Voltage Systems

22.15.1 Additional precautions are necessary to ensure safety when work is to be undertaken on high voltage equipment (designed to operate at a nominal system voltage in excess of 1kV).

22.15.2 Definitions

The following defines the terms used with respect to the High Voltage Equipment / Installations

Additional Earth - An earth connection applied to apparatus after the application of a Circuit Main Earth, normally applied at the point of work if not already fitted with Circuit Main Earth.



Approved - A type of form sanctioned for use by the Superintendent / Senior Electrical Engineer.

Authorised Person - An Authorised Person is appropriately trained and appointed in writing by the Superintendent / Electrical Engineer to carry out work as permitted by these Rules.

Caution Notice - A notice conveying a warning against interference with the apparatus to which it is attached.

Chief Engineer – Senior Engineer onboard the vessel responsible for all vessel technical operations and maintenance.

Circuit Main Earth - An earth connection applied for the purpose of making apparatus safe to work on before a Permit to Work or Sanction for Test is issued and which is nominated on the document.

Competent person - A Competent Person is appropriately trained and has sufficient technical knowledge or experience to enable him to avoid danger. It is the duty of the Authorised Person issuing a permit to work covered by these Rules to satisfy himself that persons are competent to carry out the work involved.

Danger Notice - A notice calling attention to the danger of approach or interference with the apparatus to which it is attached.

Dead - At or about zero voltage and disconnected from all sources of electrical energy.

Earthed - Connected to the general mass of earth in such a manner as will ensure at all times an immediate discharge of electrical energy without danger.

High Voltage - A voltage exceeding 1000 Volts.

High Voltage Apparatus - Any apparatus, equipment or conductors normally operated at a voltage higher than 1000 Volts.

Isolated - The disconnection and separation of the electrical equipment from every source of electrical energy in such a way that this disconnection and separation is secure.

Key safe - A device for the secure retention of keys used to lock means of isolation, Earthing or other safety devices.

Limitation of Access - A form issued by an Authorised Person to a



Competent Person, defining the limits of the work to be carried out in the vicinity of, but not on, High Voltage electrical apparatus.

Live - Electrically charged from a supply of electricity.

Permit to Work - A form of declaration signed and given by an Authorised Person to a Competent Person in charge of the work to be carried out on or in close proximity to High Voltage Apparatus, making known to him the extent of the work, exactly what apparatus is Dead, is Isolated from all Live conductors, has been discharged and Earthed and, insofar as electric hazards are concerned, on which it is safe to work.

Safety lock - A lock used to secure points of isolation, safety devices and circuit earths, being unique from any other locks used on the system.

Sanction for Test - A form of declaration, signed and given by an Authorised Person to another Authorised Person in charge of testing High Voltage Apparatus making known to the recipient what apparatus is to be tested and the conditions under which the testing is to be carried out.

Superintendent / Senior Electrical Engineer - A senior Electrical/Mechanical Engineer suitably qualified and appointed in writing by the Company to be responsible for compilation and administration of rules for High Voltage Installations and Operations.

22.15.3 Work on High Voltage Equipment/Installations

No work shall be carried out on High Voltage Equipment/Installations unless the equipment/ installations are:

- (a) Dead
- (b) Isolated and all practicable steps have been taken to lock off live conductors, voltage transformers (except where the connections are bolted) and dead conductors that may become live.
- (c) Earthed at all points of disconnection of High Voltage supply and caution notices attached in English and any other working language of the vessel.
- (d) Released for work by the issue of a Permit to Work or a Sanction for Test.



- (e) The Competent Person designated to carry out the work fully understands the nature and scope of the work to be carried out and has witnessed a demonstration that the equipment/installation is dead at the point of work.

A Limitation of Access instruction should be used to give written instructions defining the limits of work to be carried out in the vicinity of but NOT on High Voltage Equipment/Installations.

22.15.4 Operation of Switchgear

High Voltage switching shall only be carried out by an Authorised Person or by a Competent Person acting in the presence of and to the instructions of a person so Authorised or a person competent to do so and in the normal course of their duties and using equipment provided for the purpose.

In an emergency High Voltage switching to cut off supply may be carried out by any person competent to do so.

Any message relating to the operation of the High Voltage system and which has been transmitted by telephone/radio shall be repeated in full by the recipient and confirmed by the sender to ensure that the message has been accurately received.

Making Live or Dead by signals or pre-arranged understanding after an agreed time interval is not permitted.

22.15.5 Withdrawn Apparatus

High Voltage Apparatus which has been Isolated and removed from its normal operating position may be worked on without a Permit to Work or Sanction for Test, provided that:

- (a) It has been discharged
- (b) It is prevented by barriers and locking from being restored to a Live



position.

- (c) Access to High Voltage conductors on the switchboard is prevented.

22.15.6 Locking Off

All spout (orifice) shutters not required for immediate work or operations shall be locked shut. (Exception: On certain types of switchgear, access to the shutters is restricted whilst the circuit breaker is still in the cubicle.

Under these circumstances it is acceptable to lock either the cubicle door or the racking mechanism, whichever is appropriate, which must prevent further withdrawal of the circuit breaker; so long as the circuit breaker has been withdrawn from its normal operating position).

22.15.7 Protective Equipment

Protective equipment associated with the High Voltage Equipment/ Installations and forming part of the system shall not be adjusted, put into or taken out of commission without the sanction of the Chief Engineer or Superintendent / Senior Electrical Engineer.

High Voltage Equipment/Installations shall not be commissioned or re-commissioned (after major work) until the protective devices have been proved to be functioning correctly.

22.15.8 Insulation Testing

All High Voltage Equipment/Installations which are either new or have undergone substantial maintenance or alteration shall be subject to a High Voltage test in accordance with figures approved in writing by the Chief Engineer or Superintendent / Electrical Engineer.

22.15.9 Failure of Supply

During failures of supply all apparatus, equipment and conductors shall be regarded as being Live until Isolated and proved Dead.



22.15.10 Entry to Enclosures containing High Voltage Equipment/Installations

Compartments and other enclosures containing High Voltage Apparatus shall be locked except when entry or exit is necessary.

The keys giving normal access to such enclosures shall be accessible to Authorised Persons only.

No person except an Authorised Person, or a Competent Person who is under the immediate supervision of an Authorised Person, who shall be continuously present, shall enter any enclosure in which it is possible to touch exposed High Voltage conductors.

Entry to compartments or other enclosures containing High Voltage Equipment/Installations is limited to Authorised Persons or other persons only when accompanied by an Authorised Person.

Entry to compartments containing High Voltage Equipment/Installations that are not protected by insulated covers should only be undertaken when the Equipment/Installations are isolated and earthed.

22.15.11 Earthing

Circuit Main Earths shall be applied and removed only by an Authorised Person, or by a person Competent to do so in his presence and to his instructions.

When High Voltage Equipment/Installations have been made dead and Isolated, the Conductors to be Earthed shall be proved Dead if practicable using an Approved potential indicator. The potential indicator should be in date for calibration and be tested immediately before and after use, to prove it is in good working order.

Where practicable Circuit Main Earths shall be applied through a circuit



breaker or earthing switches.

Before closing to earth, the trip features shall be rendered inoperative unless this is impracticable. After closing, the circuit breaker shall be locked in the earth position and the trip features rendered inoperative with a caution notice attached.

Additional Earths may be applied at the point of work after the issue of a Permit to Work by the Competent Person in charge of the work.

Circuit Main Earths/Additional Earths may also be removed/replaced at the point of work after the issue of a Sanction for Test by the Authorised person conducting the test.

A Circuit Main Earth applied at the point of work may be removed and replaced one phase at a time to facilitate the work provided this instruction is recorded on the Permit to Work. If this is the only Circuit Main Earth connected to the apparatus, then a person Authorised to issue Permits to Work shall remain at the point of work and be responsible for the safety of all those engaged in the work whilst the Circuit Main Earth is removed. No other simultaneous work shall be permitted on any part of the circuit during the validity of this Permit to Work.

22.15.12 Notices

Caution Notices and Danger Notices shall be applied to all High Voltage Equipment/Installations covered by a Permit to Work or Sanction for Test calling attention to non-interference or danger as appropriate.

22.15.13 Work on High Voltage Cables

No person shall touch the insulation which covers or supports any



conductor subject to High Voltage unless such conductor is earthed.

Before a Permit to Work is issued a person authorised to issue permits shall identify the cable to be worked upon and prove Dead at the point of work. All cables shall be assumed to be Live High Voltage cables until proven otherwise.

Before issuing a Permit to Work to cut into or disturb the insulation of a High Voltage cable (except as required below) the person who is to issue the Permit to Work shall ensure compliance with the following and where practicable shall involve the recipient of the Permit to Work:

- (a) Check cable records.
- (b) Visually trace the cable from the point of work to a point where the apparatus is clearly identified by permanent labelling and in such a way that there is no doubt about the cable identity. Where this is not practicable then:
- (c) The cable shall be identified by signal injection methods; the cable shall be spiked with an approved spiking gun as near to the point of work as practicable. When practicable the cable shall be cut with the spiking gun in position; tests shall be made to confirm the cable cut is the correct one. The above shall be carried out under a Sanction for Test
- (d) Where work is to be carried out on cables where the conductors and/or sheath may be subject to induced voltages from live equipment in close proximity then where practicable the conductors and/or sheath shall be earthed and appropriate personal protective equipment (PPE) used.

Where the aforementioned procedures are not practicable then a special procedure shall be written and approved by the Chief Engineer or Senior



Electrical Engineer:

22.15.14 Work on Transformers

When work is to be carried out on any connections up to a point of isolation or the windings of a transformer, all windings irrespective of voltage shall be isolated. Circuit Main Earths shall be applied at the points of isolation from High Voltage supply. Low voltage points of isolation shall be locked open.

22.15.15 Work on Ring Main Units

The design of ring main units usually prevents the use of a potential indicator, prior to earthing. It is, therefore, extremely important that before any earth is applied the appropriate remote end is isolated first.

The system diagram should be checked prior to any operations and the on site labelling noted on an approved switching procedure prior to commencing operations.

All work and switching on ring main units must be carried out in strict accordance with the manufacturers instructions.

Work within the switching chamber of the Ring Main Unit may require the isolation and earthing of all remote ends of the Ring Main Unit.

22.15.16 Work on Busbars and directly connected Busbar Equipment

Before any work commences on a Busbar or section of Busbar including any directly connected equipment, the Busbar shall be isolated from any point of supply, including voltage transformers; any directly connected cable shall be isolated and earthed at the remote end.

All switches on the Busbar or section of Busbar shall be withdrawn to their



isolated position.

All isolating arrangements are to be locked and shutters covering High Voltage contacts, contacts which may become alive and contacts where no work is to be done shall be locked shut and warning notices posted.

The Busbar or section of the Busbar to be worked on shall be proved dead with an approved potential indicator in accordance with the rules for Earthing (section 22.15.11).

A Circuit Main Earth shall be applied to the Busbar on at least one switch panel on the section of Busbar on which work is to be done. An additional Circuit Main Earth shall be applied at any remote ends of directly connected equipment.

An additional Circuit Main Earth shall be applied at any such other position necessary to ensure that the Busbar remains earthed at all times while work is being carried out.

A separate Permit to Work or Sanction for Test shall be issued in respect of each section of Busbar. No more than one Permit to Work or Sanction for Test shall be issued simultaneously in respect of any section of Busbar or any electrical equipment directly connected to it.

Any orifices where work is to be done must be proved dead immediately beforehand by the use of an approved Potential Indicator.

22.16 Storage batteries – general

22.16.1 When a battery is being charged it 'gases', giving off both hydrogen and oxygen. Because hydrogen is easily ignited in concentrations ranging from 4 per cent to 75 per cent in air, battery containers and compartments should be kept adequately ventilated to prevent an accumulation of



dangerous gas.

22.16.2 Smoking and any type of open flame should be prohibited in a battery compartment. A conspicuous notice to this effect should be displayed at the entrance to the compartment.

22.16.3 Lighting fittings in battery compartments should be properly maintained at all times, with protective glasses in position and properly tightened. If cracked or broken glasses cannot be replaced immediately, the electric circuit should be isolated until replacements are obtained.

22.16.4 No unauthorised modifications or additions should be made to electrical equipment (including lighting fittings) in battery compartments.

22.16.5 Portable electric lamps and tools, and other portable power tools which might give rise to sparks should not be used in battery compartments.

22.16.6 The battery compartment should not be used as a store for any materials or gear not associated.

22.16.7 A short circuit of even one cell may produce an arc or sparks which may cause an explosion of any hydrogen present. Additionally, the very heavy current which can flow in the short circuiting wire or tool may cause burns due to rapid overheating of the metal.

22.16.8 Insulation and/or guarding of cables in battery compartments should be maintained in good condition.

22.16.9 All battery connections should be kept clean and tight to avoid sparking and overheating. Temporary clip-on connections should never be



used as they may be worked loose due to vibration and cause a spark or short circuit.

22.16.10 Metal tools, such as wrenches or spanners, should never be placed on top of batteries as they may cause sparks or short circuits. The use of insulated tools is recommended.

22.16.11 Jewellery, watches and rings etc should be removed when working on batteries. A short circuit through any of these items will heat it rapidly and may cause a severe skin burn. If rings cannot be removed, they should be heavily taped in insulating material.

22.16.12 The battery chargers and all circuits fed by the battery should be switched off when leads are being connected or disconnected. If a battery is in sections, it may be possible to reduce the voltage between cells in the work area, and hence the severity of an accidental short circuit or electric shock, by removing the jumper leads between sections before work is begun. It should be appreciated that whilst individual cell voltages may not prevent a shock risk, dangerous voltages can exist when numbers of cells are connected together in series. A lethal shock needs a current of only tens of milliamps and particular care should be exercised when the voltage exceeds 50V.

22.16.13 Battery cell vent plugs should be screwed tight while connections are being made or broken.

22.16.14 The ventilation tubes of battery boxes should be examined regularly to ensure that they are free from obstruction.

22.16.15 Lids of battery boxes should be fastened while open for servicing and properly secured again when the work is finished.



22.16.16 Batteries should be kept battened into position to prevent shifting in rough weather:

22.16.17 Alkaline and lead-acid batteries should be kept in separate compartments or separated by screens. Where both lead-acid and alkaline batteries are in use, great care should be exercised to keep apart the materials and tools used in servicing each type, as contamination of the electrolyte may cause deterioration of battery performance and mixing of the two electrolytes produce a vigorous chemical reaction which could be very dangerous.

22.16.18 Both acid and alkaline electrolytes are highly corrosive. Immediate remedial action should be taken to wash off any accidental splashes on the person or on the equipment. Hands should always be washed as soon as the work is finished.

22.16.19 Batteries should always be transported in the upright position to avoid spillage of electrolyte. A sufficient number of men should be employed since the batteries are heavy and painful strains or injury can otherwise easily result (see Chapter 19).

22.17 Storage batteries – lead acid

22.17.1 When the electrolyte is being prepared, the concentrated sulphuric acid should be added SLOWLY to the water: IF WATER IS ADDED TO THE ACID, THE HEAT GENERATED MAY CAUSE AN EXPLOSION OF STEAM, SPLATTERING ACID OVER THE PERSON HANDLING IT.

22.17.2 Goggles, rubber gloves and protective apron should be worn when acid is handled.



22.17.3 To neutralise acid on skin or clothes, copious quantities of clean fresh water should be used.

22.17.4 An eyewash bottle should be to hand in the compartment for immediate use on the eyes in case of accident. This bottle should be clearly distinguishable by touch from acid or other containers, so that it may be easily located by a person who is temporarily blinded.

22.17.5 The corrosion products which form round the terminals of batteries are injurious to skin or eyes. They should be removed by brushing, away from the body. Terminals should be protected with petroleum jelly.

22.17.6 An excessive charging rate causes acid mist to be carried out of the vents onto adjacent surfaces. This should be cleaned off with diluted ammonia water or soda solution, and affected areas then dried.

22.18 Storage batteries – alkaline

22.18.1 The general safety precautions with this type of battery are the same as for the lead-acid batteries with the following exceptions.

22.18.2 The electrolyte in these batteries is alkaline but is similarly corrosive. It should not be allowed to come into contact with the skin or clothing, but in the case of accident the affected parts should be washed with plenty of clean fresh water. Burns should be treated with boracic powder or a saturated solution of boracic powder. Eyes should be washed out thoroughly with water followed immediately with a solution of boracic powder (at the rate of one teaspoonful to 1/2 litre or one pint of water). This solution should be always readily accessible when the electrolyte is handled.

22.18.3 Unlike lead acid batteries, metal cases of alkaline batteries remain live at all times and care should be taken not to touch them or to allow metal tools to come into contact.



22.19 Work on apparatus on extension runners or on the bench

22.19.1 Chassis on extension runners should be firmly fixed, either by self-locking devices or by use of chocks, before any work is done.

22.19.2 Where units are awkward or heavy for one person to handle easily, assistance should be sought (see Chapter 19). Strain, rupture or a slipped disc can result from a lone effort.

22.19.3 Any chassis on the bench should be firmly wedged or otherwise secured to prevent it overbalancing or moving. Should a live chassis overbalance, no attempt should be made to grab it.

22.19.4 Temporary connections should be soundly made. Flexible extension cables should have good insulation and adequate current carrying capacity.

22.20 Servicing radio and associated electronic equipment – general

22.20.1 Any precautions against exposure to dangerous levels of microwave radiation recommended by manufacturers should be strictly followed. Radar sets should generally not be operated with wave guides disconnected. However, if it is necessary for servicing purposes, special precautions should be taken.

22.20.2 Work should not be taken within the marked safety radius of a Satellite Terminal Antenna unless its transmitter has been rendered inoperative.

22.20.3 Eyes are particularly vulnerable to microwave and ultraviolet radiation. Care should be taken to avoid looking directly into a radar aerial and waveguide while it is in operation or where arcing or sparking is likely to occur.

22.20.4 Exposure to dangerous levels of X-ray radiation may occur in the



vicinity of faulty high voltage valves. Care should be exercised when fault tracing in the modulator circuits of radar equipment. An open circuited heater of such valves can lead to X-ray radiation where the anode voltage is in excess of 5000V.

22.20.5 Vapours of some solvents used for degreasing are toxic, particularly carbon tetrachloride which should never be used. Great care should be exercised when using solvents particularly in confined spaces; there should be no smoking. Manufacturers' instructions should be followed.

22.20.6 Some dry recorder papers used in echo sounders and facsimile recorders give off toxic fumes in use. The equipment should be well ventilated to avoid inhalation of the fumes.

22.20.7 Radio transmitters and radar equipment should not be operated when men are working in the vicinity of aerials; the equipment should be isolated from mains supply and radio transmitters earthed. When equipment has been isolated, warning notices should be placed on transmitting and radar equipment and at the mains supply point, to prevent apparatus being switched on until clearance has been received from those concerned that they have finished the outside work.

22.20.8 Aerials should be rigged out of reach of personnel standing at normal deck level or mounting easily accessible parts of the superstructure. If that is impractical, safety screens should be erected.

22.20.9 Notices warning of the danger of high voltage should be displayed near radio transmitter aerials and lead-through insulators.

22.21 Additional electrical hazards from radio equipment

22.21.1 Where accumulators are used they should be disconnected at source; otherwise precautions should be taken to prevent short circuiting the accumulator with consequent risk of burns.



22.21.2 Live chassis connected to one side of the mains are usually marked appropriately and should be handled with caution. Where the mains are AC and a transformer is interposed, the chassis is usually connected to the earth side of the supply, but this should be verified using an appropriate meter.

22.21.3 Modern equipment often embodies a master crystal enclosed in an oven; the supply to the oven is taken from an independent source and is not disconnected when the transmitter is switched off and the mains switch is off. Mains voltage will be present inside the transmitter, and care should be taken.

22.21.4 Before work is begun on the EHT section of a transmitter or other HT apparatus, with the mains switched off, all HT capacitors should be discharged using an insulated jumper, inserting a resistor in the circuit to slow the rate of discharge. This precaution should be taken even where the capacitors have permanent discharge resistors fitted.

22.21.5 An electrolytic capacitor that is suspect, or shows blistering, should be replaced, since it is liable to explode when electrical supply is on. There is a similar risk when an electrolytic capacitor is discharged by a short circuit.

22.21.6 Work at or near live equipment should be avoided if possible but where it is essential for the safety of the ship or for testing purposes then the additional precautions described in 22.11.6 should be taken.

22.22 Valves and semi-conductor devices

22.22.1 Valves being removed from equipment which has recently been operating should be grasped with a heat resistant cloth; in case of large valves, eg power amplifier, OP and modulators, which reach a high temperature in operation, cooling down time should be allowed before they are removed. Severe burns can result if they touch bare skin.

22.22.2 Cathode ray tubes and large thermionic valves should be handled



with care; although they implode when broken, there is still a risk of severe cuts from sharp-edged glass fragments. Some special purpose devices contain vapour or gas at high pressure, for example Trigatron, but these are usually covered with a protective fibre network to contain the glass should they explode.

22.22.3 Beryllia (beryllium oxide) dust is very dangerous if inhaled or if it penetrates the skin through a cut or abrasion. It may be present in some electronic components. Cathode ray tubes, power transistors, diodes and thyristors containing it will usually be identified by the manufacturers' information provided, but lack of such information should not be taken as a positive indication of its absence. Those heat sink washers which contain it are highly polished and look like dark brass. These items should be carefully stored in their original packaging until required.

22.22.4 Physical damage to components of this kind whether they are new or defective is likely to produce dangerous dust; abrasion should be avoided, they should not be worked by tools and encapsulations should be left intact. Excessive heat can be dangerous, but normal soldering with thermal shunt is safe. Damaged or broken parts should be separately and securely packed, following the manufacturer's instructions for return or disposal.

22.22.5 Personnel handling parts containing beryllia should wear protective clothing, including gloves, to prevent beryllia coming into contact with the skin. Tweezers should be used where practicable. If the skin does become contaminated with the dust, affected parts, particularly any cuts, should be cleaned without delay.



CHAPTER 23

HOT WORK

23.1 Introduction

23.1.1 Based on the findings of the risk assessment, appropriate control measures should be put into place to protect those who may be affected. This chapter highlights some areas which may require attention in respect of hot work.

23.2 General

23.2.1 Welding and flame-cutting elsewhere than in the workshop should generally be the subject of a 'permit-to-work' (see Chapter 16).

23.2.2 Operators should be competent in the process, familiar with the equipment to be used and instructed where special precautions need to be taken.

23.2.3 Where portable lights are needed to provide adequate illumination, they should be clamped or otherwise secured in position, not hand-held, with leads kept clear of the working area.

23.2.4 Harmful fumes can be produced during these operations from galvanising paint and other protective materials. Oxygen in the atmosphere can be depleted when using gas cutting equipment and noxious gases may be produced when welding or cutting. Special care should therefore be taken when welding and flame-cutting in enclosed spaces to provide adequate ventilation. The effectiveness of the ventilation should be checked at intervals while the work is in progress, and if appropriate local exhaust ventilation should be considered. In confined spaces, breathing apparatus may be required.



23.2.5 Suggested procedures for lighting up and shutting down are at Annex 23.1.

23.3 Personal Protective Equipment

*BS EN ISO
11611:2007
Protective clothing
for use in welding
and allied
processes.*

23.3.1 Personal protective equipment complying with the relevant Standard specifications or their equivalent must be worn by the operator and as appropriate by those assisting with the operation to protect them from particles of hot metal and slag, and their eyes and skin from ultra-violet and heat radiation.

23.3.2 The operator should normally wear:

- (a) welding shields or welding goggles with appropriate shade of filter lens to EN 169. Goggles are only recommended for gas welding and flame cutting;
- (b) leather gauntlets;
- (c) leather apron (in appropriate circumstances);
- (d) long-sleeved natural fibre boiler suit or other approved protective clothing.

*BS EN
379:2003+A1:2009
Personal eye-
protection.
Automatic welding
filters*

23.3.3 Clothing should be free of grease and oil and other flammable substances.

23.4 Pre-use equipment check

23.4.1 Welding and flame-cutting equipment should be inspected before use by a competent person to ensure that it is in a serviceable condition.

23.4.2 In cold weather, moisture trapped in the equipment may freeze and, for example, cause valves to malfunction. It is recommended that equipment is thawed out with hot water and cloths, never with naked flames.



23.5 Precautions against fire and explosion

23.5.1 Before welding, flame-cutting or other hot work is begun, a check should be made that there are no combustible solids, liquids or gases, at, below or adjacent to the area of work, which might be ignited by heat or sparks from the work. Such work should never be undertaken on surfaces covered with grease, oil or other flammable or combustible materials. Where necessary, combustible materials and dunnage should be moved to a safe distance before commencing operations. Such places should also be free of materials which could release flammable substance for example if disturbed.

23.5.2 When welding is to be done in the vicinity of open hatches, suitable screens should be erected to prevent sparks dropping down hatchways or hold ventilators.

23.5.3 Port holes and other openings through which sparks may fall should be closed where practicable.

23.5.4 Where work is being done close to or at bulkheads, decks or deckheads, the far side of the divisions should be checked for materials and substances which may ignite, and for cables, pipelines or other services which may be affected by the heat.

23.5.5 Cargo tanks, fuel tanks, cargo holds, pipelines, pumps and other spaces that have contained flammable substances should be certified as being free of flammable gases before any repair work is commenced. The testing should include, as appropriate, the testing of adjacent spaces, double bottoms, cofferdams etc. Further tests should be carried out at regular intervals and before hot work is recommenced following any suspension of the work. When preparing tankers and similar ships all tanks, cargo pumps and pipelines should be thoroughly cleaned and particular care taken with the draining and cleaning of pipelines that cannot be directly flushed using the ship pumps.



23.5.6 Welding and flame-cutting operations should be properly supervised and kept under regular observation. Suitable fire extinguishers should be kept at hand ready for use during the operation. A person with a suitable extinguisher should also be stationed to keep watch on areas not visible to the welder which may be affected.

23.5.7 In view of the risk of delayed fires resulting from the use of burning or welding apparatus, frequent checks should be made for at least two hours after the work has stopped.

23.6 Electric welding equipment

23.6.1 In order to minimise personal harm from electric shock, electric welding power sources for shipboard use should have a direct current (DC) output not exceeding 70V, with a minimum ripple. Further information on DC power sources is given in 23.6.1.1.

23.6.2 When DC equipment is not available, then AC output power sources may be used providing they have an integral voltage limiting device to ensure that the idling voltage (the voltage between electrode and work piece before an arc is struck between them) does not exceed 25 V rms. The proper function of the device (which may be affected by dust or humidity) should be checked each time a welding set is used. Some voltage limiting devices are affected by their angle of tilt from the vertical, so it is important that they are mounted and used in the position specified by the manufacturers. This requirement can be affected by adverse sea conditions.

23.6.3 A 'go-and-return' system utilising two cables from the welding set should be adopted; the welding return cable should be firmly clamped to the workpiece.

23.6.4 Earthing of the workpiece is used to provide protection against internal insulation failure of the welding transformer; by keeping the



workpiece at or near earth potential until the protective device (eg a fuse) operates to cut off the mains supply. Where the welding circuit is not adequately insulated from the earthed referenced mains supply, (i.e. not constructed to one of the standards listed in Annex 23.2) the workpiece should be earthed. The 'return' cable of the welding set and each workpiece should be separately earthed to the ship's structure. The use of a single cable with hull return is not recommended. The workpiece earthing conductor should be robust enough to withstand possible mechanical damage and should be connected to the workpiece and a suitable earth terminal by bolted lugs or secure screw clamps.

Note: Some manufacturers may recommend earthing as one of their measures to reduce the electrical interference. This is not a safety related measure, but the manufacturer's advice should be followed.

23.6.5 If an alternative method of protecting against welding transformer insulation failure is used, the hazards caused by stray welding currents can be avoided by not earthing the workpiece or the welding output circuit. Self-contained engine-driven welding sets, and welding power sources which comply with the standards listed in Annex 23.2 do not need the workpiece to be earthed. It should be noted, however; that other equipment connected to the workpiece may require earthing for safe operation (eg welding sets not constructed to one of the standards listed in Annex 23.2 or electrical pre-heating systems).

23.6.6 To avoid voltage drop in transmission, the lead and return cables should be of the minimum length practicable for the job and of an appropriate cross-section.

23.6.7 Cables should be inspected before use; if the insulation is impaired or conductivity reduced, they should not be used.



23.6.8 Cable connectors should be fully insulated when connected, and so designed and installed that current carrying parts are adequately recessed when disconnected.

23.6.9 Electrode holders should be fully insulated so that no live part of the holder is exposed to touch, and, where practicable, should be fitted with guards to prevent accidental contact with live electrodes and as protection from sparks and splashes of weld metal.

23.6.10 A local switching arrangement or other suitable means should be provided for rapidly cutting off current from the electrode should the operator get into difficulties and also for isolating the holder when electrodes are changed.

23.6.11 The direct current output from power sources should not exceed 70 volts open circuit. The ripple on the output from the power source should not exceed the values of the table below. The ripple magnitudes are expressed as percentages of the DC, and the ripple peak is that with the same polarity as the DC.

Ripple Frequency, Hz	50/60	300	1200	2400
Max. RMS O/C voltage ripple, (%)	5	6	8	10
Max. peak O/C voltage ripple, (%)	10	12	16	20

23.6.12 The conditions in the table 23.6.11 are normally met by DC generators incorporating commutators and by rectifier power sources having a 3 phase bridge rectifier operating from a 3 phase 50/60 Hz supply. Rectifier power sources should not be operated from a power supply of less than 50 Hz.

23.6.13 Should it be necessary to use a power source with a DC output having a ripple magnitude in excess of those stated in the table, for example a single phase rectifier power source, then a voltage limiting device should be



incorporated in the power source to ensure that the idling voltage does not exceed 42V.

23.7 Precautions to be taken during electric arc welding

23.7.1 In addition to the protective clothing specified in 23.3.2 the welding operator should wear non-conducting safety footwear complying with BS 7193. Clothing should be kept as dry as possible as some protection against electric shock; it is particularly important that gloves should be dry as wet leather is a good conductor:

23.7.2 An assistant should be in continuous attendance during welding operations, who should be alert to the risk of accidental shock to the welder, and ready to cut off power instantly, raise the alarm and provide artificial respiration without delay. It may be desirable to have a second assistant if the work is to be carried out in difficult conditions.

23.7.3 Where persons other than the operator are likely to be exposed to harmful radiation or sparks from electric arc welding, they should be protected by screens or other effective means.

23.7.4 In restricted spaces, where the operator may be in close contact with the ship's structure or is likely to make contact in the course of ordinary movements, protection should be provided by dry insulating mats or boards.

23.7.5 There are increased risks of electric shock to the operator if welding is done in hot or humid conditions; body sweat and damp clothing greatly reduce body resistance. Under such conditions, the operation should be deferred until such time that an adequate level of safety can be achieved.

23.7.6 In no circumstances should a welder work while standing in water or with any part of their body immersed.

23.7.7 The electrode holder should be isolated from the current supply



before a used electrode is removed and before a new electrode is inserted. This precaution is necessary because some electrode coatings have extremely low resistance. Even a flux coating which is normally insulating can become damp from sweating hands and thus potentially dangerous.

23.7.8 When the welding operation is completed or temporarily suspended, the electrode should be removed from the holder.

23.7.9 Hot electrode ends should be ejected into a suitable container; they should not be handled with bare hands.

23.7.10 Spare electrodes should be kept dry in their container until required for use.

23.8 Compressed gas cylinders

23.8.1 Compressed gas cylinders should always be handled with care, whether full or empty. They should be properly secured and stored in a location appropriate to their intended use and risks which inadvertent release of gas may present. The cylinders should be so secured as to be capable of quick and easy release, for example, in the case of fire. Where appropriate, cylinder trolleys should be used to transport cylinders from one place to another:

23.8.2 If the cylinder design permits protective caps over the valve, such caps should be screwed in place when the cylinders are not in use or are being moved. Where the cylinder design does not permit protective caps over the valve, the valve system should be protected from inadvertent damage from for instance impact. Valves should be closed when the cylinder is empty.

23.8.3 Where the International Maritime Dangerous Goods (IMDG) Code requires cylinders of differing gases to be segregated, such gases should be stored in separate, well-ventilated compartments that are not



subject to extremes of temperature. If gas is flammable, the compartment in which the cylinders are stowed should have no electrical fittings or other sources of ignition and prominent and permanent 'NO SMOKING' signs should be displayed in the entrance and within the space. Empty cylinders should be segregated from the full ones and so marked. All gas cylinder stores should be appropriately marked with safety signs, to the standards as in Annex 28.1.

23.8.4 The following precautions also need to be taken in the case of compressed gas cylinders:

- (a) cylinders valves, controls and associated fittings should kept free from oil, grease and paint; controls should not be operated with oily hands;
- (b) gas should not be taken from such cylinders unless the correct pressure reducing regulator has been attached to the cylinder outlet valve;
- (c) cylinders found to have leaks that cannot be stopped by closing the outlet valve should be taken to the open deck away from any sources of heat or ignition and slowly discharged to the atmosphere.

23.8.5 Identifying marks on cylinders are set out in Section 28.5.

23.9 Gas Welding and Cutting

23.9.1 While this section deals almost exclusively with oxygen and acetylene, other fuel gases may be used and similar precautions should be taken.

23.9.2 The pressure of oxygen used for welding should always be high enough to prevent acetylene flowing back into the oxygen line.

23.9.3 Acetylene should not be used for welding at a pressure exceeding 1 atmosphere gauge as it is liable to explode, even in the absence of air, when under excessive pressure.



23.9.4 Non-return valves should be fitted adjacent to the torch in the oxygen and acetylene supply lines.

23.9.5 Flame arrestors should be provided in the oxygen and acetylene supply lines and will usually be fitted at the low pressure side of regulators although they may be duplicated at the torch.

23.9.6 Should a backfire occur (i.e. the flame returns into the blowpipe and continues burning in the neck or mixing chamber) the recommended first action is to close the oxygen valve on the blowpipe - to prevent internal burning - followed immediately by shutting off the fuel gas at the blowpipe valve. Items 3-6 of the shutting down procedure in Annex 23.1 may then be followed. When the cause of the backfire has been discovered, the fault rectified and the blowpipe cooled down, the blowpipe may be re-lit.

23.9.7 If there is a flashback into the hose and equipment, or a hose fire or explosion, or a fire at the regulator connections or gas supply outlet points, the first action should be to isolate the oxygen and fuel gas supplies at the cylinder valves or gas supply outlet points - but only if this can be done safely. Further action should follow in accordance with the vessel's fire drill requirements.

23.9.8 A watch should be kept on acetylene cylinders to ensure they are not becoming hot. If they are, this could be sign of acetylene decomposition and there is an increased risk of explosion. The cylinder stop valve should be closed immediately, which may limit or reduce the decomposition but is unlikely to stop it. Emergency action, such as evacuating the area and prolonged cooling by immersion or with copious amounts of water will still be required. Consideration should be given to jettisoning the cylinder overboard although movement of the cylinder can promote rapid decomposition, and cooling should continue while it is being moved. Any acetylene cylinder suspected of overheating should be approached with extreme caution because an impact could set off an internal ignition which might cause an explosion.



23.9.9 Only acetylene cylinders of approximately equal pressures should be coupled.

23.9.10 In fixed installations, manifolds should be clearly marked with the gas they contain.

23.9.11 Manifold hose connections including inlet and outlet connections should be such that the hose cannot be interchanged between fuel gases and oxygen manifolds and headers.

23.9.12 Only those hoses specially designed for welding and cutting operations should be used to connect any oxy-acetylene blowpipe to gas outlets.

23.9.13 Any length of hose in which a flashback has occurred should be discarded.

23.9.14 The connections between hose and blowpipe, and between hoses should be securely fixed with fittings which comply with Standard EN 1256.

[More detailed guidance on hose connections and assemblies is in Annex 23.3].

23.9.15 Hoses should be arranged so that they are not likely to become kinked or tangled or be tripped over; cut or otherwise damaged by moving objects or falling metal slag, sparks etc; a sudden jerk or pull on the hose is liable to pull the blowpipe out of the operator's hands or cause a cylinder to fall or a hose connection to fail. Hoses in passageways should be covered to avoid them becoming a tripping hazard.

23.9.16 Soapy water only should be used for testing leaks in hoses. If there are leaks which cannot easily be stopped, the gas supply should be isolated and the leaking components taken out of service, replaced or repaired. If the leak is at a cylinder valve or pressure regulator ("bull-nose") connection, the

*EN 1256: 1996,
Specification
for hose
assemblies for
equipment
for welding,
cutting and
allied processes.*



cylinder should be removed to a safe place in the open air. If it is a fuel-gas cylinder, it should be taken well clear of any source of ignition.

23.9.17 Excessive force should never be used on cylinder valve spindles or hexagon nuts of regulator connections in an attempt to stop a leak. Neither are sealing tape nor other jointing materials recommended for use in an attempt to prevent leaks between metal-metal surfaces that are designed to be gas tight. With an oxygen cylinder this could result in initiation of a metal-oxygen fire.

23.9.18 Blowpipes should be lit with a special friction igniter, stationary pilot flame or other safe means.

23.9.19 Should a blowpipe-tip opening become clogged, it should be cleaned only with the tools especially designed for that purpose.

23.9.20 When a blowpipe is to be changed the gases should be shut off at the pressure-reducing regulators.

23.9.21 To prevent a build-up of dangerous concentrations of gas or fumes during a temporary stoppage of after completion of the work, supply valves on gas cylinders and gas mains should be securely closed and blowpipes, hoses and moveable pipes should be removed to lockers that open on to the open deck.

23.9.22 Oxygen should never be used to ventilate, cool or blow dust off clothing (see also Section 20.7)

23.10 Further information

23.10.1 Detailed advice on the selection and standards for equipment used in hot work is contained in the HSE guidance note "The Safe Use of Compressed Gases in Welding, Flame Cutting and Allied Processes" (HS(G)139).



ANNEX 23.1

HOT WORK. LIGHTING UP AND SHUTTING DOWN PROCEDURES

These procedures are appropriate for oxy-fuel gas equipment and, with little modification, also for air-aspirated blowpipes.

Lighting up

1. Ensure that the pre-use equipment checks have been made.
 2. Check that the outlets of adjustable pressure regulators are closed, ie that the pressure-adjusting screw of the regulator is in the fully unwound (anti-clockwise) position.
 3. Check that the blowpipe valves are closed.
 4. Slowly open the cylinder valves (or gas supply point isolation valves) - to avoid sudden pressurisation of any equipment.
 5. Adjust pressure regulators to the correct outlet pressures. Or, check that the pressures in distribution pipework are suitable for the equipment and process.
 6. Open the oxygen valve at the blowpipe and allow the flow of oxygen to purge* air out of oxygen hose and equipment. If necessary, reset the pressure regulator to ensure correct working oxygen pressure.
 7. Close the oxygen valve at the blowpipe.
 8. Open the fuel gas valve at the blowpipe and allow the gas flow to purge* air or oxygen from the fuel gas hose and equipment. If necessary, reset the pressure regulator to ensure correct working fuel gas pressure.
 9. Light the fuel gas immediately, and preferably with a spark lighter.
 10. Open the oxygen valve at the blowpipe and adjust it and the fuel gas valve to give the correct flame setting.
- * Purging is important. It removes flammable gas mixtures from the hoses and equipment which could result in explosions and fires when the blowpipe is first lit. It should be carried out in a well-ventilated area, and it may take from several seconds to a minute or more depending on the length of the hose and gas flow rates.



Shutting down

1. Close the fuel gas valve at the blowpipe.
 2. Immediately close the oxygen valve at the blowpipe.
 3. * Close the cylinder valves or gas supply point isolation valves for both oxygen and fuel gas.
 4. Close the outlets of adjustable pressure regulators by winding out the pressure-adjusting screws.
 5. Open both blowpipe valves to vent the pressure in the equipment.
 6. Close the blowpipe valves.
- * Step 3 is not necessary when the equipment is to be used again in the immediate future.



ANNEX 23.2

EARTHING OF ARC WELDING SYSTEMS

TRANSFORMER CASING

Earthed	Class I Appliance
Not earthed	Class II Appliance

TRANSFORMER SECONDARY

Earthed	This is an obsolete type of equipment and should be taken out of service. Failure of the weld return connection might not be noticed, and damage to other earthed metallic paths could result.
Isolated	The absence of a weld return conductor will prevent welding being carried out. However a failure of isolation within the welding set could cause the work item to become live. For this reason the workpiece should be earthed.
Isolated with double or reinforced insulation	This is the most recent standard to which equipment is being built. Because of the strengthened insulation, the workpiece need not be earthed. Furthermore, to prevent the possibility of stray weld return currents in the supply system earth conductors, it is recommended that the workpiece is not earthed. Such welding power sources may be identified by the additional symbol if made to the relevant parts of BS 638 (ie Parts 1,2 or 3) and complying with the requirements of British Standard Code of Practice 7418:1991, or they will be marked with the standards numbers EN 50.060, EN 60.974 or IEC974.

BS 638, Arc welding power sources (or an equivalent alternative Standard).



ANNEX 23.3

HOT WORK. HOSES AND CONNECTIONS/ASSEMBLIES

Hoses

BS EN ISO 3821:2010 Gas welding equipment. Rubber hoses for welding, cutting and allied processes

Rubber hoses complying with Standard EN 559 are recommended for use in gas welding and cutting processes, which are often carried out in aggressive working environments. Hoses satisfying these standards are re-reinforced with an outer protective cover designed to be resistant to hot surfaces, molten slag or sparks, and made with linings that resist the action of hydrocarbons (for LPG hose) acetone or dimethyl formamide (for acetylene hoses) and ignition in an atmosphere of oxygen (for all services). Burst pressure is 60 bar g and maximum working pressure 20 bar g.

BS 3212: 1991 Flexible rubber tubing, rubber hose, and rubber hose assemblies for use in LPG vapour phase and LPG/air installations (or an equivalent alternative standard).

Hoses meeting the requirements of BS 3212 or equivalent are recommended for LPG vapour-phase applications other than welding or cutting.

Hose made of thermoplastics materials is not generally suitable for welding and cutting, because it does not have the same resistance to hot surfaces or hot particles as reinforced rubber hose.

Connections

EN 1256: 1996. Specification for hose assemblies for welding, cutting and allied processes.

Hose connections (comprising hose nipples and "bull-nose" hose connections) comply with EN 1256, ISO 3253 or equivalent. Thread sizes specified in these standards are based on Whitworth dimensions which are generally used in this field in many countries. Right-hand threads are used for oxygen and non-combustible gases; left-hand threads are used for fuel gases, with the hexagon nuts on their union connections notched to aid identification.

Hose connections may also be made with a quick-action coupling - a male probe fitted to the end of the hose and a female connector with a self-sealing valve usually fitted to a fixed piece of equipment or gas supply outlet point. The probe is pushed into the female fitting where it locks in position and automatically open the internal valve. Connections of this type are simple and quick to operate and there is no need to use a spanner to tighten any nuts.



*EN 561: 1995
Quick action
couplings with shut
off valves for
welding, cutting and
allied processes.*

Problems are that the male probe may become damaged (eg from being dragged along the ground or over-use and cause the coupling to leak, and there is a possibility of connecting the hose to the wrong gas outlet. Both should be avoided if couplings comply with Standard EN 561 or with ISO 7289. These require hard material of construction to be used for the probes, and their design dimensions are intended to prevent interchangeability between oxygen and fuel gas connections.

Hose assemblies

EN 1256

Hose lengths are usually supplied in the UK as pre-assembled units complete with connection fittings crimped to the ends of the hose. Hose and hose nipple dimensions are matched by the supplier to ensure a good fit. The recommended standard for hose assemblies is EN 1256, which specifies requirements for leak tightness and resistance to axial loading. Worm drive or similar clips are not recommended for fastening hoses.



CHAPTER 24

PAINTING

24.1 Introduction

24.1.1 Based on the findings of the risk assessment, appropriate control measures should be put into place to protect those who may be affected. This chapter highlights some areas which may require attention in respect of painting.

24.2 General

24.2.1 Paints may contain toxic or irritant substances, and the solvents may give rise to flammable and potentially explosive vapours, which may also be toxic. Personnel using such paints should be warned of the particular risks arising from their use. Paints containing organic pesticides can be particularly dangerous. If the manufacturer's instructions are not given on the container, information should be obtained at the time of supply about any special hazards, and also whether special methods of application should be followed. Such advice should be readily available at the time of use but the following precautions should always be taken.

24.3 Preparation and Precautions

24.3.1 Painted surfaces should always be rubbed down wet to reduce dust from the old paint, which may be toxic if inhaled. Where the dust is known to contain lead, other dust treating methods should be used. Dust masks should be worn as protection against other dusts.

24.3.2 If the surface to be rubbed down is known to contain lead, then methods that do not create dust should be adopted. It is safer to avoid or minimise dust creation than to try to clean up the dust afterwards. Sanding or abrasive blasting should be avoided. Lead based paint should never be burnt off as fumes will contain metallic lead in a readily absorbed form.



24.3.3 Rust removers are acids and contact with unprotected skin should be avoided. Eye protection should be worn against splashes (see section 4.7). If painting aloft or otherwise near ropes, care should be taken to avoid splashes on ropes, safety harness, lines etc. (see section 20.9 on the effect of such contamination on ropes).

24.3.4 Interior and enclosed spaces should be well ventilated, both while painting is in progress and until the paint has dried.

24.3.5 There should be no smoking or use of naked lights in interior spaces during painting or until the paint has dried hard. Some vapours even in low concentrations may decompose into more harmful substances when passing through burning tobacco.

24.3.6 When painting is done in the vicinity of machinery or from an overhead crane gantry, the power supply should be isolated and the machine immobilised in such a way that it cannot be moved or started up inadvertently. Appropriate warning notices should be posted (see 22.12.7). Close-fitting clothing should be worn.

24.4 Use of Paint Spraying Equipment

24.4.1 As there are many different types of paint spraying equipment in use, operatives should comply with the manufacturer's instructions for use.

24.4.2 Airless spray-painting equipment is particularly hazardous since the paint is ejected at a very high pressure and can penetrate the skin or cause serious eye injuries. Spray should not be allowed to come into contact with the face or unprotected skin.

24.4.3 Suitable protective clothing such as a combination suit, gloves, cloth hood, and eye protection should be worn during spraying.



24.4.4 Paints containing lead, mercury or similarly toxic compounds should not be sprayed in interiors.

24.4.5 A suitable respirator should be worn according to the nature of the paint being sprayed. In exceptional circumstances it may be necessary to use breathing apparatus (see Section 4.8).

24.4.6 If a spray nozzle clogs, the trigger of the gun should be locked in a closed position before any attempt is made to clear the blockage.

24.4.7 Before a blocked spray nozzle is removed or any other dismantling is attempted, pressure should be relieved from the system.

24.4.8 When blowing through a reversible nozzle to remove a blockage, all parts of the body should be kept clear of the nozzle mouth.

24.4.9 The pressure in the system should not exceed the recommended working pressure of the hose. The system should be regularly inspected for defects.

24.4.10 As an additional precaution against the hazards of a hose bursting, a loose sleeve, for example a length of 2 to 3 meters (6 to 10 feet) of old air hose, may be slipped over that portion of the line adjacent to the gun and paint container:



CHAPTER 25

ANCHORING, MOORING AND TOWING OPERATIONS

25.1 Introduction

25.1.1 Based on the findings of the risk assessment, appropriate control measures should be put into place to protect those who may be affected. This chapter highlights some areas which may require attention in respect of anchoring, mooring and towing operations. It is particularly important that the risk assessment considers the consequences of the failure of any element of the equipment.

25.2 Anchoring and Weighing Anchor

25.2.1 Before using an anchor a competent seafarer should check that the brakes are securely on and then clear voyage securing devices. A responsible person should be in charge of the anchoring team, with an adequate communications system with the vessel's bridge. The anchoring party should wear appropriate safety clothing - safety helmets, safety shoes and goggles as a minimum protection from injury from dirt, rust particles and debris which may be thrown off during the operation. Wherever possible, they should stand aft of the windlass.

25.2.2 Where the means of communication between bridge and anchoring party is by portable radio, the identification of the ship should be clear to avoid misinterpretation of instructions from other users of such equipment.

25.2.3 Before anchors are let go, a check should be made that no small craft or other obstacle is under the bow. As a safety precaution it is recommended that the anchor is 'walked out' clear of the pipe before letting go. For very large ships with heavy anchors and cables, the anchor should be



walked out all the way to avoid excessive strain on the brakes (and on the bitter end if the brakes fail to stop the anchor and chain).

25.2.4 Where the anchor is let go from the stowed position, if upon release of the brake, the anchor does not run, personnel should NOT attempt to shake the cable, but the brake should be re-applied, the windlass placed in gear, and the anchor walked out clear prior to release.

25.2.5 Cable should stow automatically. If, for any reason, it is necessary for personnel to enter the cable locker; they should stand in a protected position and, as far as possible, have constant communication with the windlass operator.

25.2.6 Anchors housed and not required should be properly secured to prevent accidental release.

25.3 Making Fast and Casting Off

25.3.1 During mooring and un-mooring operations a sufficient number of personnel should always be available at each end of the vessel to ensure a safe operation. A responsible officer should be in charge of each of the mooring parties, and a suitable means of communication between the responsible officers and the vessel's bridge team should be established. If this should involve use of portable radio, then the ship should be clearly identified by name to prevent misinterpretation. All personnel involved in such operations should wear suitable protective clothing (see Chapter 4).

25.3.2 Vessels' heaving lines should be constructed with a 'monkey's fist' at one end. To prevent personal injury, the 'fist' should be made only with rope and should not contain added weighting material.

25.3.3 Areas where mooring operations are to be undertaken should be clutter free as far as possible. Decks should have anti-slip surfaces provided by fixed treads or anti-slip paint coating, and the whole working area should be adequately lit for operations undertaken during periods of darkness.



25.3.4 All equipment used in mooring operations should be regularly inspected for defects. Any defects found should be corrected as soon as possible. Particular attention should be paid to the risk of oil leaks from winches, and surfaces of fairleads, bollards, bitts and drum ends should be clean and in good condition. Rollers and fairleads should turn smoothly and a visual check be made that corrosion has not weakened them. Particular attention is drawn to the need to ensure that pedestal roller fairleads, lead bollards, mooring bitts etc are

- (a) properly designed to meet all foreseeable operational loads and conditions,
- (b) correctly sited, and
- (c) effectively secured to a part of the ship's structure which is suitably strengthened.

25.3.5 Mooring ropes, wires and stoppers that are to be used in the operation should be in good condition, Ropes should be frequently inspected for both external wear and wear between strands. Wires should be regularly treated with suitable lubricants (see section 21.2.28) and inspected for deterioration internally and broken strands externally. Splices in both ropes and wires should be inspected regularly to check they are intact. Where wire rope is joined to fibre rope, a thimble or other device should be inserted in the eye of the fibre rope. Both wire and fibre rope should have the same direction of lay.

25.3.6 Ropes and wires which are stowed on reels should not be used directly from stowage, but should be run off and flaked out on deck in a clear and safe manner, ensuring sufficient slack to cover all contingencies. If there is doubt of the amount required, then the complete reel should be run off.

25.3.7 It is often difficult to achieve an ideal mooring layout. Ship's equipment can be employed to the best advantage if the following general principles are remembered:-



- (a) breastlines provide the bulk of athwartships restraint;
- (b) backsprings provide the largest proportion of the longitudinal restraint;
- (c) very short lengths of line should be avoided when possible, as such lines will take a greater proportion of the total load, when movement of the ship occurs.

25.3.8 Careful thought should be given to the layout of moorings, so that leads are those most suited without creating sharp angles, and ropes and wires are not fed through the same leads or bollards. Pre-planning of such operations is recommended and a risk assessment of the operation should be completed, especially in cases where the ship is having to use an unusual or non-standard mooring arrangement.

25.3.9 Personnel should not in any circumstances stand in a bight of rope or wire. Operation of winches should preferably be undertaken by competent personnel to ensure that excessive loads do not arise on moorings.

25.3.10 When moorings are under strain all personnel in the vicinity should remain in positions of safety, i.e. avoiding all 'Snap-Back' Zones. It is strongly recommended that a bird's eye view of the mooring deck arrangement is produced (an aerial view from a high point of the ship can be utilised) to more readily identify danger areas. Immediate action should be taken to reduce the load should any part of the system appear to be under excessive strain. Care is needed so that ropes or wires will not jam when they come under strain, so that if necessary they can quickly be slackened off.

Where a mooring line is led around a pedestal roller fairlead, the 'Snap-Back' Zone area will change and increase in area. Where possible, lines should NOT be led round pedestals except during the operation of mooring the ship, thereafter lines should be made up on bits, clear of pedestals if at all possible.



25.3.11 Annex 25.1 shows diagrams of simple and complex mooring systems, as well as an example of an actual mooring deck arrangement, illustrating the associated 'Snap-Back' Zones.

25.3.12 Further information on 'Snap-Back' Zones can be found in section 6.3.5 of the Oil Companies International Marine Forum (OCIMF) publication "Mooring Equipment Guidelines".

25.3.13 Where moorings are to be heaved on a drum end, one person should be stationed at the drum end, backed up by a second person backing and coiling down the slack. In most circumstances three turns on the drum end are sufficient to undertake a successful operation. A wire on a drum end should never be used as a check wire.

25.3.14 A wire should never be led across a fibre rope on a bollard. Wires and ropes should be kept in separate fairleads or bollards.

25.3.15 When stoppering off moorings the following applies:-

- (a) Natural fibre rope should be stoppered with natural fibre.
- (b) Man made fibre rope should be stoppered with man made fibre stopper (but not polyamide).
- (c) The 'West Country' method (double and reverse stoppering) is preferable for ropes.
- (d) Wire moorings should be stoppered with chain, using two half hitches in the form of a cow hitch, suitably spaced with the tail backed up against the lay of wire, to ensure that the chain neither jams nor opens up the lay of the wire.

25.4 Mooring to buoys

25.4.1 Where mooring to buoys is undertaken from a ship's launch or boat, personnel engaged in the operation should wear lifejackets and a lifebuoy with attached lifeline should be kept readily available in the boat.



25.4.2 Means should be provided to enable a person who has fallen into the water to climb back on board the launch or boat. If a boarding ladder with flexible sides is used, it should be weighted so that the lower rungs remain below the surface.

25.4.3 Where mooring to buoys is undertaken from the ship, a lifebuoy with attached line of sufficient length should be available for immediate use.

25.4.4 When slip wires are used for mooring to buoys or dolphins, the eyes of the wires should never be put over the bitts, as at the time of un-mooring it may not be possible to release the load sufficiently to lift the eye clear. To prevent accidental slippage of the wire eye(s) over the bitts or other obstruction the eyes should be seized, partially closing the eye.

25.5 Towing

25.5.1 A number of accidents to persons have occurred during the relatively simple operation of making fast and letting go of tug's tow lines. The common factor was that, for various reasons, the tow lines became taut, causing, for instance, messengers to part and strike ship's crew, and seamen's hands to become trapped, all of which resulted in major injuries.

25.5.2 Equipment used for towing should be adequately maintained and inspected before use, as during towing operations excessive loads may be applied to ropes, wires, fairleads, bitts and connections.

25.5.3 Prior to towing operations being undertaken, the master should establish suitable means of communication, exchange relevant information (eg speed of vessel), and agree a plan for the tow with the tug master.

25.5.4 All workers involved should be adequately briefed in their duties and safety precautions to be taken. They should be equipped with personal protective equipment including safety helmets and safety shoes.



25.5.5 Workers should, wherever possible, agree with the tug crew the area where the heaving line is to be thrown to, in order that they move clear. A messenger should be used to heave the tug's tow line on board by a winch, and then a stopper used while the eye is placed around the bollard. Only enough turns of the messenger should be used on the warping drum end to heave in the tow line. On tankers, do not place the tow line's eye over the bollard which has the fire wire made fast to it. Take the fire wire off, if there is no bollard available.

25.5.6 Once the tow is connected, non-essential personnel should keep clear of the operational area. If anyone is required to remain in this area or to attend to towing gear during the towing operation, they should take extreme care to keep clear of bights of wire or rope and the "Snap-Back" Zone should a line break. Exposure time should be kept to a minimum.

25.5.7 During operations, communications should be maintained between:-

- (a) the towing vessel and both the bridge team and the foredeck of the vessel under tow; and
- (b) the tow party and the bridge team.

In all communications clear identification of the parties communicating should be used to prevent misunderstandings. The Tug Master should be kept informed of engine movements, proposed use of thrusts etc. Persons in charge of the mooring party should monitor the tow line to give warning to the crew if the tow line should become taut, for whatever reason.

25.5.8 When letting go the tow, no attempt should be made to heave in the tow line slack before making positive communications with the tug's crew and they have indicated that they are ready to receive their line. Use the tug's attached messenger to heave in the slack and then stopper it off before taking the eye off the bollard. Use turns of the messenger around



the bollard to control the speed at which the tow line goes out and is retrieved on board the tug. If the tow line is allowed to run out uncontrolled, it could whiplash, and strike a crewmember, causing severe injuries.

MGN 308
(M+F)

25.5.9 Further recommendations on towing are contained in Merchant Shipping Notices.

25.6 Safe mooring of domestic passenger craft & ships launches to quays

25.6.1 The recognized and safe method for securing small vessels and launches alongside a quay or wharf in a good seamanlike manner is by the use of **all** of the following ropes:-

- a forward spring,
- an aft spring,
- a forward breast line, and
- an aft breast line.

A risk assessment must be carried out for the full mooring arrangement and should include a diagram.

25.6.2 **Annex 25.2** shows the full and safe mooring arrangement for small domestic passenger craft and ships launches. The diagram further illustrates the assessment of 'Snap-Back' Zones.

25.6.3 Reduced mooring arrangements may be used when considered safe to do so. This may only be done after taking into account the weather and sea conditions, tidal state, tidal flow and respective 'Snap-Back' Zones. Risk assessment must be carried out for all arrangements that diversify from the full safe arrangement in



25.6.1.

25.6.4 Passengers and crew should spend minimal time within 'Snap-Back' Zones.

25.6.5 Where mid-ships mooring is the only means of making fast, breast lines can be run from mid-ships straight to a quay.

25.6.6 Single point moorings and steaming on a spring are not recommended and should be avoided. After a full risk assessment has been done and in good weather, a normally accepted minimum would be two lines, one either side of the embarkation point. Local byelaws and guidance should always be sought.



ANNEX 25.1

Diagrams of simple and complex mooring systems and an example of an actual mooring deck arrangement, illustrating the associated 'snap-back' zones.

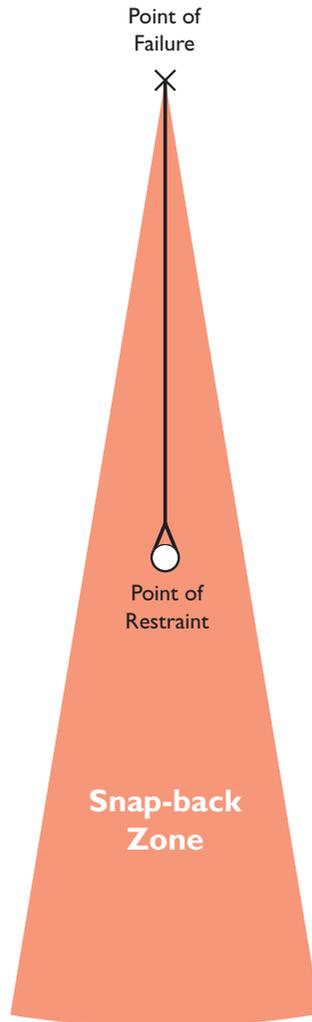


Diagram 1 - A Simple Mooring System Illustrating The Potential "Snap-Back" Zone Area



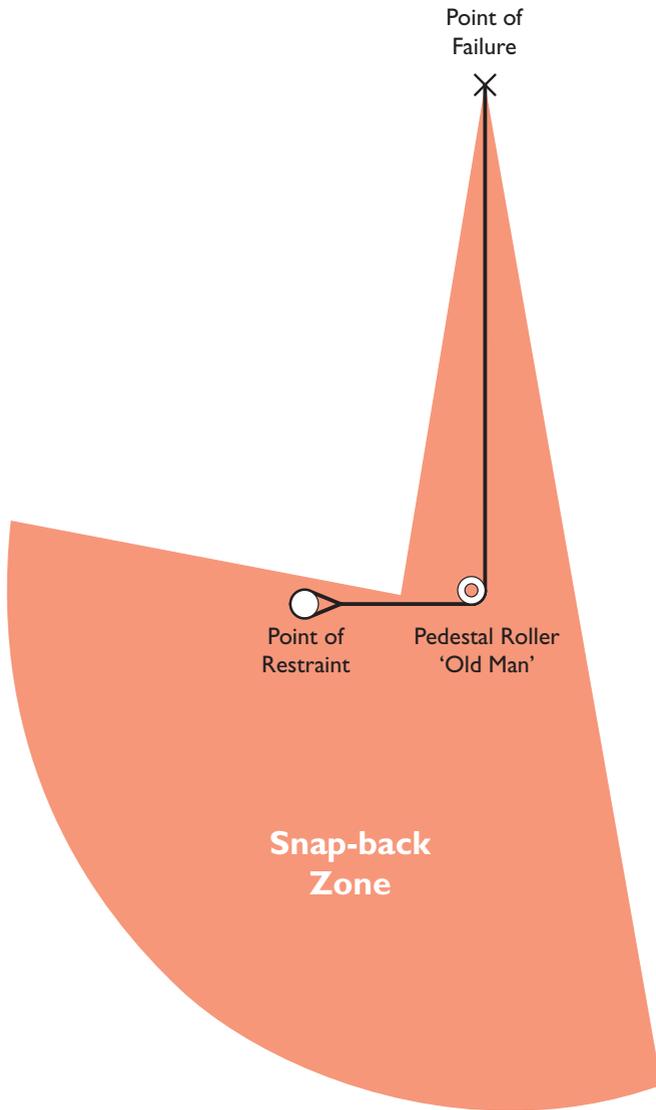


Diagram 2 - A Complex Mooring System Illustrating The Potential "Snap-Back" Zone Area



Annex 25.1 contd.

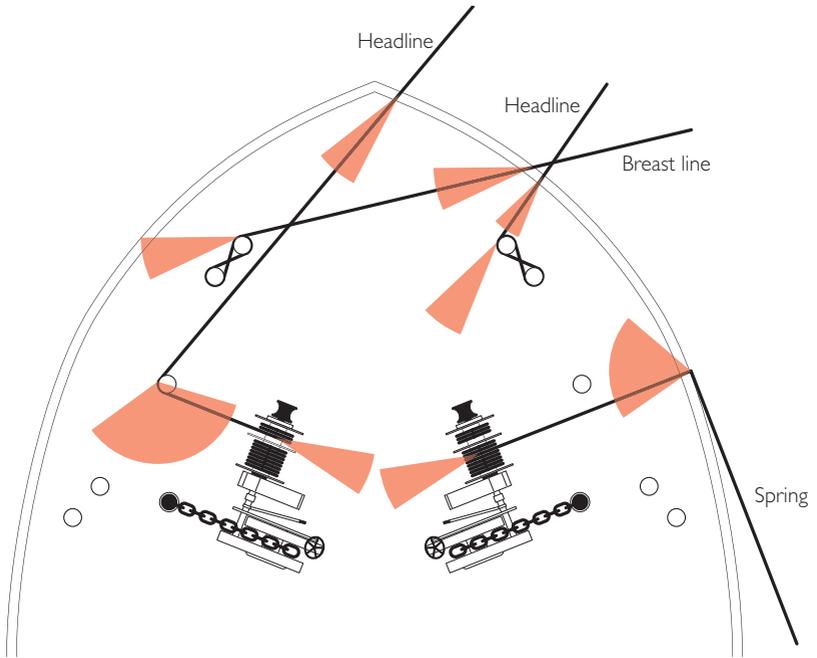
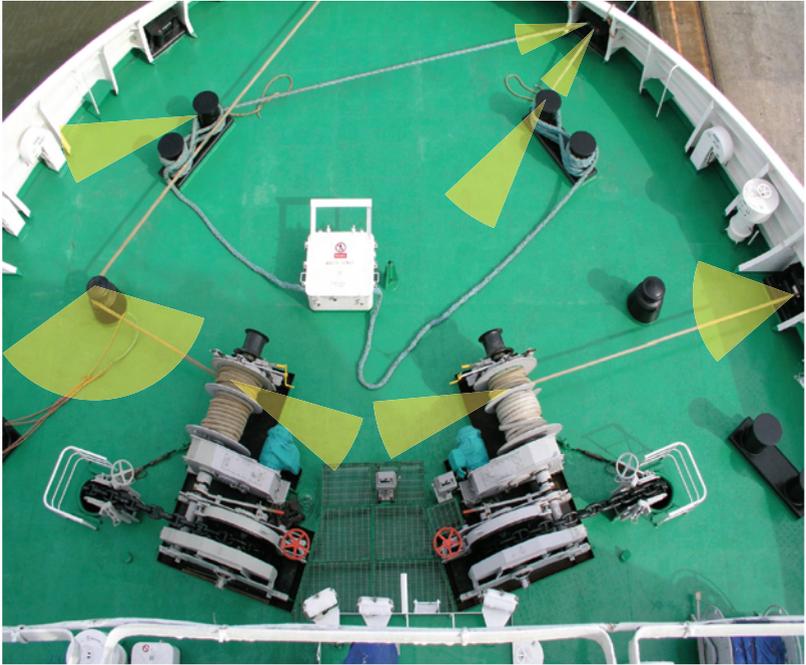


Diagram 3 - An Actual Mooring Deck Arrangement Illustrating Potential "Snap-Back" Zone Areas

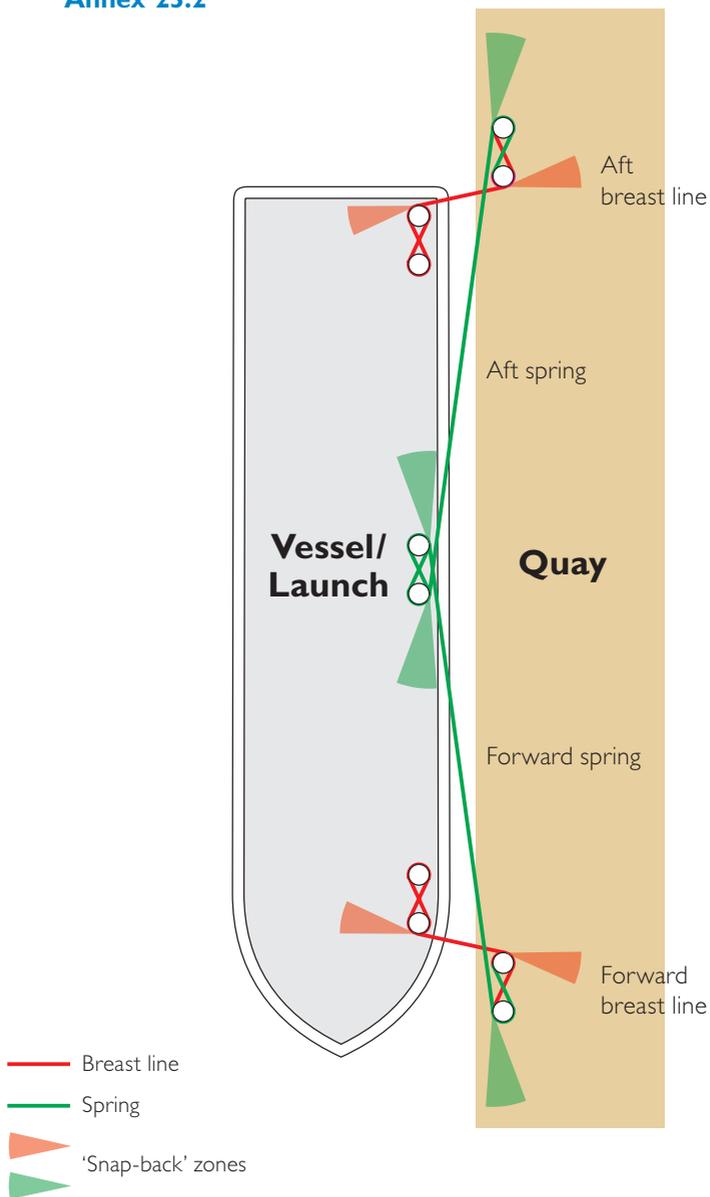




**Diagram 4 - A Picture Of An Actual Mooring Deck Arrangement
Illustrating Potential “Snap-Back” Zone Areas**



Annex 25.2



The full and safe Mooring Arrangement for small Domestic, Passenger Craft and Ships Launches illustrating potential 'Snap-Back' Zones



CHAPTER 26

HATCH COVERS AND ACCESS LIDS

26.1 Introduction

26.1.1 Based on the findings of the risk assessment, appropriate control measures should be put into place to protect those workers whose health and safety may be put at risk by the operation of hatch covers and access lids. This chapter highlights some areas which may require attention in respect of hatch covers and access lids.

26.2 General

26.2.1 Information about the regulations governing the use of hatches is given in Marine Guidance Note MGN 322 (M+F)

26.2.2 Any hatch covering used on a ship is to be of sound construction and material, of adequate strength for the purpose for which it is used, free from patent defect and properly maintained.

26.2.3 A hatch covering is not to be used unless it can be removed and replaced, whether manually or with mechanical power, without endangering any person. Information showing the correct replacement position is to be clearly marked, except where hatch coverings are interchangeable or incapable of being incorrectly replaced.

26.2.4 A hatch is not to be used unless the hatch covering has been completely removed, or if not completely removed, is properly secure.

26.2.5 Before vessel departure, weather deck hatch covers should be secured in the correct closed position. Whilst the vessel is at sea they should be regularly inspected to ensure that integrity is being maintained.



26.2.6 All hatch covers should be properly maintained. Defective or damaged covers should be replaced/repared as soon as possible. All covers and beams should only be used if they are a good fit and overlap their end supports to an extent which is adequate but not excessive.

26.2.7 All personnel involved with the handling and/or operation of hatch covers must be properly instructed in their handling and operation. All stages of opening or closing hatches should be supervised by a responsible person. When hatches are open, the area around the opening and in the hatchways should be appropriately illuminated and guard-rails erected. Guard-rails should be tight with stanchions secured in position, and properly maintained. No hatch cover should be replaced contrary to information showing the correct replacement position.

26.2.8 Where lifting appliances are used, they should be attached to hatch covers from a safe position and without personnel being exposed to the danger of falling or being trapped.

26.2.9 No loads should be placed over, nor work take place on, any section of hatch cover unless it is known that the cover is properly secured and can safely support the load.

26.2.10 Partly opened unguarded hatches should never be covered with tarpaulins; this would present a serious hazard for any person walking across the hatch.

26.2.11 Hatch covers should not be used for any other purpose.

26.3 Mechanical hatch covers

26.3.1 The manufacturer's instructions for the safe operation, inspection, maintenance and repair of the type of mechanical hatch cover fitted should always be followed.



26.3.2 During operations, personnel should keep clear of the hatches and the cover stowage positions. The area should be kept clear of all items which might foul the covers or the handling equipment.

26.3.3 Special attention should be paid to the trim of the vessel when handling mechanical covers. The hatch locking pins or preventers of rolling hatch covers should not be removed until a check wire is fast to prevent premature rolling when the tracking is not horizontal.

26.3.4 Hatch wheels should be kept greased and free from dirt and the coaming runways and the drainage channels kept clean. The rubber sealing joints should be properly secured and be in good condition so as to provide a proper weathertight seal.

26.3.5 All locking and tightening devices should be secured in place on a closed hatch at all times when at sea. Securing cleats should be kept greased. Cleats, top-wedges and other tightening devices should be checked regularly whilst at sea.

26.3.6 Hatch covers should be properly secured immediately after closing or opening. They should be secured in the open position with chain preventers or by other suitable means. No one should climb on to any hatch cover unless it is properly secured.

26.3.7 Except in the event of an emergency endangering health or safety, no person should operate a hatch covering which is power-operated or a ship's ramp or a retractable car-deck unless authorised to do so by a responsible ship's officer.

26.4 Non-mechanical hatch covers and beams

26.4.1 Each non-mechanical hatchway should be provided with an appropriate number of properly fitting beams and hatch covers, pontoons



or slab hatches adequately marked to show the correct replacement position, and with an adequate number of properly fitting tarpaulins, batten bars, side wedges and locking bars so that the hatch will remain secure and weathertight for all weather conditions.

26.4.2 Unless hatches are fitted with coamings to a height of at least 760 mm (30 inches) they should be securely covered or fenced to a height of 1 metre (39 inches) when not in use for the passage of cargo.

26.4.3 Manually handled hatch covers should be capable of being easily lifted by two people. Such hatch covers should be of adequate thickness and strength and provided with hand grips. Wooden hatch boards should be strengthened by steel bands at each end. One person should not attempt to handle hatch covers unaided unless the covers are designed for single-handed operation.

26.4.4 Hatch boards, hatch beams, pontoon hatches, hatch slabs and tarpaulins should be handled with care and properly stowed, stacked and secured so as not to endanger or impede the normal running of the vessel. Hatch boards should be removed working from the centre towards the sides, and replaced from the sides towards the centre. Personnel hauling tarpaulins should walk forwards and NOT backwards so they can see where they are walking.

26.4.5 A derrick or crane should be used to handle beams. Pontoons or slab hatches should be positioned directly over them to lessen the risk of violent swinging once the weight has been taken.

26.4.6 Appropriate gear of adequate strength should be specially provided for the lifting of the beams, pontoons and slab hatches. Slings should be of adequate length, secured against accidental dislodgement while in use and fitted with control lanyards. The angle between arms of slings at the lifting point should not exceed 120°, in order to avoid undue stress. The



winch or crane should be operated by a competent person under the direction of a ship's officer or other experienced person.

26.4.7 Beams and hatch covers remaining in position in a partly opened hatchway should be securely pinned, lashed, bolted or otherwise properly secured against accidental dislodgement.

26.4.8 Hatch covers and beams should not be removed or replaced until a check has been made that all persons are out of the hold or clear of the hatchway. Immediately before beams are to be removed, a check should be made that pins or other locking devices have been freed.

26.4.9 No one should walk out on a beam for any purpose.

26.4.10 Hatch covers should not be used in the construction of deck or cargo stages or have loads placed on them liable to damage them. Loads should not be placed on hatch coverings without the authority of a ship's officer.

26.5 Steel-hinged inspection/access lids

26.5.1 Inspection/access hatch lids should be constructed of steel or similar material, and hinged so they can be easily and safely opened or closed. Those on weather decks should be seated on watertight rubber gaskets and secured weathertight by adequate dogs, side cleats or equivalent tightening devices.

26.5.2 When not secured, inspection/access hatch lids should be capable of being easily and safely opened from above and, if practicable, from below.

26.5.3 Adequate hand grips should be provided in accessible positions to lift inspection/access hatches by hand without straining or endangering personnel.



26.5.4 Heavy or inaccessible hatch lids should be fitted with counterweights so that they can easily be opened by one or two persons. Where a counter-weight cannot be fitted due to inaccessibility, the hatch lids should be supplied with a purchase or pulley with eye-plates or ringbolts fitted in appropriate positions so that the hatch can be opened and closed without straining or endangering personnel.

26.5.5 The hatch lids when open should be easily and safely secured against movement or accidental closing. Adequate steel hooks or other means should be provided.

26.6 Access to Holds/Cargo spaces

26.6.1 Entry to holds/cargo spaces should only be undertaken on the authority of a responsible ships officer, who should ensure prior to granting authority that the space has been adequately ventilated and, where appropriate, tested for noxious gases/oxygen content (see Chapter 17).

26.6.2 Entry should be made where at all possible through the permanent means of access. Where this is not possible, portable ladders may be used (see section 15.3). When necessary, lifelines and safety harness should be available and used.



CHAPTER 27

HAZARDOUS SUBSTANCES

27.1 General Advice

27.1.1 Many substances found on ships are capable of damaging the health and safety of those exposed to them. They include not only substances containing hazard warning labels (eg on dangerous goods cargoes and ships' stores) but also, for example, a range of dusts, including hardwood dusts, fumes and fungal spores from goods, plant or activities aboard ship.

27.1.2 The employer's risk assessment will identify where personnel are working in the presence of substances hazardous to health or safety, and evaluate any risks from exposure (see Chapter 1). Appropriate measures should be taken to remove, control or minimise the risk (see section 27.2).

27.1.3 Employers should instruct and inform personnel so that they know and understand the risks arising from their work, the precautions to be taken and the results of any monitoring of exposure.

27.1.4 Employers should instruct and inform workers to make them aware of the potentially hazardous gaseous by-products which may be produced from the reaction of the cleaner/de-scaling product and the object itself or products used together; as this may result in an asphyxiating, explosive or other hazardous atmosphere.

27.1.5 The risk assessment will also provide information to determine whether health surveillance is appropriate (see Chapter 2).

27.1.6 As an aid to the identification of hazards and the assessment of risks from dangerous goods reference may be made to the International Maritime Dangerous Goods Code or to the Chemical data sheets contained in the

Tanker Safety Guides (Gas and Chemical) issued by the International Chamber of Shipping. Information concerning hazardous cargoes carried in bulk should be available where applicable to allow the assessment to be made.

27.1.7 In the case of ship's stores etc, reference should be made to the manufacturer's instructions and data sheets, which may be supplied with the goods. Reference may also be made where appropriate to the series of publications issued by the Health and Safety Executive under the Control of Substances Hazardous to Health Regulations (see Bibliography).

27.1.8 Advice on health surveillance can be found in Annex 27.4 and from the [Health Protection Agency website](#)

27.2 Carcinogens and Mutagens

MS & FV (Health and Safety at Work) (Carcinogens and Mutagens) Regulations 2007 (SI 2007/3100) and MGN 356 (M+F).

27.2.1 The Merchant Shipping and Fishing Vessel (Health and Safety at Work) (Carcinogens and Mutagens) Regulations 2007 specifically require that the risk assessment considers the risk arising from exposure to carcinogens and mutagens. A **“carcinogen”** is a substance for which evidence exists establishing a link between exposure to it and the development of cancer, and a **“mutagen”** is a substance for which evidence exists establishing a link between exposure to it that substance and heritable genetic damage.

27.2.2 For the purposes of the Regulations 2007 carcinogens and mutagens are to be considered hazardous if listed in the "Approved Supply List", produced by Health and Safety Executive (HSE), as carcinogenic (category 1); carcinogenic (category 2); mutagenic (category 1); or; mutagenic (category 2) or which if classified in accordance with the classification provided for by regulation 4 of HSE's Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (the "CHIP" Regulations) These can be accessed on the following link - www.hse.gov.uk/chip/



27.2.3 To assist in complying with the MS & FV (Health and Safety at Work) (Carcinogens and Mutagens) Regulations 2007, HSE's CHIP Regulations, referred to in paragraphs 27.8.2, require the supplier of a dangerous chemical to:

- identify the hazards of the chemical;
- provide information about the hazards to their customers. This information is usually provided on the package itself (eg by means of a label) and, if supplied for use at work, in a Safety Data Sheet (SDS);
- package the chemical safely.

27.2.4. Where the risk assessment reveals a risk to workers' health and safety from carcinogens and mutagens, and the measures required in section 27.2 do not result in the complete removal of that risk, employers must ensure that in no circumstances does the exposure exceed the limit values set out in the Regulations

27.2.5 All cases of cancer which can be identified as resulting from occupational exposure to a carcinogen or mutagen are required to be notified to the Seafarer Safety and Health Branch of the Maritime and Coastguard Agency.

27.3 Prevention or control of exposure:

27.3.1 The first consideration should always be to prevent exposure by removing the substance, eg by substituting a less harmful one.

27.3.2 Where this is not reasonably practicable, prevention or control of exposure may be achieved by any combination of the following means:

- (a) total or partial enclosure of the process and handling systems;
- (b) use of plant, processes and systems of work which minimise the generation of, or suppress and contain/prevent, spills, leaks, dust fumes and vapours of hazardous substances;
- (c) the limitation of the quantities of a substance at the place of work;



- (d) keeping the number of persons who might be exposed to a substance to a minimum, and reducing the period of exposure;
- (e) prohibiting eating, drinking and smoking in areas that may be contaminated by the substance;
- (f) hygiene measures, including providing adequate washing and laundering facilities and regular cleaning of walls/bulkheads and other surfaces;
- (g) the designation of those areas which may be contaminated and the use of suitable and sufficient warning signs; and
- (h) the safe storage, handling and disposal of hazardous substances and use of closed and clearly labelled containers.
- (i) use of appropriate procedures for the measurement of hazardous substances, in particular for the early detection of abnormal exposures resulting from an unforeseeable event or an accident;
- (j) the taking of individual/collective protection measures; and
- (k) where appropriate, drawing up plans to deal with emergencies likely to result in abnormally high exposure.

27.3.3 These measures should be applied to reduce the risk to personnel to the minimum, but where they do not adequately control the risk to health, personal protective equipment should be provided in addition.

27.3.4 Employers should take reasonable steps to ensure that any control measures are properly used and maintained. Where appropriate, exposure levels should be monitored and recorded.

27.3.5 Personnel should comply fully with the control measures in force.

27.3.6 For certain substances very specific control measures apply; eg asbestos, benzene. In cases where failure of the control measures could result in risk to health and safety, or where their adequacy or efficiency is in doubt, the exposure of personnel should be monitored and a record kept for future reference.



27.4 Asbestos dust

27.4.1 All types of asbestos have a fibrous structure and can produce harmful dust if the surface exposed to the air is damaged or disturbed. The danger is not immediately obvious because the fibres which can damage the lungs and can cause lung cancer are too small to be seen with the naked eye. Asbestos which is in good condition is unlikely to release fibres, but where the material is damaged or deteriorating, or work is undertaken on it, airborne fibres can be released. Dry asbestos is much more likely to produce dust than asbestos that is thoroughly wet or oil-soaked. Asbestos is particularly likely to occur on older vessels in insulation and panelling, but certain asbestos compounds may also be found elsewhere and on other vessels in machinery components such as gaskets and brake linings.

27.4.2 Ship owners should advise masters of any location where asbestos is known or believed to be present on their ship. Masters and/or safety officers should keep a written record of this information and should also note any other position where asbestos is suspected, but they should not probe or disturb any suspect substance. Crew members who work regularly near asbestos or a substance likely to contain it should be warned of the need for caution and should report any deterioration in its condition such as cracking or flaking.

27.4.3 The condition of old asbestos may deteriorate and where reasonably practicable consideration should be given to its removal. This should be carried out in port and a specialist removal contractor should be used, to ensure adequate protective procedures. Where the port is in the UK and the work involves asbestos insulation or asbestos coating it is usually necessary for the contractor to hold a licence issued by the Health and Safety Executive. If such work is carried out outside the UK the contractor should be of equivalent competence.



27.4.4 If it is essential to carry out emergency repairs liable to create asbestos dust while the ship is at sea strict precautions, including the use of the appropriate protective clothing and respiratory protective equipment, should be observed in accordance with the guidance given in the relevant Merchant Shipping Notice. See also the general guidance on the assessment and control of risks from hazardous substances in Section 12.6 of this Code.

27.4.5 Guidance on precautions to be taken when asbestos is carried as a cargo is also included in a Merchant Shipping Notice.

27.5 Dangerous goods

27.5.1 All dangerous goods and substances carried as cargo on ships have to be classified, packaged and labelled for transport in accordance with Merchant Shipping Regulations.

27.5.2 Examples of the labels to be affixed to packages and containers of dangerous goods are given in the International Maritime Dangerous Goods (IMDG) Code. These depict by colour, name and pictogram the particular dangers of that substance (flammability, toxicity, corrosiveness etc).

27.6 Use of Chemical agents

27.6.1 MGN 409(M+F) gives further guidance on the handling of chemicals and should be consulted. Particular emphasis is given to health monitoring for those exposed to chemicals. Annex 3 of this MGN gives details of how to carry out health monitoring.

27.6.2 A chemical from an unlabelled package or receptacle should never be used unless its identity has been positively established. In addition to the transport labelling referred to above, packaged substances supplied in Europe may also display similar or additional labelling for supply and use for compliance with the European Dangerous Preparations Directive (DPD)



27.6.3 Employers should ensure workers are instructed to familiarise themselves with the accompanying data sheet to any chemical agents they may use in the course of their work, they should also be aware of the potentially hazardous gaseous by-products which may be produced from the reaction of the cleaner/de-scaling product and the object itself or products used together, as this may result in an asphyxiating, explosive or other hazardous atmosphere.

27.6.4 Chemicals should always be handled with the utmost care. Eyes and skin should be protected from accidental exposure or contact.

27.6.5 Manufacturers' or suppliers' advice on the correct use of the chemicals should always be followed. Some cleaning agents, even though used domestically, for example, caustic soda and bleaches, may burn the skin.

27.6.6 Chemicals should not be mixed unless it is known that dangerous reactions will not be caused.

27.6.7 Employers should ensure that any necessary training in the use of chemicals is given.

27.7 Dry-cleaning operations

27.7.1 The principal hazard presented by a dry-cleaning solvent is that it is highly volatile, producing a vapour which is anaesthetic. Effective mechanical ventilation should therefore be provided in any compartment containing dry-cleaning plant. Smoking should be prohibited in compartments when the solvent is present.

27.7.2 Dry cleaning solvent is also a potential cause of skin damage, and suitable personal protective equipment should be worn.

27.7.3 A responsible person should be appointed to take overall



responsibility for the security and operation of the dry-cleaning plant, and access should be controlled.

27.8 Safe use of pesticides

*MS (Carriage
of Cargoes)
Regs SI 1999
No. 336
MSN 1718*

27.8.1 The following guidance should be read in conjunction with Merchant Shipping Notice MSN No. M1718, which has mandatory force under the MS (Carriage of Cargoes) Regulations 1999.

27.8.2 Where pesticides are used in the cargo spaces of ships or cargo units, safety procedures should be in accordance with the IMO publication 'Recommendations on the Safe Use of Pesticides' (1996). A copy of this publication should be retained on board and kept accessible for all crew members.

27.8.3 Where space and surface spraying operations are being carried out by the crew, the master should ensure that the appropriate protective clothing, gloves, respirators and eye protection are being worn.

27.8.4 Ship's personnel should not handle fumigants and such operations should be carried out only by qualified operators. Fumigation should only be carried out with the agreement of the ship's master:

27.8.5 The master should choose to allow an in-transit fumigation only after first referring to the requirements of the ship's own national administration, and seeking the approval of the administration of the state of the vessel's next destination or port of call. The master should provide safe working conditions and ensure that at least two members of his crew including one officer have received the appropriate training. They should be familiar with the recommendations of the fumigant manufacturer concerning the methods of detection of the fumigant in air; its behaviour and hazardous properties, symptoms of poisoning, relevant first-aid treatment and special medical treatment and emergency procedures.



27.8.6 The 'Fumigation Warning' sign should be conspicuously displayed on cargo units or spaces under fumigation. A watchman should be posted to prevent access to areas of risk by unauthorised personnel.

27.9 Biological agents

*MGN 408
(M+F)*

27.9.1 The following guidance should be read in conjunction with Marine Guidance Notice MGN 408 (M+F) Biological Agents.

*MS (Health
and Safety at
Work)(Biological
Agents) Regs
2010 No 323*

27.9.2 There is an additional requirement in excess to the guidance given above in that employers are required to keep a list of those exposed to biological agents of group 3 (ref MS (Health and Safety at Work)(Biological Agents) Regs 2010 No 323 – reg 2) or higher.

27.9.3 Any worker involved with the handling or being exposed to biological agents should be given the appropriate training and advice.

27.9.4 Before any work is carried out a risk assessment should be carried out as laid down in Ch 2 and procedures made for any potential accident to minimise its effects.

27.9.5 The most likely areas for contamination by biological agents are from the following:

- Food preparation;
- Contact with animals and/or products of animal origin;
- Health care;
- Work with air conditioning and water supply systems;
- Work involving waste disposal and sewage plant.



ANNEX 27.1

OTHER SUBSTANCES AND PROCESSES TO WHICH THE DEFINITION OF CARCINOGEN RELATES

- Aflatoxins
- Arsenic
- Auramine manufacture
- Work involving exposure to dusts, fumes and sprays produced during the roasting and electro-refining of cupro-nickel mattes.
- Work involving exposure to polycyclic aromatic hydrocarbons present in coal soot, coal tar or coal pitch.
- Hardwoods dusts
- Isopropyl alcohol manufacture (strong acid process)
- Leather dust in boot and shoe manufacture, arising during preparation and finishing.
- Magenta manufacture
- Mustard gas (beta, beta'- dichlorodiethyl sulphide)
- Rubber manufacturing and processing giving rise to rubber process dust and rubber fume.
- Used engine oils
- The following polychlorodibenzodioxins—
 - 2,3,7,8-TCCD
 - 1,2,3,7,8-PeCDD
 - 1,2,3,4,7,8-HxCDD
 - 1,2,3,6,7,8-HxCDD
 - 1,2,3,7,8,9-HxCDD
 - 1,2,3,4,6,7,8-HpCDD
 - OCDD



– The following polychlorodibenzofurans—

2,3,7,8-TCDF

2,3,4,7,8-PeCDF

1,2,3,7,8-PeCDF

1,2,3,4,7,8-Hx1,2,3,7,8,9-HxCDF

1,2,3,6,7,8-HxCDF

2,3,4,6,7,8-HxCDF

1,2,3,4,6,7,8-HpCDF

1,2,3,4,7,8,9-HpCDF

OCDF

Where T=tetra, Pe=penta, Hx=hexa, Hp=hepta and O=octa.



ANNEX 27.2

SAFETY DATA SHEETS

Under EC Directive 91/155/EC any person established within the Community who is responsible for placing a dangerous substance or preparation on the market, whether the manufacturer, importer or distributor, shall supply the recipient who is an industrial user of the substance or preparation with a safety data sheet containing the information under the following obligatory headings:

1. identification of the substance/preparation and of the company/
undertaking;
2. composition/information on ingredients;
3. hazards identification;
4. first-aid measures;
5. fire-fighting measures;
6. accidental release measures;
7. handling and storage;
8. exposure controls/personal protection;
9. physical and chemical properties;
10. stability and reactivity;
11. toxicological information;
12. ecological information;
13. disposal considerations;
14. transport information;
15. regulatory information;
16. other information.



ANNEX 27.3

TABLE OF LIMITVALUES

Name of agent	EINECS ⁽¹⁾	CAS ⁽²⁾	Limit values		Notation
			Mg/m ³ ⁽³⁾	ppm ⁽⁴⁾	
Benzene	200-753-7	71-43-2	3,25 ⁽⁵⁾	1 ⁽⁵⁾	Skin ⁽⁶⁾
Vinyl chloride monomer	200-831	75-01-04	7,77 ⁽⁵⁾	3 ⁽⁵⁾	—
Hardwood dusts	—	—	5,0 ⁽⁵⁾⁽⁷⁾	—	—

- (1) EINECS: European Inventory of Existing Chemical Substances
- (2) CAS: Chemical Abstract Service Number
- (3) mg/m³ = milligrams per cubic metre of air at 20° C and 101,3 kPa (760 mm mercury pressure).
- (4) ppm = parts per million by volume in air (ml/m³).
- (5) Measured or calculated in relation to a reference period of eight hours.
- (6) Substantial contribution to the total body burden via dermal exposure possible.
- (7) Inhalable fraction; if hardwood dusts are mixed with other wood dusts, the limitvalue shall apply to all wood dusts present in that mixture.



ANNEX 27.4

PRACTICAL RECOMMENDATIONS FOR THE HEALTH SURVEILLANCE OF WORKERS

1. The doctor and/or the authority responsible for the health surveillance of workers exposed to biological agents must be familiar with the exposure conditions or circumstances of each worker:

2. Health surveillance of workers must be carried out in accordance with the principles and practices of occupational medicine: it must include at least the following measures:

- keeping records of a worker's medical and occupational history;
- a personalised assessment of the worker's state of health; and
- where appropriate, biological monitoring, as well as detection of early and reversible effects.

Further tests may be decided on for each worker when he is the subject of health surveillance, in the light of the most recent knowledge available to occupational medicine



CHAPTER 28

USE OF SAFETY SIGNS

28.1 Introduction

28.1.1 Safety signs should be used to indicate hazards or control measures to be taken where the hazard cannot otherwise be removed.

28.2 Signs and notices

28.2.1 The international standards for safety signs are explained in the following paragraphs. Annex 28.1 shows the international colour coding of signs.

28.2.2 Permanent signs are used:

- to give prohibitions, warnings and mandatory requirements
- to mark emergency escape routes
- to identify first aid facilities
- to show the location of fire fighting equipment.

28.2.3 **Red signs** mean either:

- stop doing something or don't do it (prohibition);
- stop/shut down or evacuate;

or they mark the location and type of fire-fighting equipment.

28.2.4 Signs of prohibition are based on a red circular band with a red diagonal bar and white backing. The symbol for the prohibited action is shown in black behind the red diagonal bar;

for example, 'No Smoking' with a cigarette depicted.

28.2.5 A sign indicating fire-fighting equipment is a red square or rectangle, with information given in words or by a symbol in white. Alternatively an IMO sign is a square or rectangle, with information given in words or by a symbol in red.

*IMO Resolution
A.654(16)*



28.2.6 Yellow signs are advisory and mean:

- be careful, or take precautions;

28.2.7 Warning signs are based on a yellow triangle with a black border:

The symbol for the hazard is shown in black:

for example, poisoning risk with black skull and crossbones on the yellow background.

28.2.8 Blue signs are mandatory and mean:

- take specific action.

Mandatory signs are based on a blue disc. The symbol for the precaution to be taken is shown in white;

for example, 'Goggles to be worn' with a man's head with goggles depicted.

If, exceptionally, no suitable symbol is available, appropriate wording may be used instead:

for example, 'Keep Clear'.

28.2.9 Green signs mean:

- emergency escape; or
- first aid sign.

28.2.10 The sign is a green square or rectangle, with safety information shown by words or a symbol in white.

for example, a white arrow on a green background points to an emergency exit.

28.2.11 If more information is needed to make clear the meaning of any symbols used in a safety sign or notice, then a supplementary sign with text only may appear below the sign:

for example, 'Not Drinking Water'.

The supplementary sign should be oblong or square and either:

- (a) white with text in black; or



- (b) the same background colour as the safety colour used on the sign it is supplementing, with the text in the relevant contrasting colour:

28.2.12 Shore based personnel and passengers may not be aware that they are colour blind, and colour should not be used as a sole indicator.

28.2.13 Where a language other than English is extensively used on a ship, any text used in conjunction with a sign should usually be displayed also in that language.

28.3 Occasional signs

28.3.1 Illuminated signs, acoustic signals, hand signals and spoken signals may also be used for temporary hazards or circumstances.

28.3.2 Illuminated signs and acoustic signals must be tested regularly to ensure that they are working. Acoustic signs should comply with the IMO Code on Alarms and Indicators 1992.

28.3.3 The internationally understood hand signals for use of lifting appliance are given in Annex 21.1.

28.3.4 Spoken signals should comply with the IMO Standard for Marine Navigational Vocabulary. This is particularly important when communicating with another ship or with shore-side workers abroad, where English is not much used.

28.4 Electrical wiring

28.4.1 The cores of electrical cables should be readily identifiable throughout their length by colours or numbers. Although various standards (British, other national or international) exist for colour coding of cores, the colours specified in the standards differ. The colours found on any ship will therefore depend on the country of building or of manufacture of the cables. Care should therefore always be taken to make a positive identification of



cable duty, and colours should be used primarily as a means of conductor tracing.

28.4.2 Particular care is required when connecting plugs to domestic equipment which has been brought on to a ship, as a wrong connection could prove fatal. New British equipment should be supplied with cable to the international standard, i.e., brown for 'live', blue for 'neutral' and yellow/green for 'earth', but older equipment and that purchased abroad may have other colours.

28.5 Gas cylinders

*BS 349:
Safety of
machinery.
Minimum gaps
to avoid
crushing parts
of the human
body (or an
equivalent
alternative
Standard).*

28.5.1 Gas cylinders used on United Kingdom ships should be marked and colour coded according to the relevant British Standard Specification or internationally recognised equivalent.

28.5.2 Each cylinder should be clearly marked with the name of the gas and its chemical formula or symbol. The cylinder body should be coloured according to contents, with, where necessary, a secondary colour band painted around the neck of the cylinder to denote the particular hazards of the gas (flammability, toxicity, etc). Examples of such colour coding on gas cylinders commonly used on board ship are as follows:

Name of gas	Chemical formula or symbol	Ground colour of container	Colour of band
Oxygen	O ₂	Black	None
Carbon Dioxide	CO ₂	Black	None
Compressed Air	None (mixed gases)	French Grey	None
Nitrogen	N ₂	French Grey	Black
Acetylene	C ₂ H ₂	Maroon	None
Propane	C ₃ H ₈	Signal Red	None
Butane	C ₂ H ₆	None Specified	Signal Red
Helium	He	Brown	None

Note: Cylinder of refrigerant gases are not allocated specified ground or band colours under the British Standard Specification.



BS EN ISO 407:2004 Small medical gas cylinders. Pin-index yoke-type valve connections (or an equivalent alternative Standard).

28.5.3 Medical gas cylinders carried on board should similarly be marked in accordance with the relevant British Standard Specification or equivalent (See Appendix I). The name of the gas or gas mixture contained in the cylinder should be shown on a label affixed to it. The chemical symbol of the gas should be given on the shoulder of the cylinder. The cylinder should also be colour-coded according to the contents as shown in the following examples:

Name of gas	Symbol	Colour of Body	Colour of Shoulder
Oxygen	O ₂	Black	White
Medical Oxygen	O ₂	White	Green
Nitrous Oxide	N ₂ O ₂	White	Blue
Compressed Air (for breathing app)	None (mixed gases)	Grey	White and Black

28.6 Pipelines

28.6.1 The following colour coding system is recommended for adoption for the main common pipeline services of United Kingdom registered ships:

Pipe contents	Basic Identification Colour	BS Colour Reference	Colour Code Band	BS Colour Reference
Water (Fresh)	Green	12D 45	Blue	18E 53
Water (Salt)	Green	12D 45	None	
Water (Fire Extinguishing)	Green	12D 45	Safety red	04E 53
Compressed Air	Light Blue	20E 51	None	
Steam	Silver Grey	10A 03	None	
Oil (Diesel Fuel)	Brown	06C 39	White	
Oil (Furnace Fuel)	Brown	06C 39	None	
Oil (Lubricating)	Brown	06C 39	Emerald Green	14E 53

BS 1710: 1984, Identification of pipelines and services.
BS 4800: 1989, Paint colours for building purposes (or equivalent alternative standards).

28.6.2 The basic identification colour should be applied on the pipe either on its whole length or as a colour band at regular intervals on the pipe. The colour should similarly be applied at junctions, both sides of valves, service appliances, bulkheads etc, or at any other place where identification might be necessary. Valves on pipelines used for firefighting should be painted red.



28.6.3 Where applicable, the colour code banding should be in approximately 100 mm widths at regular intervals along the length of the pipe on the basic identification colour or painted between two basic identification colour bands each of a width of about 150 mm as shown in the following examples:

Pipe Contents	Basic colour (150 mm approx.)	Colour Code (100 mm approx.)	Basic colour (150 mm approx.)
Water (Fresh)	Green	Blue	Green
Water (Fire Extinguishing)	Green	Safety Red	Green
Diesel Fuel	Brown	White	Brown

28.6.4 Care should be taken to ensure that when replacing or repainting pipes, valves etc, the correct colour is used.

28.6.5 When it is necessary to know the direction of the flow of the fluid, this should be indicated by an arrow situated in the proximity of the basic identification colour and painted white or black in order to contrast clearly with that colour:

28.6.6 Such a system as recommended above would be useful, for instance, in tracing a run of pipes but should not be relied upon as a positive identification of the contents of the pipe; a check should always be made before opening up and precautions taken against the contingency that the content is other than that expected.

28.6.7 Other pipeline systems on ships, such as cargo pipelines, may be colour-coded in a similar fashion but no specific recommendations are made here because a comprehensive system to cover the needs of all types of ship would require so wide a range of colours that contrasts would be small and easily obscured by fading or dirt.



28.6.8 Colour coding of pipelines may vary from ship to ship and seamen moving from one ship to another should check with a competent officer what the colours mean on each particular vessel.

28.7 Portable fire extinguishers

MSN 1665 (M)

28.7.1 *Portable fire extinguishers must comply with the relevant British Standard or an equivalent alternative standard.*

EN 3:
Portable fire
extinguishers.

28.7.2 Fire extinguishers manufactured since June 1996, and all extinguishers manufactured since May 1997, must comply with the new Standard, EN 3. The body of the extinguisher is red, with a zone of colour of up to 5% of the external area to identify the extinguishing agent. Manufacturers have complied with this by printing the operating instructions in the appropriate colour.

28.7.3 It is possible to increase the visibility of the extinguishers by highlighting the area around the extinguisher with the appropriate colour coding (as in 28.7.4 below). No additional colour should be added to the extinguishers, as this may invalidate the kite mark.

BS 5423: 1987,
Portable fire
extinguishers
(withdrawn).

28.7.4 BS 5423 applied to fire extinguishers manufactured before May 1997. The colour of these extinguishers should not conflict with the following recommended systems of colour coding by medium (BS 7863):

BS 7863:
Recommendations
for colour coding to
indicate the
extinguishing media
contained in
portable fire
extinguishers.

Water	- Signal Red
Foam	- Pale Cream
Powder (all types)	- French Blue
Carbon Dioxide	- Black
Vaporising liquid (Halon)	- Emerald Green

The area so coded should be large enough to be readily apparent. Where the coding does not cover the whole surface of the extinguisher it is recommended that the remaining area should be either;



- (a) predominantly signal red, or
- (b) of self-coloured (i.e. natural) metal.

28.7.5 Where there is a mixture of the two types of extinguishers on a ship, as far as possible they should be grouped so as to avoid confusion.



**Safety Signs as required by the MS & FV
(Safety Signs & Signals) Regulations 2001
& Merchant Shipping Notice MSN 1763**

PART 1 – Prohibitory signs

Symbol

Meaning



**Prohibition –
Do not do**

Examples:



No smoking



Smoking and naked
flames forbidden



No access for
pedestrians



Do not extinguish
with water



Not drinkable



No access for
unauthorised persons



No access for industrial
vehicles



Do not touch

Additional Useful Prohibition Signs



Do not remove
electrical earth



Do not operate



Do not use
mobile telephones
or
Turn off
mobile telephones



Unauthorised persons
not to use this
machine



Do not oil or clean
machine whilst in
motion



Unauthorised persons
may not change
grinding wheels

PART 2 – Warning signs

Symbol



Meaning

**Warning –
Danger**

Examples:



Flammable material
or high temperature (a)



Explosive material



Toxic material



Corrosive material



Radioactive material



Overhead load



Industrial vehicles



Danger: electricity



General danger



Laser beam



Oxidant material



Non-ionising radiation

(a) In the absence of a specific sign for high temperature.



Strong magnetic field



Obstacles



Drop



Biological risk (a)



Low temperature



Harmful or irritant material (b)

Additional Useful Warning Signs



Slip or slippery surface



Suffocation (asphyxiation),
deficiency in oxygen



Breakthrough hazard



Danger of entrapment



Bump or low deckhead



CAUTION
Moving vehicles

(a) Pictogram laid down in Council Directive 90/679/EEC of 26th November 1990 on the protection of workers from the risks relate to exposure to biological agents at work (Seventh individual Directive within the meaning of article 16(1) of Directive 89/391/EEC) OJ. No 1,374, 31.12.1990, p1.

(b) The background to this sign may exceptionally be amber if justified in order to differentiate it from a similar road safety sign.



Optical radiation



Glass hazard,
broken glass



Machinery starts
automatically



Hot surface



High temperature



Danger
Very hot water



DANGER
Hot surface



Danger
Explosive
atmosphere



CAUTION
Moving vehicles



Danger
Compressed gas



Acetylene



Oxygen



DANGER
You are entering a
CO₂ protected area



Caution
Harmful fumes

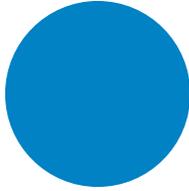


Danger
High noise levels

PART 3 – Mandatory signs

Symbol

Meaning



**Mandatory –
Must do**

Examples:



eye protection
must be worn



Safety helmet
must be worn



Ear protection
must be worn



Respiratory equipment
must be worn



Safety boots
must be worn



Safety gloves
must be worn



Safety overalls
must be worn



Face protection
must be worn



Safety harness
must be worn



Pedestrians must
use this route



General mandatory sign
(to be accompanied where
necessary by another sign)

Additional Useful Mandatory Signs



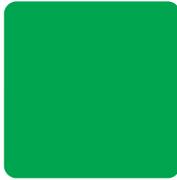
High visibility clothing must be worn



PART 4 – Emergency escape, first-aid signs and safe condition

Symbol

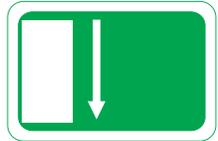
Meaning



**Emergency Escape,
First Aid and Safe
Condition –
The safe way**

Examples:

Emergency exit/escape route signs



Supplementary information signs



This way

Annex 28.1 contd.

First aid signs



First-aid post



Stretcher



Safety shower



Eyewash

Safe condition sign



Emergency telephone
for first-aid or escape



Emergency stop for machinery

Additional Useful Safe Condition Sign



PART 5 – Fire fighting signs

Symbol

Meaning



Fire Equipment –
Location or use of
fire equipment

Examples:



Fire Hose



Ladder



Fire
extinguisher



Emergency fire
telephone



This way
(supplementary information sign)



Fire alarm



Fire extinguisher

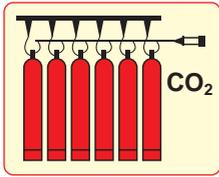
Additional Useful Fire Equipment Signs



Annex 28.1 contd.



Annex 28.1 contd.



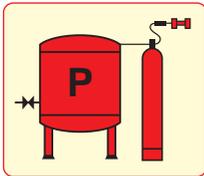
CO₂ fixed installation



FM 200 fixed installation



NOVEC 1230 fixed installation



Dry powder fixed installation



SECTION 4

4

SPECIALIST SHIPS



CHAPTER 29

DRY CARGO SHIPS

Note: Chapters 19, 21 and 26 also have special relevance to work on Dry Cargo Ships

29.1 Stowage of cargo

29.1.1 This chapter concerns both packaged and dry bulk cargoes, with the exception of cargoes carried in roll-on roll-off ships which are covered in Chapter 32.

29.1.2 All cargoes should be stowed and secured in a manner that will avoid exposing the ship and persons on board to unnecessary risk. The safe stowage and securing of cargo depends upon proper planning, execution and supervision by properly qualified and experienced personnel.

29.1.3 The planned procedures for the handling of cargo should be agreed with berth or terminal operators in advance of loading or unloading. In the case of dry bulk cargo (excluding grain), procedures should follow the IMO Code of Practice for the Safe Loading and Unloading of Bulk Carriers, with the associated IMO Ship/Shore Safety Check List. For grain there is more detailed guidance in the International Code for the Safe Carriage of Grain in Bulk.

29.1.4 Loading, stowage and securing of cargo other than bulk cargo is to be carried out in accordance with the ship's approved Cargo Securing Manual. Handling and safety instructions for securing devices are contained in sections 3.1 and/or 4.1 of the manual. Further guidance is contained in the IMO Code of Practice for Cargo Stowage and Securing (IMO Resolution

*MS (Carriage
of Cargoes)
Regs 1999
SI No.336
MGN
107(M)*



A.714/17). Cargo securing should be completed before the ship proceeds to sea.

29.1.5 All cargo should be stowed having due regard to the order of discharge. When planning the position of cargo and the order of loading and unloading, the effects that these operations will have upon access and the safety of personnel should be considered. The following points should be taken into account:

- cargo information, including gross mass of the cargo or cargo units and any special properties detailed on board or in the shipping documents, should be recorded and used in planning;
- wherever practicable, where more than one port is involved for loading or unloading, cargo should be loaded in layers rather than in tiers, so as to avoid the development of high vertical walls of cargo;
- care should be taken not to overstuff lighter cargoes with heavier cargoes which may lead to a collapse of the stow;
- wherever practicable, cargo should be stowed so as to leave safe clearance behind the rungs of hold ladders and to allow safe access as may be necessary at sea;
- the need to walk across or climb onto deck cargo, where this may involve an approach to an unprotected edge with risk of falling, should be minimised;
- care should be taken to avoid large gaps next to cargo where it is stacked against corrugated bulkheads.

*MS (Load
Line) Regs SI
1998 No
2241*

29.1.6 Deck cargo should be stowed in accordance with the statutory regulations, and kept clear of hatch coamings to allow safe access. Access to safety equipment, fire fighting equipment (particularly fire hydrants) and sounding pipes should also be kept free. Any obstructions in the access way such as lashings or securing points should be painted white to make them more easily visible. Where this is impracticable and cargo is stowed against ship's rails or hatch coamings to such a height that the rails or coamings do



not give effective protection to personnel from falling overboard or into the open hold, temporary fencing should be provided (see Chapter 13.5 Guarding of openings).

29.1.7 Suitable safety nets or temporary fencing should be rigged where personnel have to walk or climb across built-up cargo, and are therefore at risk of falling.

29.1.8 When deck cargo is stowed against and above ship's rails or bulwarks, a wire rope pendant or a chain, extending from the ring bolts or other anchorage on the decks to the full height of the deck cargo, should be provided and used to save personnel having to go overside to attach derrick guys and preventers directly to the anchorages on the deck.

29.1.9 Where beams and hatch covers have to be removed at intermediate ports before surrounding deck cargo is unloaded, an access space at least one metre wide should be left adjacent to any part of the hatch or hatchway that is to be opened. If on deck this is impracticable, fencing or lifelines should be used to enable seamen to remove and replace beams and hatch coverings in safety (see Chapter 13.5 Guarding of Openings).

29.1.10 In the 'tween decks, guidelines should be painted around 'tween deck hatchways at a distance of one metre from the coamings.

29.2 Dangerous goods and substances

*(Dangerous
Goods and
Marine
Pollutants)
Regs 1997 SI
No 2367
MGN 340(M)*

29.2.1 Merchant Shipping Regulations lay down requirements for carriage of dangerous substances and the provisions of the International Maritime Dangerous Goods (IMDG) Code together with those contained in relevant merchant shipping notices should be observed. The IMDG Code contains details of classification, documentation, packaging etc and advice on such



application as will meet the requirements of the regulations. In particular it lists and gives details of many dangerous substances.

29.2.2 The general introduction and the introductions to individual classes of the IMDG Code contain many provisions to ensure the safe handling and carriage of dangerous goods including requirements for electrical equipment and wiring, fire fighting equipment, ventilation, smoking, repair work, provision and availability of special equipment etc, some of which are general for all classes and others particular to certain classes only. It is important that reference should be made to this information before handling dangerous goods. Some of the requirements are highlighted in subsequent paragraphs. Where any doubts exist, advice should be sought from the Maritime and Coastguard Agency or other competent authority.

29.2.3 Dangerous substances should be loaded or unloaded only under the supervision of a competent responsible officer. Suitable precautions, such as the provision of special lifting gear as appropriate, should be taken to prevent damage to receptacles containing dangerous substances.

29.2.4 Dangerous substances should not be loaded other than in accordance with the regulations - ie in accordance with the IMDG Code, and if applicable the ship's document of compliance for the carriage of dangerous goods. In the case of certain solid dangerous substances shipped in bulk, loading should be carried out in accordance with Appendix B of the Code of Safe Practice for Solid Bulk Cargoes published by the International Maritime Organisation (IMO). In addition, the Emergency Procedures for Ships Carrying Dangerous Goods, published by the IMO, should be consulted to ensure that appropriate emergency equipment is carried.

MSN 1706

29.2.5 Additional UK requirements govern the loading and unloading of explosives.



29.2.6 In compartments containing cargo which has an explosion or fire risk (eg explosives or flammable liquids), all electrical circuits and equipment (including any portable equipment) should meet the recommendations of the IMDG Code. Smoking and naked flames should be prohibited while cargo handling is in progress, except in authorised places, which should be clearly marked.

29.2.7 Emergency response procedures should be established. The application of such measures is under the control of the master of the ship and will depend on the circumstances of the incident and location of the ship. The equipment necessary for the execution of the emergency response should be immediately available and the crew trained and practised in its use.

29.2.8 These procedures should include :

- cases of accidental exposure (see para 29.2.12 below)
- the possibility of fire.

29.2.9 Personnel who are required to handle consignments containing dangerous substances, should be able to identify dangerous goods from the labelling and placarding and should promptly report any leakage, spillage or any other incident which occurs involving exposure to dangerous substances.

MSN 1731

29.2.10 Those required to handle dangerous substances, should be provided with and wear personal protective equipment (including breathing apparatus, where necessary) appropriate to the hazard involved.

29.2.11 In the event of accidental exposure to dangerous substances, reference should be made to the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) published by IMO.



29.2.12 Appropriate measures should be taken promptly to render harmless any spillage of dangerous substances. Particular care should be taken when dangerous substances are carried in refrigerated spaces where any spillage may be absorbed by the insulating material. Insulation affected in this way should be inspected and renewed if necessary.

29.2.13 Where there is leakage or escape of dangerous gases or vapours from the cargo, personnel should leave the danger area and the area should be treated as an enclosed or confined space (see Chapter 17). Personnel required to deal with spillages or to remove defective packages should be provided with and wear suitable breathing apparatus and protective clothing as the circumstances dictate. Suitable rescue and resuscitation equipment should be readily available in case of an emergency (see Chapter 4).

29.2.14 Guidance on the assessment and control of risks from substances hazardous to health is also given in Chapter 27. Further guidance on the handling and stowage of dangerous goods is contained in the Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas published by IMO.

29.3 Carriage of containers

29.3.1 Containers are simply packages of pre-stowed cargo and sections of Chapters 21 and 26 may also be relevant to their safe working. Guidance is also published by HSE in Docks Information Sheet No 7 Safe working on top of containers on board ship [in draft].

29.3.2 Where a container holds dangerous goods the relevant guidance contained in 29.2 should be followed. For guidance on control of substances hazardous to health refer to Chapter 27.

29.3.3 Freight containers should comply with the International Convention for Safe Containers 1972 (CSC). They should not be loaded



beyond the maximum net weight indicated on the Safety Approval Plate, and should be in a safe condition for handling and carriage.

29.3.4 The equipment used for lifting a container should be suitable for the load, and safely attached to the container. The container should be free to be lifted and should be lifted slowly to guard against the possibility of the container swinging or some part of the lifting appliances failing, should the contents be poorly secured, unevenly loaded and poorly distributed or weight of contents incorrectly declared. The process of loading and securing of goods into a container should follow the IMO/ILO/UN/ECE Guidelines for Packing of Cargo Transport Units (CTUs). Special care should be taken when lifting a container the centre of gravity of which is mobile, e.g. a tank container, bulk container or a container with contents which are hanging.

29.3.5 Safe means of access to the top of a container should be provided to release lifting gear, and to fix lashings, and personnel so engaged should, where appropriate, be protected from falling by use of a properly secured safety harness or other suitable means. Where containers are stacked account should be taken of the appropriate strength features and stacking induced stress. Containers should be lashed individually.

29.3.6 On ships not specially constructed or adapted for their carriage, containers should, wherever possible, be stowed fore and aft, and should be securely lashed. Containers should not be stowed on decks or hatches unless it is known that the decks or hatches are of adequate overall and point load-bearing strength. Adequate dunnage should be used.

29.3.7 The system of work should be such as to limit the needs to work on container tops. Where the design for securing of containers and the checking of lashing makes access onto the container tops necessary, it should be achieved by means of the ship's superstructure or by a purpose-designed access platform or personnel cages using a suitable adapted lifting



appliance. If this is not possible, an alternative safe system of work should be in place.

29.3.8 To allow access to the tops of over-height, soft top or tank containers where necessary for securing or cargo handling operations, solid top or "closed containers" should be stowed between them whenever practicable.

29.3.9 Where the ship's electrical supply is used for refrigerated containers, the supply cables should be provided with proper connections for the power circuits and for earthing the container. Before use the supply cables and connections should be inspected and any defects repaired and tested by a competent person. Supply cables should only be handled when the power is switched off. Where there is a need to monitor and repair refrigeration units during the voyage, account should be taken of the need to provide safe access in a seaway when stowing these containers.

29.3.10 Personnel should be aware that containers may have been fumigated at other points in the transport chain, and there may be a residual hazard from the substances used.

29.4 Working cargo

For regulations and guidance on lifting equipment and lifting operations, including examination and testing requirements, see sections 7.3 - 7.8 and Chapter 21 of this Code.

29.4.1 Safety arrangements prior to working cargo should ensure that adequate and suitable lifting plant is available, in accordance with the register of lifting appliances and cargo gear, and that all plant and equipment, and any special gear necessary is available and used. Cargo gear should be checked regularly throughout the cargo operation for damage or malfunction.



29.4.2 Repair or maintenance work, such as chipping, spray painting, shot-blasting or welding, should not be undertaken in a space where cargo operations are in progress, if such work could create a hazard to personnel working in the space.

29.4.3 Loads being lowered or hoisted should not pass or remain over any person engaged in any work in the cargo space area, or over means of access. Personnel should take care when using access ladders in hatch squares whilst cargo operations are in progress.

29.4.4 Cargo information for goods should always provide the gross mass of the cargo or of the cargo units. Where loads of significant gross mass are not marked with their weight, the loads should be check-weighed unless accurate information is available as provided by the shipper or packer of the goods.

29.4.5 A signaller should always be employed at a hatchway when cargo is being worked unless the crane driver or winchman has a complete unrestricted view of the load or total working area. The signaller should be in a position where he has a total view of the operation, where this is not possible then additional signallers should be used to assist. Guidance for signallers is given in 21.2.11 to 21.2.16.

29.4.6 Before giving a signal to hoist, the signaller should receive clearance from the person making up the load that it is secure, and should ascertain that no one else would be endangered by the hoist. Before giving the signal to lower, he should warn personnel in the way and ensure all are clear.

29.4.7 Loads should be raised and lowered smoothly, avoiding sudden jerks or 'snatching'. When a load does not ride properly after being hoisted, the signaller should immediately give warning of danger and the load should



be lowered and adjusted as necessary.

29.4.8 Hooks, slings and other gear should not be loaded beyond their safe working loads. Strops and slings should be of sufficient size and length to enable them to be used safely and be so applied and pulled sufficiently tight to prevent the load or any part of the load from slipping and falling. Loads (sets) should be properly put together and properly slung before they are hoisted or lowered.

29.4.9 Before any heavy load is swung, it should be given a trial lift in order to test the effectiveness of the slinging.

29.4.10 Except for the purpose of breaking out or making up slings, lifting hooks should not be attached to:

- (a) the bands, strops or other fastenings of packages of cargo, unless these fastenings have been specifically provided for lifting purposes;
- (b) the rims (chines) of barrels or drums for lifting purposes, unless the construction or condition of the barrels or drums is such as to permit lifting to be done safely with properly designed and constructed can hooks.

29.4.11 Suitable precautions, such as the use of packing or chafing pieces, should be taken to prevent chains, wire and fibre ropes from being damaged by the sharp edges of loads.

29.4.12 When slings are used with barrel hooks or other similar holding devices where the weight of the load holds the hooks in place, the sling should be led down through the egg or eye link and through the eye of each hook in turn so that the horizontal part of the sling draws the hooks together.



29.4.13 The angle between the legs of the slings should not normally exceed 90°, as this reduces the safe working load of the sling. Where this is not reasonably practicable, the angle may be increased up to 120° provided that the slings have been designed to work at the greater angles. However it should be noted that at 120°, each sling leg is taking stress equivalent to the whole mass of the load.

29.4.14 Trays and pallets (unit loads) should be hoisted with four-legged slings and where necessary, nets and other means should be used to prevent any part of the load falling.

29.4.15 Bundles of long metal goods such as tubes, pipes and rails, should be slung with two slings or strops and, where necessary, a spreader. A suitable lanyard should also be attached, where necessary.

29.4.16 Logs should be loaded or discharged using wire rope slings of adequate size; tongs should not be used except to break out loads.

29.4.17 Cargo buckets, tubs and similar appliances should be carefully fitted so that there is no risk of the contents falling out and be securely attached to the hoist (for example, by a shackle) to prevent tipping and displacement during hoisting and lowering.

29.4.18 Shackles should be used for slinging thick sheet metal, if there are suitable holes in the material; otherwise suitable clamps on an endless sling should be used.

29.4.19 Loose goods such as small parcels, carboys, small drums etc should be loaded or discharged in suitable boxes or pallets with sufficiently high sides, and lifted using four-legged slings.



29.4.20 Slings or chains being returned to the loading position should be securely hooked on the cargo hook before the signaller gives the signal to hoist. Hooks or claws should be attached to the egg link or shackle of the cargo hook, not allowed to hang loose. The cargo hook should be kept high enough to keep slings or chains clear of personnel and obstructions.

29.4.21 "One-trip slings", that is, slings which have not been used previously for lifting and are fitted to the load prior to loading, should not be taken back on board ship after the load is discharged at the end of the voyage, but should be left on shore for disposal.

29.4.22 When work is interrupted or has ceased for the time being, the hatch should be left in a safe condition, with either guard rails or the hatch covers in position.

29.5 Lighting in cargo spaces

29.5.1 During cargo operations cargo spaces should be adequately lit, avoiding strong contrasts of light and shadow or dazzle (see section 6.4.5). Open or naked lights should not be used. Portable lights should be adequately guarded, suitable for the task, and firmly secured in such a manner that they cannot be accidentally damaged. Portable lights should never be lowered or suspended by their electrical leads, and leads should be run so that they are clear of loads, running gear and moving equipment.

29.6 General precautions for personnel

29.6.1 Personnel undertaking duties in cargo spaces should move with caution over uneven surfaces or over loose dunnage and be alert to protrusions such as nails etc.

29.6.2 Where vessels have been built with corrugated bulkheads precautions such as suitable rails, grids or nets should be erected to prevent



cargo handlers or other personnel from falling into the space between the rear of the corrugation and the stowed cargo.

29.6.3 Where work is being undertaken on or near the cargo 'face', the 'face' should be secured against collapse, especially where bagged cargo may be bleeding from damage. Where it is necessary to mount a 'face' a portable ladder should be used, properly secured against slipping or shifting sideways, or held in position by other personnel. When work is undertaken in areas where there is a risk of falling, safety net(s) should be erected. Such nets should not be secured to hatch covers.

29.6.4 Personnel should be aware that cargoes may have been fumigated at other points in the transport chain, and there is a risk of that toxic fumes may build up in enclosed spaces.

29.7 Moveable bulkheads in cargo holds

29.7.1 Moveable bulkheads are fitted in some small multi-purpose vessels to allow more flexibility in the types of dry cargo carried from one voyage to the next.

29.7.2 There have been several serious accidents that have occurred when moving or carrying out maintenance on these types of bulkheads. Some of these accidents have led to the death of the seafarers involved.

29.7.3 Personnel undertaking duties which involve moving the position of the bulkhead or carrying out maintenance and hold cleaning should, prior to starting these duties, follow the risk assessment for these specific operations with these bulkheads.

29.7.4 Personnel carrying out these duties must be fully trained and competent in the moving operations associated with these bulkheads and, where required, with the jacking up of these bulkheads for hold cleaning



purposes. These personnel must be supervised at all times by an Officer or other Supervisor who is familiar with these types of bulkhead and who is competent in overseeing such operations.

29.7.5 Officers and personnel must be given training prior to being given duties associated with these bulkheads.

29.7.6 Due to the dangerous nature of the operations involved with these bulkheads, strong consideration should be given to the issuing of a Permit-To-Work for any duties associated with such operations.

29.7.7 In the operation of certain designs of moveable bulkhead, consideration should also be given, when jacking up these bulkheads for hold cleaning purposes, or for inspection and maintenance purposes, to the use of additional temporary holding supports at the upper end, when the “swing-over” wheel system for moving these bulkheads cannot be engaged.

29.7.8 Permit-To-Work for Machinery or Equipment is to be found in Annex 16.1.3 of this Code.



CHAPTER 30

TANKERS AND OTHER SHIPS CARRYING BULK LIQUID CARGOES

30.1 General

*MS (Training
and
Certification)
Regs SI 1997
No 348*

30.1.1 Masters, officers and ratings appointed to work on tankers or similar vessels must meet the minimum training and qualifications requirements specified in regulation V/I of the International Conventions on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995.

MGN 95(M)

30.1.2 Training in emergency procedures and in the use of any special emergency equipment should be given as appropriate to members of the crew at regular intervals. The instruction should include personal first aid measures for dealing with accidental contact with harmful substances in the cargo being carried and inhalation of dangerous gases and fumes.

30.1.3 Because of the risks of ill effects arising from contamination by certain liquid cargoes, especially those carried in chemical tankers and gas carriers, personnel should maintain very high standards of personal cleanliness and particularly so when they have been engaged in cargo handling and tank cleaning.

30.1.4 Those on board responsible for the safe loading and carriage of the cargo should have all the relevant information about its nature and character before it is loaded and about the precautions which need to be observed during the voyage. The remainder of the crew should be advised of any precautions which they too should observe.



30.1.5 High risks require the strict observance of rules restricting smoking and the carriage of matches or cigarette lighters.

30.1.6 Spillages and leakages of cargo should be attended to promptly. Oil-soaked rags should not be discarded carelessly where they may be a fire hazard or possibly ignite spontaneously. Other combustible rubbish should not be allowed to accumulate.

30.1.7 Cargo handling equipment, testing instruments, automatic and other alarm systems should be maintained to a very high standard of efficiency at all times. Where electrical equipment is to be used in the cargo area it should be of approved design and 'certified safe'. The safety of this equipment depends on maintenance of a high order which should be carried out only by competent persons. Unauthorised personnel should not interfere with such equipment. Any faults observed, such as loose or missing fastenings or covers, severe corrosion, cracked or broken lamp glasses etc should be reported immediately.

30.1.8 Work about the ship which might cause sparking or which involves heat should not be undertaken unless authorised after the work area has been tested and found gas-free, or its safety is otherwise assured.

30.1.9 Where any enclosed space has to be entered, the precautions given in Chapter 17 should be strictly observed. Dangerous gases may be released or leak from adjoining spaces while work is in progress and frequent testing of the atmosphere should be undertaken. 'Permit-to-work' procedures should generally be adopted - See Section 17.7.

MS (Entry into dangerous spaces) Regs SI 1988 No. 1638

30.2 Oil and bulk ore/oil carriers

30.2.1 Tankers and other ships carrying petroleum or petroleum products in bulk, or in ballast after carrying these cargoes, are at risk from



fire or explosion arising from ignition of vapours from the cargo which may in some circumstances penetrate into any part of the ship.

30.2.2 Additionally, vapours may be toxic, some in low concentrations, and some liquid products, especially petrol (gasoline) treated with tetra-ethyl or tetra-methyl-lead, are harmful in contact with the skin.

*MS
(International
Safety
Management
(ISM) Code)
Regs SI 1998
No. 1561*

30.2.3 Guidance on the general precautions which should be taken is given in publications of the International Chamber of Shipping:

- (a) International Safety Guide for Oil Tankers and Terminals;
- (b) Safety in Oil Tankers, a handbook for crew members.

Companies are additionally required, under the ISM Code, to have their own safety regulations. These publications should be available on board and the guidance conscientiously followed.

30.3 Liquefied gas carriers

*MS (Gas
Carriers) Regs
SI 1994
No. 2464*

30.3.1 Guidance on the general precautions which should be taken on these vessels is given in the Tanker Safety Guide (Liquefied Gas) and Safety in Liquefied Gas Tankers (a handbook for crew members) published by the International Chamber of Shipping. The IMO Codes for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk contain guidance on operational aspects and are mandatory under the relevant Merchant Shipping regulations.

30.3.2 It should be noted that cargo pipes, valves and connections and any point of leakage at the gas cargo may be intensely cold. Contact may cause severe cold burns.

30.3.3 Pressure should be carefully reduced and liquid cargo drained from any point of the cargo transfer system, including discharge lines, before any opening up or disconnecting is begun.



30.3.4 Some cargoes such as ammonia have a very pungent, suffocating odour and very small quantities may cause eye irritation and disorientation together with chemical burns. Seafarers should take this into account when moving about the vessel, and especially when climbing ladders and gangways. The means of access to the vessel should be such that it can be closely supervised and is sited as far away from the manifold area as possible. Crew members should be aware of the location of eye wash equipment and safety showers.

30.4 Chemical carriers

30.4.1 A bulk chemical tanker may be dedicated to the carriage of one or a small number of products or it may be constructed with a large number of cargo tanks in which numerous products are carried side by side simultaneously.

30.4.2 The products carried range from the so-called non-hazardous to those which are extremely flammable, toxic or corrosive or have a combination of these properties, or which possess other hazardous characteristics.

30.4.3 The ship arrangements and the equipment for cargo handling may be complex and require a high standard of maintenance and the use of special instrumentation, protective clothing and breathing apparatus for entry into enclosed spaces.

30.4.4 The International Maritime Organization (IMO) has produced codes (the IBC Code and the BCH Code) for the construction and equipment of ships carrying dangerous chemicals in bulk. The Codes are statutory under Merchant Shipping regulations. They contain some operational guidance, and the associated index of dangerous chemicals carried in bulk contains references to the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) published by IMO.



30.4.5 Guidance on general operational procedures and precautions which should be followed on chemical tankers is given in the Tanker Safety Guide (Chemicals) and the booklet 'Safety in Chemical Tankers', both published by the International Chamber of Shipping. These publications, together with the codes referred to above and any special safety requirements issued by the company should be available on board.

30.4.6 Many products carried on chemical tankers are loosely referred to as alcohols. Drinking these could lead to serious injury and death, and strict controls should be exercised when carrying such cargoes in order to prevent pilfering.



CHAPTER 31

SHIPS SERVING OFFSHORE OIL AND GAS INSTALLATIONS

31.1 General

31.1.1 Ships serving offshore oil and gas installations are often expected to operate in adverse weather conditions. Cargo operations should not be undertaken, except in an emergency, if there is any danger of the crew being injured by water on deck or shifting cargo. For the avoidance of doubt, an emergency does not mean when an installation is short of water, food or drilling equipment.

31.1.2 The master of the vessel has the final responsibility for ensuring that any operation is carried out with proper regard to the safety of all those on board and that measures are taken to minimise risks.

31.1.3 The Offshore Installation Manager controls the entry of all vessels into the 500 metre zone around the installation and can modify or terminate any support vessel activity that they regard as hazardous to the installation or persons on it.

31.1.4 The crane driver may also terminate a cargo operation on safety grounds.

31.1.5 Where a vessel has open stern and deck gangway doors and a low freeboard, particular care should be taken against loss of watertight integrity by ensuring that scuttles, deadlights, hatches and ventilators are securely closed. Freeing ports should be kept clear and unobstructed to ensure the rapid drainage of water trapped on the deck.



31.1.6 While work is being done on the deck the ship's heading and speed should be adjusted to provide as safe a working platform as possible. A look-out should be kept to give warning of imminent oncoming, quartering or following seas, or the operation suspended until the risk of shipping seas is over.

31.1.7 At all times work is being done on the deck, there should be an efficient means of communication between bridge, crane and crew. This should be by a hand-held radio on an uncluttered working frequency, backed up by a tannoy system.

31.1.8 During hours of darkness, sufficient lighting should be provided at access ways and at any work location, to ensure that obstructions are clearly visible, that persons working on deck can be clearly seen from the bridge and installation and that the operation may be carried out safely.

31.1.9 Lighting should be so placed that it does not dazzle the navigational watch and does not interfere with prescribed navigation lights.

31.1.10 If working on deck cannot be avoided during bad weather, lifelines should be rigged on the working deck to facilitate safe movement. Decks should as far as practicable be kept free from ice, slush and any substance or loose material likely to cause slips and falls.

31.1.11 Men working in cold and wet conditions should wear water-proof garments over warm clothing. The need to avoid undue exhaustion and hands and limbs becoming numbed should be taken into account when making the necessary arrangements for relief at suitable intervals.

MSN 1731(M+F) **31.1.12** If it is necessary for a man to work in an exposed position he should, where practicable, wear a safety harness and lifeline, and one of the



approved types of self-inflating buoyancy aids which would not unduly hamper or impede working movements.

31.1.13 Safety helmets and high visibility garments should be worn during work on deck.

31.1.14 Advice on mooring and casting off is given in Chapter 25.

31.1.15 Further advice and guidance on Offshore Support Vessel operations may be found in the UKOOA/Chamber of Shipping "Guidelines for the Safe Management and Operation of Offshore Support Vessels". For further information on this document telephone UKOOA on 0171 802 2400 or the Chamber of Shipping on 0171 417 8400. A copy of the document is publicly available on the Internet on www.british-shipping.org

31.2 Carriage of cargo on deck

31.2.1 The safe securing of all deck cargoes should be checked by a competent person before the vessel proceeds on passage. The master is responsible for ensuring that it is correctly stowed and adequately secured for the intended voyage. Areas on the deck which are not to be used for cargo stowage should be clearly marked or otherwise indicated.

31.2.2 To aid unloading at sea to be carried out safely, independent cargo units should, as far as practicable, be individually lashed. Where it is not practical to lash individual pieces of cargo, then groups of lifts intended for the same delivery location should be secured together. Lashings should, where practicable, be of a type that can be easily released and maintained.

31.2.3 All lashings should be checked at least once during each watch whilst at sea. Personnel engaged in the operation should be closely supervised from the bridge, particularly in adverse weather conditions. At



night in bad weather; an Aldis lamp or searchlight should be used to aid remote checking of lashings to avoid placing personnel at risk.

31.2.4 Where fitted, pipe posts to restrain the movement of tubulars should be used.

31.2.5 Discarded rope and damaged and unserviceable equipment and cargo should not be jettisoned at sea but retained for disposal ashore. Such materials and articles can foul propellers or cause damage to fishing gear.

31.3 Lifting, hauling and towing gear

*MS (Hatches
and Lifting
Plant) Regs
SI 1988
No 1639*

31.3.1 All mixed and running gear should be carefully maintained in good order and regularly inspected to detect wear, damage and corrosion. Statutory requirements for the use, maintenance and thorough examination of lifting plant are explained in Chapters 7 and 21 . More frequent inspections should be made where gear has had hard use or is much exposed to sea and weather.

31.3.2 In all operations which may impose large loads or shock strains upon the gear, precautions should be taken against sudden failure which may cause injury to personnel. As far as practicable, the system should be so defined that the weakest element is at a point where failure is likely to cause least danger.

31.3.3 While gear is under load, personnel essential for the operation should keep in protected positions to the greatest practicable extent. Others not engaged in the operations should keep clear of the working area.



31.4 Preparation for cargo handling

31.4.1 It is important to plan in advance, both at the shore terminal and offshore to aid effective cargo securing. The objective of pre-planning is the safe and practical restraint of cargo carried on the deck of offshore support vessels so that personnel, ship and cargo may be reasonably protected at all stages of carriage, and during cargo operations offshore.

31.4.2 The master and the Offshore Liaison Manager or their representatives must establish liaison prior to unloading or backloading of cargo.

31.4.3 The order of loading/discharging and stowage arrangements should be pre-planned in order to avoid wherever possible the "slotting-in" of containers and the necessity for any person to climb on top of the cargo.

31.4.4 The master should ensure he is provided with details of any unusual items of cargo, including dangerous goods, cargoes requiring special sea-fastening arrangements, or heavy lifts before loading.

MS (Dangerous Goods and Marine Pollutants) Regs SI 1997 2367 and MGN340 (M+F)

31.5 Approaching installation and cargo handling at installation

31.5.1 The master should pre-plan his approach to the installation with the vessel set up prior to the final approach to take account of the prevailing wind and tide etc.

31.5.2 In the event that it is necessary to drop anchor personnel should never stand forward of the windlass when letting go anchors at the installation. This is particularly important in vessels of this type because of the length of the chain and the loads thus imposed. Care should be taken when stowing the anchor cable in the locker (see Chapter 25).



31.5.3 In bad weather and under certain conditions of trim, considerable amounts of water may be shipped over the after-deck when the vessel is approaching a installation stern-on under power. Personnel should be alert to this possibility and remain in positions of shelter and safety until it is safe to proceed onto the deck.

31.5.4 Life-saving equipment, including lifebuoy, boathook and heaving line should be readily available at a suitable position on the stern and other points of particular danger when mooring and while cargo handling is in progress.

31.5.5 In applying the guidance of Chapter 21 to cargo handling, it should be borne in mind that the transfer of cargo at sea is at any time a difficult operation and the risks are greatly increased when heavy or bulk items are being handled from a combined deck space in a seaway.

31.5.6 The master has the authority to decide the sequence of cargo discharge to and backloading from the installation.

31.5.7 When cargo is being unloaded at the installation, the lashings of each individual item or cargo should not be released until the item is about to be lifted; there are grave risks if all cargo lashings are removed before loading operations are begun.

31.5.8 Once unlashd, cargo should be secured against movement as much as possible, until lifted.

31.5.9 Personnel should be at all times alert to the danger of being hit or crushed should items of cargo swing during a lift or become dislodged through sudden movement of the ship. For this reason, all personnel should seek positions of safety as far as practicable during the lifting and lowering of cargo. If, in some circumstances, cargo hooks have to be held until the strain



is taken, as when pipes are to be unloaded, crew members thus engaged should immediately move to a safe position before the actual lift is effected.

31.5.10 Lifts should be speedily effected to hoist the load well off the deck and swung clear of the ship as quickly as possible.

31.5.11 If any back-loading has to take place from the installation during off-loading of cargo from the vessel, care should be taken to ensure that the cargo taken on board is immediately secured against movement until it can be properly stowed.

31.5.12 It is essential that an efficient means of communication, preferably by radio link, is established by the installation crane operator and the working deck officer who should at all times be in visual contact with each other.

31.6 Transfer of personnel by ship to installation by 'personnel baskets'

31.6.1 The following procedures should be observed for the transference of personnel from ship to installation by 'personnel baskets':

- (a) two people should steady the equipment when it is lowered to the deck;
- (b) luggage should be secured within the net of the basket;
- (c) personnel to be transferred should wear lifejackets and other PPE suitable for the water and sea conditions;
- (d) personnel transferring should be evenly distributed around the base board to ensure maximum stability;
- (e) personnel should stand outside the basket with feet apart on the board and the basket securely gripped with both arms looped through;
- (f) when the officer in charge is satisfied that all is ready, and at an appropriate moment having regard to the movement of the ship in a seaway, the basket should be lifted clear of the vessel and then swung



- up and out as quickly as possible before being carefully hoisted up to the installation;
- (g) throughout the operation, a lifebuoy, boathook and heaving line should be kept immediately available on board the vessel for use in the case of emergencies;
 - (h) the arrangements for rescue and recovery of persons near the installation set out in the Installations Emergency Response Plan should be in place;
 - (i) radio communications should be set up between ship, Stand By Vessel and installation.

31.7 Transfer of personnel by boat

31.7.1 The master of the ship providing the boat should be responsible for the operation. Due consideration should be given to the effect of prevailing conditions on the safety of the transfer:

31.7.2 The boat should be reliably powered.

31.7.3 The boat must be crewed by no less than two experienced persons, at least one of whom must be experienced in handling the boat. Lifejackets and if necessary, suitable protective clothing, must be worn by all personnel.

31.7.4 A safety rope should be provided for all personnel ascending or descending overside by ship's ladder:

31.7.5 All personnel to be transferred should be briefed by a responsible Deck Officer. Boarding and disembarkation should be carried out in an orderly manner under the coxswain's direction.

31.7.6 The boat's coxswain should ensure an even and safe distribution of passengers. Passengers should not stand up or change their positions



during the passage between ships save under instructions from the coxswain.

31.7.7 The parent vessel should establish communication with the receiving vessel prior to the commencement of the operation and should maintain continuous visual contact with the boat concerned throughout the transfer. It is recommended that the boat should carry a VHF radio.

31.7.8 If the transfer of personnel involves a Stand By Vessel, the master should bear in mind that his vessel must at all times be ready to fulfil its Stand By Vessel duties.

31.7.9 Where transfer is to or from an installation, personnel should be aware that ladders and platforms can be very slippery or rough with shells at water level.

31.8 Anchor handling

31.8.1 Handling installation anchors at sea can be a particularly hazardous and arduous task. The vessel should be controlled in such a manner so as to minimise the risks concerned, in particular to avoid as far as possible an anchor wire under heavy load whipping from quarter to quarter across the deck.

31.8.2 During bad weather lifelines should be rigged on the working deck to facilitate safe movement. Decks should, as far as practicable be kept free from ice, slush and any substance or loose material likely to cause slips and falls.

31.8.3 The provisions of section 31.3.3 on the need for personnel to keep to protected positions are particularly important during the handling of anchors and anchor buoys. Lifelines should be provided.



31.8.4 Anchor buoys being lifted aboard should be kept clear of the working area and lashed immediately upon landing to prevent movement.

31.8.5 Care should be taken when stoppering off wires.

31.8.6 When anchors are let go over the stern, all personnel should be well forward of the stern and in protected positions.



CHAPTER 32

RO-RO FERRIES

32.1 Introduction

32.1.1 This section gives general advice for the safety of personnel working on the vehicle decks of ro-ro ferries. Where other documents or chapters of this Code apply these are cross-referenced and should be read in conjunction with this chapter.

32.2 General

32.2.1 The movement, stowage and securing of vehicles on vehicle decks and ramps should be supervised by a responsible ship's officer assisted by at least one competent person.

32.2.2 Smoking and naked flames should not be permitted on any vehicle decks. Conspicuous "No Smoking" or "No Smoking/Naked Lights" signs should be displayed.

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32.2.3 There should be no unauthorised persons on vehicle decks at any time, and there should be no entry to vehicle decks when the vessel is at sea unless specifically permitted.

32.2.4 Passengers and drivers should not be permitted to remain on vehicle decks without the express authority of a responsible ship's officer. The period prior to disembarkation when passengers and drivers are requested to return to their vehicles should be kept to a minimum.

32.2.5 Where closed circuit television (CCTV) cameras are fitted, they should, where practicable, have an uninterrupted view of the vehicle deck. The use of CCTV for continuous watch does not necessarily preclude the



need for car deck patrols - eg coupled with fire patrols of passenger accommodation.

32.3 Ventilation

32.3.1 Vehicle decks should have adequate ventilation at all times, with special regard to hazardous substances.

32.3.2 On passenger vessels, ventilation fans in closed ro-ro spaces must normally be run continuously whenever vehicles are on board. An increased number of air changes may be required when vehicles are being loaded or unloaded, or where flammable gases or liquids are stowed in a closed ro-ro space. Merchant Shipping regulations specify the special requirements for cargo space ventilation.

32.3.3 To reduce the accumulation of fumes, drivers should be instructed to stop their engines as soon as practicable after embarking and to avoid starting up prior to departure until instructed to do so. During loading and discharging ventilation may be improved by keeping both bow and stern doors open, provided that there is adequate freeboard at these openings. When there is doubt about the freshness of the atmosphere, arrangements should be made for testing of the atmosphere to ensure the maintenance of 21 per cent oxygen and a carbon monoxide content below 50ppm in the atmosphere of the space.

32.4 Fire safety/prevention

32.4.1 Fire detection systems should be switched on whenever vehicle decks are unattended. Deck and engine crew should be trained in the use of the drencher systems and their operation. Continuous monitoring of vehicle decks by CCTV or regular fire patrols should also be in place.

32.4.2 All fire doors should be kept closed on vehicle decks when the vessel is at sea.

MS (Fire Protection - Small Ships) Regs SI 1998 No.1011 and MS (Fire Protection - Large Ships) SI 1998 No. 1012



32.5 Noise

32.5.1 Personnel working on vehicle decks should not be exposed to the equivalent of 90dB(A) or greater when averaged over an 8 hour day. Hearing protection should be available for use when the noise level is equivalent to or exceeds 85dB(A) averaged over an 8 hour day, and should be worn when it is equivalent to or exceeds 90dB(A) averaged over an 8 hour day. For further guidance on noise levels see the Code of Practice for Noise Levels in Ships (revised 1990).

32.6 Safe movement

32.6.1 Pedestrians should be warned of vehicle movements when entering or crossing car or vehicle decks and keep to walkways when moving about the ship.

32.6.2 As far as possible, routes used by vehicles should be separated from pedestrian passageways, and the use of ship's ramps for pedestrian access should be avoided. Ramps which are used by vehicles should not be used for pedestrian access unless there is suitable segregation of vehicles and pedestrians. Segregation can be achieved through the provision of a suitably protected walkway, or by ensuring that pedestrians and vehicles do not use the ramp at the same time (See the Code of Practice on the Stowage and Securing of Vehicles on Ro-Ro Ships Section 2.6).

32.6.3 Crew members should exercise great care when supervising the driving, marshalling and stowing of vehicles to ensure that no person is put at risk. The following precautions should be taken:

- Crew should be easily identifiable by passengers.
- Communications between deck officers and ratings should be clear and concise to maintain the safety of passengers and vehicles.
- There should be suitable traffic control arrangements, including speed limits, and where appropriate the use of signallers. Collaboration may



be necessary with shore side management where they also control vehicle movements on board ship.

- Hand signals used by loading supervisors and personnel directing vehicles should be unambiguous.
- Adequate illumination should be provided.
- Personnel directing vehicles should keep out of the way of moving vehicles, and particularly those that are reversing, by standing to the side, and where possible should remain within the driver's line of sight. Suitable high visibility clothing should be worn by all personnel working on vehicle decks. Extra care should be taken at the 'ends' of the deck where vehicles may converge from both sides of the ship.
- Crew members should be wary that vehicles may lose control on ramps and sloping decks, especially when wet, and that vehicles on ramps with steep inclines may be susceptible to damage. Ramps should have a suitable slip resistant surface.
- Where fitted, audible alarms should be sounded by vehicles that are reversing.
- Safe systems of work should be provided in order to ensure that all vehicle movements are directed by a competent person.
- Personnel moving about the ship should be aware of moving ramps, moveable decks etc. Where possible such ramps and decks should be fitted with audio and visual alarms,

32.7 Inspection of vehicles

32.7.1 Before being accepted for shipment, every freight vehicle should be inspected externally by a competent and responsible person or persons to check that it is in a satisfactory condition for shipment - for example,

- its suitability for securing to the ship in accordance with the approved cargo securing manual (see also 29.1.4);
- where practicable, the securing of the load to the vehicle;



- a check to ensure the deck or doorway is high enough for vehicles to pass through, and that vehicles have adequate clearance for ramps with steep inclines;
- any labels, placards and marks which would indicate the carriage of dangerous goods .

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32.7.2 It is important to ensure, so far as is reasonably practicable, that on each vehicle the fuel tank is not so full as to create a possibility of spillage. No vehicle showing visual signs of an overfilled tank should be loaded.

32.7.3 Personnel should be aware of hazardous units as detailed on the stowage plan and indicated by labels, placards and marks, and should be on guard against the carriage of undeclared dangerous goods.

32.8 Stowage

32.8.1 Shippers' special advice or guidelines regarding handling and stowage of individual vehicles should be observed.

32.8.2 Vehicles should:

- so far as possible, be aligned in a fore and aft direction;
- be closely stowed athwartships so that, in the event of any failure in the securing arrangements or from any other cause, the transverse movement is restricted. However, sufficient distance should be provided between vehicles to permit safe access for the crew and for passengers getting into and out of vehicles and going to and from accesses serving vehicle spaces;
- be so loaded that there are no excessive lists or trims likely to cause damage to the vessel or shore structures.

32.8.3 Vehicles should not :

- be parked on permanent walkways;



- be parked so as to obstruct the operating controls of bow and stern doors, entrances to accommodation spaces, ladders, stairways, companionways or access hatches, fire-fighting equipment, controls to deck scupper valves and controls to fire dampers in ventilation trunks;
- be stowed across water spray fire curtains, if these are installed.

32.8.4 Safe means of access to securing arrangements, safety equipment, and operational controls should be properly maintained. Stairways and escape routes from spaces below the vehicle deck should be clearly marked with yellow paint and kept free from obstruction at all times.

32.8.5 Parking brakes of each vehicle or each element of a vehicle, where provided, should be applied and the vehicle should, where possible, be left in gear.

32.8.6 Semi-trailers should not be supported on their landing legs during sea transport unless the landing legs are specially designed for that purpose and so marked, and the deck plating has adequate strength for the point loadings.

32.8.7 Uncoupled semi-trailers should be supported by trestles or similar devices placed in the immediate area of the drawplates so that the connection of the fifth-wheel to the kingpin is not restricted.

32.8.8 Drums, canisters and similar thin walled packaging are susceptible to damage if vehicles break adrift in adverse weather; and should not be stowed on the vehicle deck without adequate protection.

32.8.9 Depending on the area of operation the predominant weather conditions and the characteristics of the ship freight vehicles should be stowed so that the chassis are kept as static as possible by not allowing free play in the suspension. This can be done by securing the vehicles to the



deck as tightly as the lashing tensioning device will permit or by jacking up the freight vehicle chassis prior to securing or, in the case of compressed air suspension systems, by first releasing the air pressure where this facility is provided.

32.8.10 Since compressed air suspension systems may lose air, adequate arrangements should be made to prevent the slackening off of lashings as a result of air leakage during the voyage. Such arrangements may include the jacking up of the vehicle or the release of air from the suspension system where this facility is provided.

32.9 Securing of cargo

32.9.1 Securing operations should be completed before the ship proceeds to sea.

32.9.2 Within the constraints laid down in the approved cargo securing manual, the master has the authority to decide on the application of securings and lashings and the suitability of the vehicles to be carried. In making this decision due regard shall be given to the principles of good seamanship, experience in stowage, good practice and the IMO Code for Cargo Stowage and Securing (CSS Code).

32.9.3 Personnel appointed to carry out the task of securing vehicles should be trained in the use of the equipment to be used and in the most effective methods for securing different types of vehicles.

32.9.4 Securing operations should be supervised by competent personnel who are conversant with the contents of the Cargo Securing Manual. Freight vehicles of more than 3.5 tonnes should be secured in all circumstances where the expected conditions for the intended voyage are such that movement of the vehicles relative to the ship could be expected.



32.9.5 During the voyage the lashings should be regularly inspected to ensure that vehicles remain safely secured. Personnel inspecting vehicle spaces during a voyage should exercise caution in order to avoid being injured by moving or swaying vehicles. If necessary, the ship's course should be altered to reduce movement or dangerous sway when lashings are being adjusted. The officer of the watch should always be notified when an inspection of the vehicle deck is being made.

32.9.6 When wheel chocks are being used to restrain a semi-trailer they should remain in place until the semi-trailer is properly secured to the semi-trailer towing vehicle.

32.9.7 No attempt should be made to secure a vehicle until it is parked, the brakes, where applicable, have been applied and the engine has been switched off.

32.9.8 When vehicles are being stowed on an inclined deck, the wheels should be chocked before lashing commences.

- The tug driver should not leave the cab to disconnect or connect the trailer brake lines. A second person should do this.
- The parking brake on the tug should be engaged and in good working condition.
- As well as wheel chocks, at least two lashings holding the unit against the incline should be left in place until the trailer's braking system is charged and operating correctly.

32.9.9 Where personnel are working in shadow areas or have to go under vehicles to secure lashings, hand lamps and torches should be available for use.

32.9.10 Personnel engaged in the securing of vehicles should take care to avoid injury from projections on the underside of the vehicles.



32.9.11 Wherever possible, lashings should be attached to specially designed securing points on vehicles, and only one lashing should be attached to any one aperture, loop or lashing ring at each securing point.

32.9.12 When tightening lashings, care should be exercised to ensure that they are securely attached to the deck and to the securing points of the vehicle.

32.9.13 Hooks and other devices which are used for attaching a lashing to a securing point should be applied in a manner which prevents them from becoming detached if the lashing slackens during the voyage.

32.9.14 Lashings should be so attached that, provided there is safe access, it is possible to tighten them if they become slack.

32.9.15 Lashings on a vehicle should be under equal tension.

32.9.16 Where practicable, the arrangement of lashings on both sides of a vehicle should be the same, and angled to provide some fore and aft restraint, with an equal number pulling forward as are pulling aft.

32.9.17 The lashings are most effective on a vehicle when they make an angle with the deck of between 30 and 60 degrees. When these optimum angles cannot be achieved additional lashings may be required.

32.9.18 Crossed lashings should, where practicable, not be used for securing freight vehicles because this arrangement provides no restraint against tipping over at moderate angles of roll of the ship. Lashings should pass from a securing point on the vehicle to a deck securing point adjacent to the same side of the vehicle. Where there is concern about the possibility of low co-efficients of friction on vehicles such as solid wheeled



trailers, additional crossed lashings may be used to restrain sliding. The use of rubber mats should be considered.

32.9.19 Lashings should not be released for unloading before the ship is secured at the berth, without the Master's express permission.

32.9.20 Personnel should release lashings with care to reduce the risk of injury when the tension is released.

32.9.21 To avoid being damaged during loading and unloading all unused securing equipment should be kept clear of moving vehicles on the vehicle deck.

32.9.22 A competent appointed person should inspect securing equipment to ensure that it is in sound condition at least once every six months and on any occasion when it is suspected that lashings have experienced loads above those predicted for the voyage. Defective equipment should be taken out of service and placed where it cannot be used inadvertently. Unused lashing equipment should be securely stowed away from the vehicle deck.

32.10 Dangerous goods

32.10.1 This section should be read in conjunction with Chapter 27: Hazardous Substances. For guidance on dealing with emergencies involving dangerous goods, see Chapter 10: Emergency Procedures and the IMDG Code.

32.10.2 Prior to loading, freight vehicles carrying dangerous goods should be examined externally for damage and the signs of leakage or the shifting of contents. Any freight vehicle found to be damaged, leaking or with shifting contents should not be accepted for shipment. If a freight vehicle is found to be leaking after loading, a ship's officer should be informed and



personnel kept well clear until it is ascertained that no danger to personnel persists.

32.10.3 Freight vehicles carrying dangerous goods and adjacent vehicles should always be secured.

MGN 59

32.10.4 Tank vehicles, and tank containers on flat-bed trailers, containing products declared as dangerous goods should be given special attention. (For heated tanks see Marine Guidance Note 59). Pre-voyage booking procedures should ascertain that tanks have been approved for the carriage of their contents by sea.

32.11 Specialised vehicles

MGN 341 (M)

32.11.1 Gas cylinders used for the operation and business of vehicles such as caravans should be adequately secured against movement of the ship, with the gas supply cut off for the duration of the voyage. Leaking and inadequately secured or connected cylinders should be refused for shipment.

32.11.2 The following vehicles, trailers and loads should be given special consideration:

- Tank vehicles or tank containers containing liquids not classified as dangerous goods. These may be sensitive to penetration damage and may act as a lubricant. These vehicles must always be secured.
- Tracked vehicles and other loads making metal to metal contact with the deck - where possible rubber mats or dunnage should be used.
- Loads on flat-bed trailers.
- Vehicles with hanging loads such as chilled meat or floated glass.
- Partially filled tank vehicles.

32.11.3 Freight vehicles carrying livestock require special attention to ensure that they are properly secured, adequately ventilated and stowed so



that access to the animals is possible. Further guidance is contained in the Ministry of Agricultural Fisheries and Food publication "Livestock Shipments on Roll-on/Roll-off (Ro-Ro) Vessels - Advice to Masters, Loading Officers and Vessel Operators".

32.11.4 Where vehicles are connected to electrical plug-in facilities, personnel should take the appropriate precautions as described in Chapters 7 and 20 of this Code for working with any electrical equipment.

32.12 Use of work equipment

32.12.1 Ships' ramps, car platforms, retractable car-decks and similar equipment should be operated only by competent persons authorised by a responsible ship's officer, in accordance with the company's work instructions. Safe systems of work should be provided to ensure that the health and safety of crew or passengers is not put at risk. Ramps etc should not be operated unless the deck can be seen to be clear of people, and if any person appears on the deck while the ramp is moving, the operation should be stopped immediately.

32.12.2 Training in the use of such equipment should consist of theoretical instruction enabling the trainee to appreciate the factors affecting the safe operation of the plant, and supervised practical work.

32.12.3 Moveable deck ramps should be kept clear of passengers when being raised or lowered. When cars are lowered on the ramps of moveable decks they should be suitably chocked.

32.12.4 No person should be lifted by ramps, retractable car



decks or lifting appliances except where the equipment has been designed or especially adapted for that purpose.

32.12.5 Retractable car-decks and lifting appliances should be securely locked when in the stowed position.

32.12.6 After all vehicles have been loaded, the car deck hydraulics should be isolated, so that they cannot be accidentally activated during the voyage, and the bridge should be informed.

32.12.7 The ship's mobile handling equipment, which is not fixed to the ship, should be secured in its stowage position before the ship proceeds to sea.

32.13 Housekeeping

32.13.1 All walkways should be kept clear:

32.13.2 All vehicle decks, ships' ramps and lifting appliances should, so far as is reasonably practicable, be kept free of water, oil, grease or any liquid which might cause a person to slip or which might act as a lubricant to a shifting load. Any spillage of such liquid should be quickly cleaned up; sand boxes, drip trays and mopping up equipment should be available for use on each vehicle deck.

32.13.3 All vehicle decks, ships' ramps and lifting appliances should be kept free of obstructions and loose items such as stores and refuse.

32.13.4 Personnel should be careful to avoid electrical points and fittings when washing down vehicle decks.

32.13.5 All scuppers should be kept clear of lashing equipment, dunnage, etc.



CHAPTER 33

PORT TOWAGE INDUSTRY

33.1 General

33.1.1 This section covers crews engaged on tugs which are involved in towage operations within port/harbour limits and provides general guidance on safety. Where other documents or sections of this Code apply these are referenced and should be read in conjunction with this Chapter.

33.1.2 Before beginning towing operations, a comprehensive plan of action should be prepared, taking account of all relevant factors, including sea-state, visibility and the findings of the risk assessment.

33.2 Watertight integrity

33.2.1 The watertight integrity of the tug should be maintained at all times. When a tug is engaged on any towage operation all watertight openings should be securely fastened.

33.2.2 All watertight openings should be marked with a sign stating that they are to remain closed during towage operations. Any such openings used whilst moving about the tug during a towage operation should be re-secured immediately after use. Signs should conform with Chapter 28 of this Code.

33.3 Testing and inspection of towing equipment

33.3.1 Towing hooks and alarm bells, if fitted, should be inspected daily.

33.3.2 The emergency release mechanisms on towing hooks and winches should be tested, both locally and where fitted remotely, at frequent intervals to ensure correct operation.

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33.3.3 All towing equipment in use should be inspected for damage before undertaking and after completing a tow.

33.4 Connecting and disconnecting the towing gear

33.4.1 Before commencing a tow the master should determine which towing gear is suitable for the operation and instruct the crew accordingly.

33.4.2 When receiving heavy lines, the tug crew should be aware of the risk of injury through being struck by a 'Monkey's Fist' or other weighted object attached to the line. They should stand clear of and where possible indicate the area that the heaving line is to be thrown up to.

33.4.3 When connecting to a tow, the crew on deck should ensure that the towing gear is clear of any obstructions, able to run freely and is released from the tug in a controlled manner.

33.4.4 During disconnection, the crew on deck should be aware of the risk of injury if the towing gear is released from the tow in an uncontrolled manner and avoid standing directly below. They should also be aware that any towing gear which has been released and is still outboard may 'foul' on the tug's propeller(s), steelworks or fendering, causing it to come tight unexpectedly.

33.5 Use of bridal/gog rope during towing operations

33.5.1 A suitable bridle/gog rope/ wire should be used where it is identified, through the position of the tug in assisting the tow or the nature of the operation, that the tow line is likely to reach such an angle to the fore and aft line of the tug that a 'girting' situation may arise.

33.6 Crew Safety During Towing Operations

33.6.1 Once the towing gear is connected, the deck crew should indicate this to the master and then clear the area and, if required to remain on



deck, stand in a safe position. If the crew are required to attend the towing gear during a towing operation, the length of time exposed should be kept to a minimum.

33.6.2 During towage operations the towing gear, equipment and personnel should be continuously monitored and any change in circumstances immediately relayed to the master. This is particularly important on tugs where the master has a restricted view of those areas/ personnel.

33.6.3 During all towing operations, where a tug is made fast to the tow, the crew should be aware that the tow may have to be released in an emergency situation, and that this may occur without any warning.

33.6.4 Tug crews should wear appropriate personal protective equipment - see Chapter 4.

33.7 Communications

33.7.1 Prior to undertaking the tow, relevant information should be exchanged and an effective means of communication established between the tug and the tow. Secondary/alternative means of communication when possible should also be agreed.

33.7.2 Internal communications are equally important and the Tug Master should ensure that the crew are aware of the intended operation, including any special circumstances or instructions, and that an effective means of communication is established between the master and crew during the towing operation.

33.8 Interaction

MGN 199(M)

33.8.1 Interaction and its effects on the tug and its handling are well known and appreciated in port/harbour towage. Masters and crew are



reminded that these effects increase with speed. MGN 199(M) provides guidance on the effects of interaction.

33.8.2 In areas where interaction exists, and when manoeuvring alongside a tow, the master should be aware of the possibility of underwater obstructions such as bulbous bows, stabiliser fins etc, and areas of the ship's sides, such as pilot doors, which are to be avoided. The use of bow thrusts by the tow may present a hazard to the tug.

33.8.3 When in close proximity to or coming alongside a tow, the crew should be aware of interaction and the effect it may have on the tug. This may take the form of sudden movement or contact and result in loss of balance or movement of equipment and other objects.

33.9 Escorting

33.9.1 Escorting as a regular operation is becoming common within the port towage industry. It should only be carried out after investigating the suitability of the tug for the operation and agreeing a plan. This type of operation is carried out in the 'passive' and 'active' modes: passive when running free in close attendance and active when fast to the tow. If active escort is being undertaken the form of towage can be 'direct' or 'indirect', depending on the speed of the tow. When fast, masters should be aware that increased loads can be applied to towing gear, especially when operating in the indirect mode.



CHAPTER 34

NOISE, VIBRATION AND OTHER PHYSICAL AGENTS

34.1 General Advice

34.1.1 A physical agent is an environmental factor such as noise, vibration, optical radiation and electromagnetic fields that may damage the health of those exposed to them.

34.1.2 The employer's risk assessment will identify where personnel are working in the presence of physical agents hazardous to health or safety, and evaluate any risks from exposure (see Chapter 1). Appropriate measures should be taken to remove, control or minimise the risk (see section 34.2).

34.1.3 Employers should instruct and inform personnel so that they know and understand the risks arising from their work, the precautions to be taken and the results of any monitoring of exposure.

34.1.4 The risk assessment will also provide information to determine whether health surveillance is appropriate (see Chapter 2).

34.1.5 Where exposure to a physical agent arises from the use of a particular piece of equipment, reference should be made to any instructions and operating data supplied by the manufacturer of that equipment. Reference may also be made where appropriate to any publications on the subject issued by the Health and Safety Executive.

34.2 Prevention or control of exposure to a physical agent

34.2.1 The first consideration should always be to prevent risk by removing exposure to the physical agent concerned.



34.2.2 Where this is not reasonably practicable, prevention or control of exposure may be achieved by any combination of the following means:

- (a) total or partial enclosure of equipment concerned;
- (b) use of plant, processes and systems of work which minimise exposure to the physical agent;
- (c) keeping the number of persons who might be exposed to a physical agent to a minimum, and reducing the period of exposure;
- (d) the designation of areas which may be subject to hazardous levels of exposure to a physical agent and the use of suitable and sufficient warning signs;
- (e) use of appropriate procedures for the measurement of hazardous levels of exposure to a physical agent, in particular for the early detection of abnormal exposures resulting from an unforeseeable event or an accident;
- (f) the taking of individual/collective protection measures; and
- (g) where appropriate, having plans in place to deal with emergency situations which could result in abnormally high exposure to physical agents.

34.2.3 These measures should be applied to reduce the risk to personnel to the minimum, but where they do not adequately control the risk to health, appropriate personal protective equipment should be provided in addition.

34.2.4 Employers should take reasonable steps to ensure that any control measures are properly used and maintained. Where appropriate, exposure levels should be monitored and recorded.

34.2.5 Personnel should comply fully with the control measures in force.

34.2.6 For certain physical agents specific control measures apply; eg noise and vibration. In cases where failure of the control measures could



result in risk to health and safety, or where their adequacy or efficiency is in doubt, the exposure of personnel should be monitored and a record kept for future reference.

34.3 Consultation

34.3.1 Ship safety representatives and workers should be consulted about proposals to manage risks from exposure to physical agents and other health problems arising from such exposure. Consultation should cover the results of the risk assessment, proposals for control, for providing information and training for employees and for any health monitoring system.

34.4 Worker information and training

34.4.1 Employers should provide workers with sufficient information and training to ensure that they are aware of potential risks to their health from exposure to physical agents. Such information and training must in a language understood by the worker and include:-

- the nature of such risks;
- details of the measures taken in order to eliminate or reduce to a minimum the risks from the physical agent;
- any exposure limit values and the exposure action values;
- the results of the risk assessment carried out;
- the correct use of personal protective equipment where required;
- the circumstances in which workers are entitled to health surveillance;
- safe working practices to minimise exposure to mechanical vibration;
- how to detect and report signs of injury;
- and the importance of detecting and reporting signs of injury.

34.4.2 Ship safety representatives and workers should be consulted about proposals to manage potential risks from exposure to physical agents. Consultation should cover results of risk assessments, proposals for control, and procedures for providing information.



NOISE

34.5 Introduction

*MS & FV
(Control of
Noise at Work)
Regulations
2007 (SI
2007/3075)
and Marine
Guidance Note
MGN 352*

34.5.1 When exposed to harmful noise - sounds that are too loud or loud sounds that last a long time - sensitive structures in the inner ear can be damaged, causing hearing loss. This section gives advice on the assessment of noise in the workplace, and steps to prevent any associated problems it may cause.

34.6 Assessing exposure to noise

34.6.1 As a simple guide there may be a problem if:

- workers have to shout to be clearly heard by someone only 2 metres away;
- workers' ears are still ringing after leaving the workplace;
- workers are using equipment which causes loud explosive noises such as cartridge-operated tools or guns;
- workers are exposed to high level impact noise from hammering on metal benches; chipping machines or metal endplates on the decks of Ro-Ro vessel ramps;
- there is machinery such as a diesel engines, generators etc running in a confined space such as a ship's engine room;
- workers, not engaged in the provision of entertainment (e.g. waiters), have to enter or remain in noisy areas such as discos, nightclubs etc on cruise ships whilst carrying out their duties.

34.6.2 Annex 34.3 provides guidance on daily exposure to different sound levels and the recommended maximum limits for different areas on board ship

34.6.3 The following table describes the lower and upper noise exposure values, noise exposure limits and where appropriate, action required to be taken to reduce that exposure. A detailed formula for calculating Daily Exposure Levels can be found in Annex 34.2



	Daily/Weekly Exposure	Peak Exposure dB(C)	Action to be taken
Lower Exposures Action Values	80	135	Workers must be provided with personal hearing protection, complying with the requirements of the Merchant Shipping and fishing Vessels personal Protective Equipment) Regulations 1999.
Upper Exposure Action Values	85	137	Workers are required to use personal hearing protection complying with the requirements of the Merchant Shipping and Fishing Vessels (Personal Protective Equipment) Regulations 1999 Workers are entitled to have their hearing examined by a doctor, or a suitably qualified person under the supervision of a doctor. Employers must establish and implement a programme of measures to reduce the exposure to noise
Exposure Limit Values	87	140	This limit must not be exceeded.

Merchant Shipping and Fishing Vessels (Personal Protective Equipment) Regulations 1999

34.6.4 Annex 34.3 provides guidance on daily exposure to different sound levels and the recommended maximum limits for different areas on board ship

34.6.5 For further information on Personal Hearing Protection, see annex 34.4

34.6.6 Workers may not be charged for either personal hearing protectors or for hearing examinations.

34.6.7 When determining noise exposure action levels, no account is to be taken of the effects of using hearing protection. Account may however be taken of hearing protection in the case of exposure limit values.

34.6.8 Although being aware of decibel levels is an important factor in protecting one's hearing, distance from the source of the sound and duration of exposure to the sound are equally important. A good rule of thumb is to avoid noises that are "too loud" and "too close" or that last "too long."



34.7 Risk Assessment – Noise

34.7.1 If there is considered to be a problem arising from exposure to noise a risk assessment should be undertaken by a competent person.

34.7.2 If any worker is likely to be exposed to noise exceeding the lower exposure action values set out in paragraph 34.6.3, employers must arrange for a competent person to assess the actual level of noise exposure.

34.7.3 The employer should

- keep a record of the noise assessment;
- regularly review the noise assessment whenever there is a change in the work being undertaken or when new equipment is introduced which may alter noise levels;
- use the assessment to develop an action plan for introducing noise control measures.

34.7.4 It is good practice to review the assessment every two years, as noise levels can change over time as, for example, machinery wears out or working practices change

34.8 Health Surveillance – Noise

34.8.1 If there is considered to be a problem as a result of exposure to noise, the employer is required to provide health surveillance of the workers at risk in accordance with Chapter 2.

34.8.2 Health surveillance can include

- regular hearing checks to measure the sensitivity of hearing over a range of sound frequencies;
- informing employees about the results of their hearing checks
- keeping records;
- encouraging workers to seek further advice from a doctor where hearing damage is suspected.



34.8.3 As cases differ from situation to situation, the person/organisation responsible for the carrying out of health surveillance must decide on the most appropriate form of health surveillance in each case.

34.8.4 It is good practice for employers to arrange regular hearing checks on all workers whose daily personal noise exposure exceeds the second action level, and to encourage them to attend their appointments

34.9 Noise arising from Music and Entertainment

MGN 377
(M+F)

34.9.1 A Code of Conduct has been drawn up by the Health and Safety Executive (HSE) and industry representatives from the music and entertainment sector. The Code enables those sectors to meet the requirements of HSE's Noise Regulations. The provisions of the HSE Code are equally relevant to the provision of music and entertainment on ships, including vessels on inland waterways, although the applicable legislation for ships will be the Merchant Shipping and Fishing Vessels (Control of Noise at Work) Regulations 2007 and not HSE's regulations. The Code of Conduct can be found on HSE's website at www.soundadvice.info or a copy can be purchased from HSE quoting ISBN 9780717663071

Vibration

34.10 Types of vibration and their effects

34.10.1 Hand-arm vibration is comes from the use of hand held power tools or other vibrating equipment. Regular and frequent exposure to hand-arm vibration can lead to permanent health effects. Occasional exposure is unlikely to cause ill health.

34.10.2 Whole-body vibration occurs through the shaking or jolting of the body through a supporting surface, for example when controlling or riding on a vessel at high speed in choppy seas or standing next to a ship's main engines or generators.. Whole body vibration can also be made worse by poor design of working environment, incorrect worker posture, and



exposure to shocks and jolts. A primary symptom of whole body vibration is back pain.

34.11 Exposure limits set by the Vibration Regulations

34.11.1 The following table describes the Daily Exposure Action Value and Limits for Hand Arm, and Full Body vibration.

	Hand Arm Vibration (Standardised to eight hour reference period)	Whole Body Vibration	
Daily Exposure Action Value	2.5 m/s ² A(8)	0.5 m/s ² A(8)]	Above this limit, employers are required to reduce exposure of vibration to workers
Daily Exposure Limit Value	5 m/s ² A(8)	1.15 m/s ² A(8)	Maximum amount of vibration an employee may be exposed to on any single day

34.12 Determining vibration levels

*MS & FV
(Control of
Vibration at
Work) Regs
2007 (SI
2007/3077)
and Marine
Guidance Note
MGN 353
(M+F)*

34.12.1 Employers are required to control the risks from hand-arm and whole-body vibration. In most cases it is simpler to make a broad assessment of the risk rather than try to assess exposure in detail.

34.12.2 During the assessment, attention should be paid to

- which, if any, processes/operations involve regular exposure to vibration including that emanating from the vessel itself;
- whether there are any warnings of vibration risks in equipment handbooks;
- any symptoms which might be caused by hand-arm or whole-body vibration and whether the equipment being used, or the vessel itself, produces high levels of vibration or uncomfortable strains on hands and arms or is causing back pain.



34.12.3 If, there is considered to be a problem caused by vibration, a risk assessment should be undertaken by a competent person who has read and understood the Vibration Regulations and MGN 353 and who has a good knowledge of the work processes used on the vessel.

34.12.4 As an alternative an employer may choose either to use available vibration data or to have measurements made to estimate exposures if they want to be more certain of whether the risk is high, medium or low.

34.12.5 Employers may be able to get suitable vibration data from the equipment handbook, or from the equipment supplier. Should such data be reasonably representative of the way equipment is used on the vessel, it should be suitable for use in estimating workers' exposure.

34.12.6 It is also necessary to note how long a workers are exposed to vibration. Once the relevant vibration data and exposure times have been collected it will be necessary to calculate each employee's daily exposure. This could be by means of an exposure calculator such as the one on HSE's vibration web pages at www.hse.gov.uk/vibration) or alternatively the simple 'exposure points' system table below.

Tool vibration (m/s ²)	3	4	5	6	7	10	12	15
Points per hour (approximate)	20	30	50	70	100	200	300	450

34.12.7 Multiply the points assigned to the tool vibration by the number of hours of daily 'trigger time' for the tool(s) and then compare the total with the exposure action value (EAV) and exposure limit value (ELV) points.

- 100 points per day = exposure action value (EAV)
- 400 points per day = exposure limit value (ELV)



34.13 Mitigation - Vibration

34.13.1 If there is considered to be a problem arising from vibration, the employer is required to do all that is reasonable to minimise it.

34.13.2 Employers should be group work activities according to whether they are high, medium or low risk. Action plans should be prioritised for workers at greatest risk. As a general guide, the controls described in section **34.2** should be followed.

34.13.3 Alternative work methods which eliminate or reduce exposure to vibration should be sought.

34.13.4 Employers should design workstations to minimise the load on employees' hands, wrists, arms and backs and, where appropriate, use devices such as jigs and suspension systems to reduce the need to grip heavy tools tightly.

34.13.5 Employers must ensure equipment selected for tasks is suitable and can do the work efficiently. Select the lowest vibration tool that is suitable and can do the work efficiently and limit the use of high-vibration tools wherever possible.

34.13.6 When work equipment requires replacement because it is worn out, employers must choose replacements which are suitable for the work to be carried out, efficient and of lower vibration. It is recommended that employers have a policy on purchasing suitable equipment, taking account of vibration emission, efficiency and any specific requirements.

34.13.7 Appropriate maintenance programmes for equipment must be drawn up, to prevent avoidable increases in vibration through the use of blunt or damaged equipment or consumable items



34.13.8 Workers using equipment which can cause vibration must be provided with appropriate training and instruction on its correct use.

34.13.9 Employers should plan tasks to avoid workers being exposed to vibration for long, continuous periods.

34.13.10 Workers must be provided with protective clothing where appropriate. Whilst gloves can be used to keep hands warm, they will not themselves provide protection from vibration.

34.13.11 Safety signs must be displayed in any area of the ship where workers are likely to be exposed to noise (for further information, see Chapter 28 – Use of Safety Signs)

34.14 Additional guidance

BSI PUBLICATIONS

ISO standard 5349-1- 2001 - Mechanical vibration - Measurement and evaluation of human exposure to hand-transmitted vibration Part 1: General Requirements;

ISO standard 5349-2 - 2001 - Mechanical vibration - Measurement and evaluation of human exposure to hand-transmitted vibration - Part 2: Practical guidance for measurement at the workplace;

ISO 2631-1 - 1997 - Mechanical vibration and shock - Evaluation of human exposure to whole-body vibration - Part 1: General requirements.

The above Standards can be obtained from:

British Standards Institution,
BSI House,
389 Chiswick High Road,
London W4 4AL
Tel: 020 8996 9000
Fax: 020 8996 7001



HSE PUBLICATIONS

The Health and Safety Executive have produced guidance on their related Regulations, which may be of assistance to employers of seafarers on ships. Details of such publications can be found on the HSE website at "<http://www.hse.gov.uk/vibration/>" and may in some cases be downloaded from that site or alternatively can be obtained from:-

HSE Books

PO Box 1999

Sudbury

Suffolk

CO10 2WA

Tel : 01787 881165

Fax: 01787 313995

or through good booksellers



ANNEX 34.1

EXAMPLES OF TYPICAL DB(A) LEVELS

Examples of noise levels in different locations are given below in order to enable personnel to appreciate when and where a potentially harmful noise exposure may exist:

120 dB(A)	60 metres from a jet aircraft taking off. Between 2 running 1800 rpm diesel generators.
110 dB(A)	1 metre from a riveting machine. In a small ship engine room with 900 rpm diesel main engines and 1550 rpm diesel generator.
105 dB(A)	1 metre from cylinder tops of a slow speed (120 rpm) main diesel engine.
100 dB(A)	Between 2 running diesel generators (600 rpm).
95 dB(A)	In a slow speed (120 rpm) diesel main engine room at the after end on the floor plate level or in an open side flat.
90 dB(A)	Noisy factory, machine shop, quieter parts of ships' engine rooms.
80 dB(A)	15 metres from a pneumatic drill.
70 dB(A)	Noisy domestic machinery (vacuum cleaner at 3 metres).
60 dB(A)	Inside large public building (e.g. supermarket).
50 dB(A)	Inside a house in a suburban area during daytime.
40 dB(A)	Quiet city area outdoors at night. Library whisper at 1 metre.
25-30 dB(A)	Countryside at night with no wind. Quiet church.
0	Threshold of hearing of young persons of normal hearing.

These levels are only illustrative and noise levels can vary between similar locations. This is especially true of engine rooms as engine noise can vary considerably with the type of installation.



ANNEX 34.2

PART I

Daily Personal Noise Exposure Levels

1. The daily personal noise exposure level, LEP_d , which corresponds to LEX_{8h} defined in international standard ISO 1999: 1990 clause 3.6, is expressed in decibels and is ascertained using the formula:

$$L_{EP,d} = L_{Aeq,T_e} + 10 \log_{10} \left(\frac{T_e}{T_0} \right)$$

where—

T_e is the duration of the person's working day, in seconds;

T_0 is 28,800 seconds (8 hours); and

L_{Aeq,T_e} is the equivalent continuous A-weighted sound pressure level, as defined in ISO 1999: 1990 clause 3.5, in decibels, that represents the sound the person is exposed to during the working day.

2. If the work is such that the daily exposure consists of two or more periods with different sound levels, the daily personal noise exposure level (LEP_d) for the combination of periods is ascertained using the formula:

$$L_{EP,d} = 10 \log_{10} \left[\frac{1}{T_0} \sum_{i=1}^{i=n} \left(T_i 10^{0.1(L_{Aeq,T_i})} \right) \right]$$

where—

n is the number of individual periods in the working day;

T_i is the duration of period i ;

(L_{Aeq,T_i}) is the equivalent continuous A-weighted sound pressure level that represents the sound the person is exposed to during period i ; and

$\sum_{i=1}^{i=n} T_i$ is equal to T_e , the duration of the person's working day, in seconds.



PART 2

Weekly Personal Noise Exposure Levels

The weekly personal noise exposure, $L_{EP,w}$, which corresponds to $\bar{L}_{EX,8h}$ defined in international standard ISO 1999: 1990 clause 3.6 (note 2) for a nominal week of five working days, is expressed in decibels and is ascertained using the formula:

$$L_{EP,w} = 10 \log_{10} \left[\frac{1}{5} \sum_{i=1}^{i=m} 10^{0.1(L_{EP,d})_i} \right]$$

where—

m is the number of working days on which the person is exposed to noise during a week; and

$(L_{EP,d})_i$ is the $L_{EP,d}$ for working day i .

PART 3

Peak Sound Pressure Level

Peak sound pressure level, L_{Cpeak} , is expressed in decibels and is ascertained using the formula:

$$L_{Cpeak} = 20 \log_{10} \left[\frac{P_{Cpeak}}{p_0} \right]$$

where—

P_{Cpeak} is the maximum value of the C-weighted sound pressure, in Pascals (Pa), to which a person is exposed during the working day; and

P_0 is 20 μ Pa.



ANNEX 34.3

DAILY EXPOSURE TO DIFFERENT SOUND LEVELS

In the circumstances that occur on board ship, where personnel move from one place to another and the length of time spent in each place may vary, they may be exposed to different levels of noise throughout the day. The following figures give a guide to the acceptable maximum daily noise doses for unprotected ears, based on dB(A) sound energy received.

less than	80 dB(A)		no limit (24 hours)
	82 dB(A)	for	16 hours
	85 dB(A)	for	8 hours
	90 dB(A)	for	2 hours
	95 dB(A)	for	50 minutes
	100 dB(A)	for	15 minutes
	105 dB(A)	for	5 minutes
	110 dB(A)	for	1 minute

As an alternative illustration and equivalent to the above figures, the maximum daily noise dose for unprotected ears is halved for each increase of 3 dB(A).

Recommended maximum limits for different areas on board ship

The limits below should be regarded as maximum levels, rather than desirable levels, and as appropriate take account of the attenuation (noise reduction) that can be achieved with ear protectors.



Area	Recommended Limit
Machinery spaces – general	90 dB(A)
Machinery spaces – unmanned	110 dB(A)
Machinery control rooms	75 dB(A)
Wheelhouse/bridge/chart room/radar room	65 dB(A)
Bridge wings	70 dB(A)
Radio room/communications centre	60 dB(A)
Galleys, serveries, pantries	75 dB(A)
Normally unoccupied spaces	90 dB(A)
Sleeping cabins, Day cabins, hospital	60 dB(A)
Offices, Conferences rooms etc	65 dB(A)
Mess rooms, recreation rooms recreation areas	65 dB(A)
Open deck areas	75 dB(A)
Corridors, changing rooms, bathrooms, lockers and similar spaces	80 dB(A)
Ship's whistle	110 dB(A)



ANNEX 34.4

PERSONAL HEARING PROTECTION

1. The Hearing protection required to be provided by virtue of the Merchant Shipping and Fishing Vessels (Control of Noise at Work) Regulations 2007 is a last resort to control noise exposure. It should only be used:-
 - as a short-term measure until other controls to reduce the noise exposure have been introduced; or
 - where all reasonably practicable measures have been taken and a risk to hearing remains.

2. Any hearing protection provided to workers is, as indicated in section 34.5 required to comply with the requirements of the Merchant Shipping and Fishing Vessels (Personal Protective Equipment) Regulations 1999. However not all hearing protectors are the same and different types may be more suitable for different workers or indeed the work being undertaken. In this respect the main types of hearing protection are:
 - earmuffs, which completely cover the ear - however the effectiveness of earmuffs may be reduced if the wearer is also wearing glasses;
 - earplugs, which are inserted in the ear canal; and
 - semi-inserts (also called 'canal caps'), which cover the entrance to the ear canal.

3. In choosing what form of hearing protection to provide, employers should use the results from their noise assessment and information from hearing protection suppliers to make the best choice of hearing protection for the particular work being undertaken. Whatever form of protection is chosen, It must:



- reduce employees' noise exposure to below 85 dB(A);
- be suitable for the employees' working environment - consider comfort and hygiene; and
- be compatible with other protective equipment used by the employee (eg hard hats, dust mask and eye protection).

Wherever possible, workers should be provided with a suitable range of effective hearing protection so they can choose the one that suits them best. Some workers may prefer a particular type, or may not be able to use some types of hearing protection because of the risk of ear infections. Particular consideration should be given to those workers who wear spectacles or wear eye protection similar to spectacles which have arms which go over the ear. In such cases ear muffs may not fit securely against the ear because of the presence of the spectacle arms and thus provide inadequate protection against noise. In such circumstances another form of ear protection may be more suitable.

Maintenance

7. Employers should ensure that hearing protection works effectively and check that:
 - its overall condition is still good and it is clean;
 - earmuff seals are undamaged;
 - the tension of the headbands is not reduced;
 - there are no unofficial modifications; and
 - compressible earplugs are soft, pliable and clean.

Supervision

8. Employers should ensure that workers use hearing protection when required to. In this context employers may want to:
 - include the need to wear hearing protection in their safety policy and put someone in authority in overall charge of issuing it and making sure replacement hearing protection is readily available;



- carry out spot checks to see that the rules are being followed and that hearing protection is being used properly. Consideration might perhaps be given to including failure hearing protectors when required to do so in the company disciplinary procedures; and
- ensure that all managers and supervisors set a good example and wear hearing protection at all times when in ear protection zones.



APPENDICES

APPENDICES



APPENDIX I

Standards specifications referred to in this Code

NOTE: Copies of standards produced by British Standards Institution can be obtained from BSI, 389 Chiswick High Road, London, W4 4AL, United Kingdom/ telephone: +44 (0)20 8996 9001/ fax: +44 (0)20 8996 7001/ e-mail: cservices@bsigroup.com or online from www.shop.bsigroup.com.

A. ARRANGED BY CODE CHAPTER

Chapter 1 Risk Assessment

1.9.2 BS 8800: 1996 Guide to occupational health and safety management systems (withdrawn).

Chapter 4 Personal Protective Equipment

4.5.4 EN 812: 1998 Industrial bump caps.

Chapter 17 Entering Enclosed or Confined Spaces

17.13.3 EN 137: 2006 Self-contained open-circuit compressed air breathing apparatus.

17.13.3 BS 1146: 2005 Self contained open-circuit breathing apparatus incorporating a hood.

Chapter 18 Boarding Arrangements

Annex 18.1 BS MA 78: 1978 Specification for aluminium shore gangways.

BS MA 89: 1980 Accommodation ladders (obsolescent).

BS MA 39: Part 2 1973 Ships' ladders. Steel, sloping (withdrawn).

Chapter 23 Hot Work

23.3.1 EN ISO 11611:2007 Protective clothing for use in welding and allied processes.

23.3.2 EN 379:2003+A1:2009 Personal eye-protection. Automatic welding filters.



- 23.6.8 EN 60529: 1992 Specification for degrees of protection provided by enclosures (IP Code).
- 23.9.14 EN 1256: 1996 Specification for hose assemblies for equipment for welding, cutting and allied processes.
- Annex 2 BS 638: (5 parts) Arc welding power sources.
- Annex 3 EN ISO 3821:2010 Gas welding equipment. Rubber hoses for welding, cutting and allied processes.
- .BS 3212: 1991 Flexible rubber tubing, rubber hose and rubber hose assemblies for use in LPG vapour phase and LPG/air installations.
- EN 1256: 1996 Specification for hose assemblies for welding, cutting and allied processes.
- EN 561: 2002 Quick action couplings with shut off valves for welding, cutting and allied processes.

Chapter 27 Hazardous Substances

- 27.5.2 BS 5609: 1986 Specification for printed pressure-sensitive adhesive-coated labels for marine use, including requirements for label base material.

Chapter 28 Use of Safety Signs

- 28.5.1 BS 349: Safety of machinery.
- 28.5.3 BS EN ISO 407:2004 Small medical gas cylinders. Pin-index yoke-type valve connections.
- 28.6.1 BS 1710: 1984 Identification of pipelines and services.
- 28.6.1 BS 4800: 1989 Paint colours for building purposes.
- 28.7.2 EN 3: Portable fire extinguishers.
- 28.7.4 BS 5423: 1987 Portable fire extinguishers (withdrawn).
- 28.7.4 BS 7863: 1996 Recommendations for colour coding to indicate the extinguishing media contained in portable fire extinguishers.



B. ARRANGED BY NUMBER

EUROPEAN NORMS

EN Number	EN Title	Code Reference
EN 3:	Portable fire extinguishers.	28.7.2
EN 137: 2006	Self-contained open-circuit compressed air breathing apparatus.	17.13.3
EN 139: 1995	Compressed air line breathing apparatus.	17.13.3
EN 379:2003 +A1:2009	Personal eye-protection. Automatic welding filters.	23.3.2
EN ISO: 407 2004	Small medical gas cylinders. Pin-index yoke-type valve connectors.	28..5.3
EN 561: 2002	Quick action couplings with shut off valves for welding, cutting and allied processes.	Chapter 23, Annex 3
EN 812: 1998	Industrial bump caps.	4.5.4
EN 1256: 1996	Specification for hose assemblies for equipment for welding, cutting and allied processes.	23.9.14 Chapter 23, Annex 3
EN ISO: 11611:2007	Protective clothing for use in welding and allied processes.	23.3.1
EN 60592: 1992	Specification for degrees of protection provided by enclosures (IP Code).	23.6.8

BRITISH STANDARDS

BS Number	BS Title	Code Reference
BS 349:	Safety of machinery.	28.5.1
BS 638 (5 parts)	Arc welding power sources.	Chapter 23, Annex 2
BS 1146: 2005	Self contained open-circuit breathing apparatus incorporating a hood.	17.13.3
BS 1710: 1984	Identification of pipelines and services.	28.6.1
BS 3212: 1991	Flexible rubber tubing, rubber hose and rubber hose assemblies for use in LPG vapour phase and LPG/air installations.	Chapter 23 Annex 3



BS 4275: 1997	Recommendations for the selection, use and maintenance of respiratory protective equipment	4.8.2
BS 4800: 1989	Paint colours for building purposes.	28.6.1
BS 5378: 1980	Safety signs and colours.	5.1.1
BS 5378, Part 1: 1980	Safety signs and colours. Colour and design.	6.4.6
BS 5423: 1987	Portable fire extinguishers (withdrawn).	28.7.4
BS 5609: 1986	Specification for printed pressure-sensitive adhesive-coated labels for marine use, including requirements for label base material.	27.4.2
BS 7863: 2009	Recommendations for colour coding to indicate the extinguishing media contained in portable fire extinguishers.	28.7.4
BS 8800: 1996	Guide to occupational health and safety management systems (withdrawn).	1.9.2

BRITISH STANDARDS (MARINE SERIES)

BS MA Number	BS MA Title	Code Reference
BS MA 39 Part 2: 1973	Ships' ladders. Steel, sloping.	Chapter 18, Annex I
BS MA 40: 1975	Marine guardrails, stanchions, etc (obsolescent).	13.5.2
BS MA 89: 1980	Accommodation ladders (obsolescent).	Chapter 18, Annex I

British Standards and European Norms are subject to periodic updating; the most recent version should be used.



APPENDIX 2

Bibliography

I. TSO publications

Available from TSO bookshops and agents, or by Mail, Telephone, Fax & Email from TSO, PO Box 29, Norwich NR3 1GN. Telephone orders/General enquiries: 0870 600 5522, online: www.tso.co.uk/bookshop

- (a) Maritime and Coastguard Agency Guidance and Codes of Practice
Code of Practice for Noise Levels in Ships
ISBN 978-0-11-550950-6
Roll-on/Roll-off Ships-Stowage and Securing of Vehicles
ISBN 978-0-11-552493-6
The Ship Captain's Medical Guide
ISBN 978-0-11-551658-0
- (b) Health and Safety Executive Guidance and Codes of Practice
Anthrax: health hazards (Guidance note EH 23)
ISBN 0-11-883194-1
Asbestos (Guidance note MS 13)
ISBN 0-11-885402-X
Beryllium - Health and Safety Precautions (Guidance Note EH 13)
ISBN 0-71-760824-7
Colour Vision (Guidance Note MS 7)
ISBN 0-11-883950-0
Display Screen Equipment Work: Guidance on Regulations - Health and work with display screen equipment:
ISBN 0-71-762582-6
Work with Display Screen Equipment: Health and Safety (Display Screen Equipment) Regulations 1992 as amended by the Health and Safety (Miscellaneous Amendments) Regulations 2002
ISBN 0-71-762582-6
Drilling Machines: Guarding of Spindles and Attachments (Guidance Booklet HS(G)44)
ISBN 0-71-761546-4



Electrical Safety in Arc Welding (Guidance Note HS(G) 118)
ISBN 0-7176-0704-6

Safe Work in Confined Spaces, Confined Spaces Regulations 1997.
Approved Code of Practice, Regulations and Guidance
ISBN 0-7176-1405-0

Five steps to risk assessment (INDG63)
ISBN 0-71-761565-0

(Control of Substances Hazardous to Health) Regulations 2002.
Approved Codes of Practice and Guidance
ISBN 0-7176-2534-6

A Guide to Dangerous Substances in Harbour Areas Regulations, 1987
ISBN 0-11-883991-8

Hazard and Risk Explained. Control of Substances Hazardous to Health
Regulations 1988 (COSHH). Health and Safety Information and COSHH
(Leaflet IND(G)67(L))

Industrial Use of Flammable Gas Detectors (Guidance Note CS 1)
ISBN 0-11-883948-9

Occupational Exposure Limits (Guidance Note EH 40)
ISBN 0-71-762194-4

HS(G)53 Respiratory Protective Equipment: a Practical Guide for Users
COSHH. Control of Substances Hazardous to Health
ISBN 0-71-761198-1

HSE INDG288 Selection of suitably respiratory protective equipment
for work with asbestos (pack of 5)
ISBN 0-7176-2220-7

Safety in Docks: Docks regulations 1988: Approved Code of Practice
with Regulations and Guidance
ISBN 0-71-761408-5

Safety in the Use of Abrasive Wheels (Guidance Booklet HS(G)17)
ISBN 0-71-761739-4

Visual Display Units
ISBN 0-11-883685-4



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