CHAPTER 4

ACCOMMODATION AND ESCAPE MEASURES

EU Directive on Safety Requirements for Persons with Reduced Mobility on Domestic Passenger Ships (2003/24/EC)

Directive 2003/24/EC amends 98/18/EC on safety rules and standards for seagoing domestic passenger ships and requires appropriate measures to be taken for high speed craft used for public transport (see Regulation 7A of S.I. 2004 No. 302 *The Merchant Shipping (High Speed Craft) Regulations 2004*), based, where practicable on the *'Guidelines for Safety Requirements for Passenger Ships and High-Speed Passenger Craft for Persons of Reduced Mobility'* which is Annex III to the Directive 98/18/EC (see Article 2 (w)) of the Directive for a definition of persons of reduced mobility). This Directive applies to all high speed passenger craft in operation on domestic seagoing routes, the keel of which is laid or which are at a similar stage of construction on or after 1 October 2004.

This Directive also applies to existing vessels upon modification, in respect of that modification so far as reasonable and practicable in economic terms. Directive 2003/24/EC applies after 1 October 2004.

Refer to *The Merchant Shipping (Passenger Ships on Domestic Voyages) (Amendment) (No. 2) Regulations 2004*, S.I. 2004 No.2883*; Designing and Operating Smaller Passenger Vessels: Guidance on Meeting the Needs of Persons with Reduced Mobility*, MGN 306 (M); and Directive 2003/24/EC – Safety Requirements For Persons Of Reduced Mobility On Domestic Passenger Ships, MSN 1789 (M).

Vessels on International voyages are recommended to follow the IMO's MSC/Circ.735 which is elaborated by the Disabled Persons Transport Advisory Committee (DPTAC) publication "The design of large passenger ships and passenger infrastructure: Guidance on meeting the needs of disabled people"*. This is available online at www.dptac.gov.uk.*

High speed craft on voyages in categorized waters should follow MGN 306(M).

Maritime Labour Convention ILO178

The MCA have implemented a regular inspection regime and apply the ILO Recommendations to the Convention to promote and ensure effective co-operation between inspectors, ship owners, seafarers and their respective organizations, in order to maintain or improve seafarers' working and living conditions. For further details on ILO178 refer to MSN 1769(M) International Labour Organization Convention (ILO) 178 and Recommendation 185 – *Concerning the Inspection of Seafarers' Working and Living Conditions* and MGN 345(M) Alternative Compliance Scheme.

The requirements of the Maritime Labour Convention (MLC) need to be addressed for seagoing vessels. This came into force 2 July 2004.

The MLC 2006, which brings almost all existing maritime labour instruments together into a single new Convention, comes into force internationally in 2010 (not currently ratified by the United Kingdom) and will entail a more detailed inspection.

Under the MLC 2006 vessels >500 tonnes require a Maritime Labour Certificate (MLC). Vessels >200 gt but <500 gt shall be surveyed but will not be given an MLC. Vessels <200 gt and not on international voyages will be subject to a general exemption but the seafarer rights will need to be addressed and surveyed for. Existing ships, according to MLC 2006,

will be treated on a case by case basis but will generally be substantially exempted from the requirements. The Maritime Labour Convention does not apply to vessels in categorized waters.

4.1 General

4.1.1 Public spaces and crew accommodation shall be designed and arranged so as to protect the occupants from unfavourable environmental conditions and to minimize the risk of injury to occupants during normal and emergency conditions.

4.1.2 Spaces accessible to passengers shall not contain controls, electrical equipment, high-temperature parts and pipelines, rotating assemblies or other items, from which injury to passengers could result, unless such items are adequately shielded, isolated, or otherwise protected.

4.1.3 Public spaces shall not contain operating controls unless the operating controls are so protected and located that their operation by a crew member shall not be impeded by passengers during normal and emergency conditions.

4.1.4 Windows in passenger and crew accommodation shall be of adequate strength and suitable for the worst intended conditions specified in the Permit to Operate and be made of material which will not break into dangerous fragments if fractured.

See also the guidance notes regarding windows given under chapter 3 – Structure.

4.1.5 The public spaces, crew accommodation and the equipment therein shall be designed so that each person making proper use of these facilities will not suffer injury during craft's normal and emergency start, stop and manoeuvring in normal cruise and in failure or maloperation conditions.

4.2 Public address and information system

4.2.1 A general emergency alarm system shall be provided. The alarm shall be audible throughout all the public spaces, corridors and stairways, crew accommodation and normal crew working spaces and open decks, and the sound pressure level shall be at least 10 dB(A) above ambient noise levels under way in normal cruise operation. The alarm shall continue to function after it has been triggered until it is normally turned off or is temporarily interrupted by a message on the public address system.

4.2.2 There shall be a public address system covering all areas where passengers and crew have access, escape routes, and places of embarkation into survival craft. The system shall be such that flooding or fire in any compartment does not render other parts of the system inoperable. The public address system and its performance standards shall be approved by the Administration having regard to the recommendations developed by the Organization.*

* Refer to the Recommendations on performance standards for public address systems on passenger ships, including cabling (MSC/Circ.808) and the Code on Alarms and Indicators, 1995 (resolution A.830(19)).

4.2.3 All passenger craft shall be equipped with illuminated or luminous notices or video information system(s) visible to all sitting passengers, in order to notify them of safety measures.

4.2.4 The master shall, by means of the public address system and the visual information system, be able to request passengers "please be seated" when found to be appropriate to safeguard passengers and always when the safety level 1 according to table 1 of annex 3 is exceeded.

4.3 Design acceleration levels

4.3.1 For passenger craft, superimposed vertical accelerations above 1 g at longitudinal centre of gravity shall be avoided unless special precautions are taken with respect to passenger safety.

4.3.2 Passenger craft shall be designed for the collision design acceleration g_{coll} with respect to the safety in, and escape from, the public spaces, crew accommodation and escape routes, including in way of life-saving appliances and emergency source of power. The size and type of craft together with speed, displacement and building material shall be taken into consideration when the collision load is determined. The collision design condition shall be based on head-on impact at a defined collision speed.

4.3.3 Mounting of large masses such as main engines, auxiliary engines, lift fans, transmissions and electrical equipment shall be proved by calculation to withstand, without fracturing, the design acceleration given in table 4.3.3.

*It should be noted that the requirement is that the mounting(s) should not **fracture**, thus causing the object to become loose and a danger to personnel. Mountings or fastenings may deform, and this is permissible provided total failure would not occur.*

Table 4.3.3 - Design acceleration as multiples of g

Types of craft Direction	All HSC except amphibious ACVs	Amphibious ACVs
Forward direction	g_{coll}	6
After direction	2 or g_{coll} if less	3
Transverse direction	2 or g_{coll} if less	3
Vertical direction	2 or g_{coll} if less	3

where:

g_{coll} = the collision design acceleration expressed as a multiple of the acceleration due to gravity (9.806 m/s^2)

Note that g_{coll} has no units, as it is the multiplier applied to the acceleration due to gravity. Although termed "collision design acceleration", when applied in the forward direction it refers to the fact that as the craft decelerates the object concerned experiences a forward acceleration relative to the craft.

Vertical accelerations should be applied either upwards or downwards superimposed on the nominal 1g due to the static mass of the object. Transverse accelerations should be applied in both port and starboard directions.

4.3.4 Collision design acceleration g_{coll} (for craft other than amphibious ACVs where g_{coll} = 6) shall be calculated as follows:

$g_{coll} = 1.2\left(\frac{P}{g \cdot \Delta}\right)$, but not to be taken greater than 12,

where the load P shall be taken as the lesser of P_1 and P_2, where:

$P_1 = 460\ (M \cdot C_L)^{2/3}(E \cdot C_H)^{1/3}$

$P_2 = 9000 \cdot M \cdot C_L\ (C_H \cdot D)^{1/2}$

where the hull material factor M shall be taken as:

M = 1.3 for high tensile steel

M = 1 for aluminium alloy

M = 0.95 for mild steel

M = 0.8 for fibre-reinforced plastics,

where the length factor C_L of the craft is:

$C_L = \frac{(165 + L)}{245}\left(\frac{L}{80}\right)^{0.4}$,

where the height factor C_H = (80 - L)/45 but not greater than 0.75 or less than 0.3,

where the kinetic energy of the craft at speed V_{imp} is:

$E = 0.5 \cdot \Delta \cdot V_{imp}^2$

where the main particulars of the craft are:

L = craft length as defined in chapter 1 (m)

D = depth of the craft from the underside of keel to the top of the effective hull girder (m)

Δ = craft displacement, being the mean of the lightweight and maximum operational weight (t)

V_{imp} = estimated impact speed (m/s) = 60% of maximum speed as defined in chapter 1

g = acceleration due to gravity = 9.806 m/s^2.

Collision design accelerations greater than 12 are no longer required to be addressed, as it is considered that it is impractical to design accommodation arrangements to suit such events.

The above method has been amended from that given in the 1994 HSC Code to overcome the difficulties experienced with smaller craft, and to avoid the irrational steps in g_{coll} generated according to the precise relationship between the dimensions of the craft and the arbitrary 2m high rock. As such the method no longer relates to a rock of exactly 2m height,

but rather to a rock of approximately that height. Consistency requires that this fact be considered in applying 4.3.5 below.

For hydrofoils, the collision design acceleration, g_{coll} shall be taken as the greater of either the g_{coll} as calculated above or:

$$g_{coll} = F/(g \cdot \Delta)$$

where:

F = failure load of bow foil assembly applied at the operational waterline (kN).

4.3.5 As an alternative to the requirements of 4.3.4, the collision design acceleration g_{coll} may be determined by carrying out a collision load analysis of the craft on a vertical rock having a maximum height of 2 m above the waterline and using the same assumption for displacement Δ and impact speed V_{imp} as described in 4.3.4. This evaluation may be carried out as part of the safety analysis. If the collision design accelerations are determined by both 4.3.4 and the collision load analysis, the lower resulting value may be used as the collision design acceleration.

In order to avoid the same step changes in g_{coll} according to the precise dimensions of the craft as previously experienced using the empirical formulae given in the 1994 HSC Code, a collision load analysis should also consider the effect of impact with rigid obstructions of other than exactly 2m height above the waterline, and the worst case applied. Refer also to the guidance given under 4.3.4 above.

4.3.6 Compliance with the provisions of 4.1.5 and 4.3.1 shall be shown for the actual type of craft, as described in annex 9.

Trials to address the aspects detailed in 4.1.5 and 4.3.1 should be conducted on each prototype craft.

4.3.7 Limiting sea states for operation of the craft shall be given in normal operation condition and in the worst intended conditions, at 90% of maximum speed and at reduced speed as necessary.

The Permit is issued for one maximum sea state only, this being set as the speed needed to be maintained to complete the scheduled crossing to meet the Operators advertised times. Refer to 18.1.2. Information relating the form of operating envelope curves of significant wave height versus speed according to heading relative to sea is not appropriate for the Permit restrictions.

4.4 Accommodation design

4.4.1 The public spaces, control stations and crew accommodation of high-speed craft shall be located and designed to protect passengers and crew in the design collision condition. In this respect, these spaces shall not be located forward of a transverse plane (see figure 4.4.1) such that:

A_{bow} = 0.0035 A m f V, but never less than 0.04 A,

where:

A_{bow} = the plan projected area of craft energy absorbing structure forward of the transverse plane (m^2)

A = total plan projected area of craft (m^2)

m = material factor $= \frac{0.95}{M}$

M = appropriate hull material factor as given in 4.3.4

Where materials are mixed, the material factor shall be taken as a weighted mean, weighted according to the mass of material in the area defined by A_{bow}.

f = framing factor as follows:

- longitudinal deck and shell stiffening = 0.8
- mixed longitudinal and transverse = 0.9
- transverse deck and shell stiffening = 1

V = 90% of maximum speed (m/s).

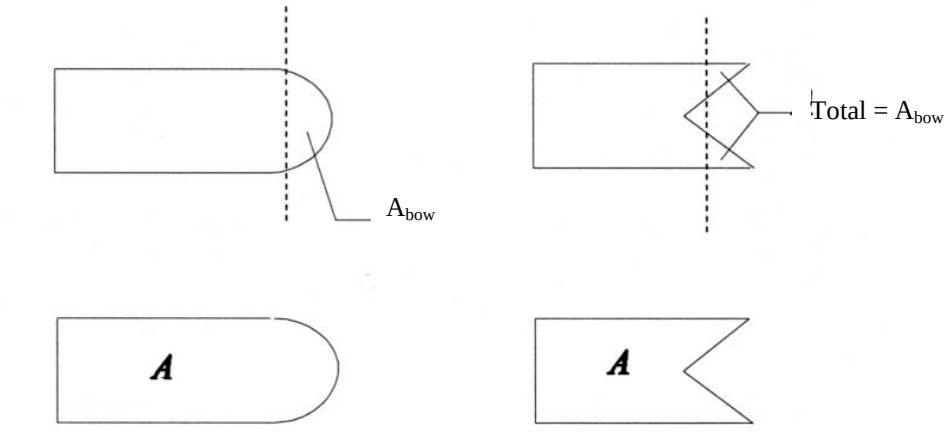

Figure 4.4.1: Plan view of two different craft styles

The areas A_{bow} and A should generally be measured at deck level, and not include railings or bulwarks (unless these latter are sufficiently substantial to provide significant energy absorption).

A full structural analysis of a collision with an object of any height greater than the depth of the craft may be considered acceptable to the Administration as providing equivalent safety to the above empirical method.

4.4.2 The public spaces and crew accommodation shall be designed based on the guidelines given in table 4.4.2 or by other methods which have been proven to give equal protective qualities.

The provisions of Table 4.4.2, which are clearly labelled as guidelines, are non mandatory. However the MCA maintain that for a design level 2 situation if seats are rearward facing then they should be of high seat back design, and that sofas are not acceptable.

4.4.3 Equipment and baggage in public spaces and in the operator's compartment shall be positioned and secured so that they remain in the stowed position when exposed to the collision design acceleration according to 4.3.4, 4.3.5 and table 4.3.3.

The preferred arrangement is where baggage and equipment stowages face athwartships or aft so that reliance is not placed on securing arrangements. Where forward facing stowages cannot be avoided, fixed deep fiddles should be fitted.

4.4.4 Seats, life-saving appliances and items of substantial mass and their supporting structure shall not deform or dislodge under any loads up to those specified in 4.3.4, 4.3.5 and table 4.3.3 in any manner that would impede subsequent rapid evacuation of passengers.

4.4.5 There shall be adequate handholds on both sides of any passage to enable passengers to steady themselves while moving about. The armrests and backrests of seats in public spaces may serve as handholds.

Table 4.4.2 - Overview general design guidelines*

Design level 1: g_{coll} less than 3	
1	Seat/seat belts
1.1	Low or high seatback
1.2	No restrictions on seating direction
1.3	Sofas allowed
1.4	No seat belts requirement
2	Tables in general allowed
3	Padding of projecting objects
4	Kiosks, bars, etc., no special restrictions
5	Baggage, no special requirements
6	Large masses, restrainment and positioning
Design level 2: g_{coll} = 3 to 12	
1	Seat/seat belts
1.1	Seatbacks with protective deformation and padding
1.2	Forward or backward seating direction
1.3	No sofas allowed as seat
1.4	Lap belt in seats when no protective structure forward unless satisfactorily tested without belts in that orientation and arrangement
2	Tables with protective features allowed. Dynamic testing
3	Padding of projecting objects
4	Kiosks, bars, etc., on aft side of bulkheads, or other specially approved arrangements
5	Baggage placed with protection forward
6	Large masses, restrainment and positioning

* Other arrangements may be employed if an equivalent level of safety is achieved.

A high seat back should be sufficiently high to provide support to the rear of the skull of a seated adult against whip-lash type injuries. All other seats are considered as low seatbacks. (MSC/Circ.1102)

4.5 Seating construction

4.5.1 A seat shall be provided for each passenger and crew member for which the craft is certified to carry. Such seats shall be arranged in enclosed spaces.

4.5.2 Seats fitted in addition to those required under 4.5.1 and which are not permitted to be used in hazardous navigational situations or potentially dangerous weather or sea conditions need not comply with 4.5 or 4.6. Such seats shall be secured according to 4.4.4 and clearly identified as not being able to be used in hazardous situations.

This paragraph applies to all seating fitted on weather decks.

4.5.3 The installation of seats shall be such as to allow adequate access to any part of the accommodation space. In particular, they shall not obstruct access to, or use of, any essential emergency equipment or means of escape.

4.5.4 Seats and their attachments, and the structure in the proximity of the seats, shall be of a form and design, and so arranged, such as to minimize the possibility of injury and to avoid trapping of the passengers after the assumed damage in the collision design condition according to 4.4.1. Dangerous projections and hard edges shall be eliminated or padded.

4.5.5 Seats, seat belts, seat arrangements and adjacent parts such as tables shall be designed for the actual collision design acceleration as specified in 4.3.4.

4.5.6 All seats, their supports and their deck attachments shall have good energy-absorbing characteristics and shall meet the requirements of annex 10.

4.6 Safety belts

4.6.1 One-hand-release safety belts of three-point type or with shoulder harness shall be provided for all seats from which the craft may be operated for all craft with the g_{coll} acceleration from the collision design acceleration exceeding 3, as prescribed in 4.3.4.

4.6.2 Safety belts shall be provided on passenger seats and crew seats, if necessary, to obtain the protective performance measures described in annex 10.

Lap-type safety belts should be provided on all forward facing seats (other than those covered by 4.6.1 or 4.5.2 above) not positioned behind another row of seats, or otherwise provided with a suitable restraining barrier unless the arrangement has been satisfactorily tested without belts in that orientation.

4.7 Exits and means of escape

4.7.1 In order to ensure immediate assistance from the crew in an emergency situation, the crew accommodation, including any cabins, shall be located with due regard to easy, safe and quick access to the public spaces from inside the craft. For the same reason, easy, safe and quick access from the operating compartment to the public spaces shall be provided.

4.7.2 The design of the craft shall be such that all occupants may safely evacuate the craft into survival craft under all emergency conditions, by day or by night. The positions of all exits which may be used in an emergency, and of all life-saving appliances, the practicability of the evacuation procedure, and the evacuation time to evacuate all passengers and crew shall be demonstrated.

4.7.3 Public spaces, evacuation routes, exits, lifejacket stowage, survival craft stowage, and the embarkation stations shall be clearly and permanently marked and illuminated as required in chapter 12.

4.7.4 Each enclosed public space and similar permanently enclosed space allocated to passengers or crew shall be provided with at least two exits as widely separated as practical. All exits shall clearly indicate the directions to the evacuation station and safe areas. On category A craft and cargo craft, at least one exit shall give access to the evacuation station serving the persons in the enclosed space considered, and all other exits shall give access to a position on the open deck from which access to an evacuation station is provided. On category B craft, exits shall provide access to the alternative safe area required by 7.11.1; external routes may be accepted providing that the requirements of 4.7.3 and 4.7.11 are complied with.

4.7.5 Subdivision of public spaces to provide refuge in case of fire may be required in compliance with 7.4.4.1 and 7.11.1.

4.7.6 Exit doors shall be capable of being readily operated from inside and outside the craft in daylight and in darkness. The means of operation shall be obvious, rapid and of adequate strength. Doors along escape routes should, wherever appropriate, open in the direction of escape flow from the space served.

4.7.7 The closing, latching and locking arrangements for exits shall be such that it is readily apparent to the appropriate crew member when the doors are closed and in a safe operational condition, either in direct view or by an indicator. The design of external doors shall be such as to minimize the possibility of jamming by ice or debris.

4.7.8 The craft shall have a sufficient number of exits which are suitable to facilitate the quick and unimpeded escape of persons wearing approved lifejackets in emergency conditions, such as collision damage or fire.

4.7.9 Sufficient space for a crew member shall be provided adjacent to exits for ensuring the rapid evacuation of passengers.

4.7.10 All exits, together with their means of opening, shall be adequately marked for the guidance of passengers. Clear markings, including the location of the fire control plan, shall be provided for the guidance of rescue personnel outside the craft.

Although the arrangement of a low-location lighting system is not required, markings, if installed, should be of photoluminescent or electroluminescent material. In addition to exits, routes leading to evacuation stations, and routes leading to safe areas should be marked. Markings for rescue personnel should indicate the location of the fire control plan.
(MSC/Circ.1102).

If fitted, the low level lighting should be fitted using the IMO's Fire Safety Systems Code (FSS Code) *Chapter 11 and Res. A.752(18) or ISO 15370:2001 as a guide. The FSS Code means the* International Code for Fire Safety Systems *as defined in chapter II-2 of the Convention.*

4.7.11 Footholds, ladders, etc., provided to give access from the inside to exits shall be of rigid construction and permanently fixed in position. Permanent handholds shall be provided whenever necessary to assist persons using exits, and shall be suitable for conditions when the craft has developed any possible angles of list or trim.

4.7.12 At least two unobstructed evacuation paths shall be available for the use of each person. Evacuation paths shall be disposed such that adequate evacuation facilities will be available in the event of any likely damage or emergency conditions, and evacuation paths shall have adequate lighting supplied from the main and emergency sources of power. Doors providing escape from a space shall, where possible, be situated at opposite ends of the space. Where the doors providing escape from a space are situated in the same end of the space, the distance between those doors shall be greater than the maximum length of the space.

4.7.13 The width of corridors, doorways and stairways which form part of the evacuation paths shall be not less than 900 mm for passenger craft and 700 mm for cargo craft. This width may be reduced to 600 mm for corridors, doorways and stairways serving spaces where persons are not normally employed. There shall be no protrusions in evacuation paths which could cause injury, ensnare clothing, damage lifejackets or restrict evacuation of disabled persons. Requirements of this paragraph do not apply to aisles (fore-aft passageways separating seating areas) or to spaces between adjacent rows of seats. However, the width of aisles and the seat pitch shall be such as to allow the craft to comply with the provisions of 4.8.

4.7.14 Special category spaces used for stowage of motor vehicles shall be provided with walkways having a width of at least 600 mm leading to a safe means of escape.

4.7.15 Adequate notices shall be provided to direct passengers to exits.

4.7.16 Provision shall be made on board for embarkation stations to be properly equipped for evacuation of passengers into life-saving appliances. Such provision shall include handholds, anti-skid treatment of the embarkation deck, and adequate space which is clear of cleats, bollards and similar fittings.

4.7.17 Main propulsion machinery spaces and ro-ro spaces shall be provided with two means of escape leading to a position outside the spaces from which a safe route to the evacuation stations is available. One means of escape from the main propulsion machinery spaces shall avoid direct access to any ro-ro space. Main propulsion machinery spaces having a length of less than 5 m and not being routinely entered or continuously manned, may be provided with a single means of escape. At least one means of escape from a machinery space shall consist of either a ladder leading to a door or hatch (not being a horizontal flush-hatch) or a door located in the lower part of that space and giving access to an adjacent compartment from which a safe means of escape is provided.

4.7.18 Spaces that are only entered occasionally by crew members may have only one means of escape provided that it is independent of watertight doors.

4.8 Evacuation time

4.8.1 The provisions for evacuation shall be designed such that the craft can be evacuated under controlled conditions in a time of one third of the structural fire protection time (SFP) provided in 7.4.2 for areas of major fire hazard areas after subtracting a period of 7 min for initial detection and extinguishing action. In determining the evacuation time, all means of escape are to be considered serviceable and they need not be dimensioned to take into account any additional number of persons that might be diverted from other means of escape if one or more of those other means of escape are lost or rendered unserviceable.

$$\text{Evacuation time} = \frac{(\text{SFP} - 7)}{3} \text{ (min)}$$

where:

SFP = structural fire protection time (min)

The number "3" is a safety factor which includes passenger ages and disabilities varying from the standard applied demographic (see MSC.1/Circ.1238 "Guidelines for evacuation analysis for new and existing passenger ships"*), restricted visibility due to smoke, effects of waves and craft motions on deployment, travel and embarkation times. This safety factor also includes any violations to the evacuation procedure.*

The "7 minutes" is to take account of initial detection and extinguishing action and passenger awareness time, passengers to reach assembly stations and manning of emergency stations by the crew.

The 7 minutes is for use in the design of a vessel and not necessarily for the vessels operation. The muster lists and emergency procedures need not refer to this, but the 7 minutes should be treated as a guide and not as a definitive time of when the master should make a decision on the evacuation of his vessel.

The time allowed for evacuation is one third of the SFP (Structural Fire Protection) less 7 minutes allowed for initial assessment. This is a design parameter – the time required and available in an actual emergency will clearly depend on the circumstances of each case.

While there is theoretically no requirement to test what might be achieved or should be done within that 7 minutes other than "initial detection and extinguishing action", the following guidance may be useful to surveyors when conducting drills and what could reasonably be expected to be achieved in the initial phase of the drill.

OPERATIONAL APPLICATION – GUIDANCE FOR FIRE AND EMERGENCY DRILLS

Nothing contained in this guidance shall override the Master's discretion regarding the safety of the vessel either during a drill or in the event of a genuine emergency.

A fire drill is the practical demonstration of the vessel's personnel, their procedures, equipment and their capabilities to deal with a fire irrespective of its location. As part of the Type rating Certificate, the vessel's crew should be adequately and suitably trained to have the full understanding of the vessel's equipment, their use and limitations and be able to perform their duty during an emergency as defined in the Muster List.

It is reasonable to expect the command and control to be effective and that within 7 minutes, under the controlled conditions of a drill, an initial assessment can be made, suitably trained crew members can be assigned to their emergency stations, commence use of first aid or fixed fire fighting facilities and assess whether evacuation may be required.

Drills may also exercise many other aspects of emergency scenarios, such as entry to a compartment and rescue of a casualty in accordance with SOLAS training requirements. This would not be included in the 7 minutes period.

MCA SURVEYOR'S JUDGEMENT WHEN WITNESSING DRILLS

When witnessing fire, emergency and abandon ship drills, MCA surveyors will therefore draw upon their professional experience to judge whether the crew are able to perform their duty during an emergency as defined in the Muster List.

This will allow the surveyor to form a view as to whether the drill is acceptable.

4.8.2 An evacuation procedure, including an evacuation analysis carried out taking into account the guidelines developed by the Organization* shall be developed for the information of the Administration in connection with the approval of fire insulation plans and for assisting the owners and builders in planning the evacuation demonstration required in 4.8.3. The evacuation procedures shall include:

* Refer to Guidelines for a simplified evacuation analysis of high-speed passenger craft (MSC/Circ.1166).

.1 the emergency announcement made by the master;

.2 contact with base port;

.3 the donning of lifejackets;

.4 manning of survival craft and emergency stations;

.5 the shutting down of machinery and oil fuel supply lines;

.6 the order to evacuate;

.7 the deployment of survival craft and marine escape systems and rescue boats;

.8 the bowsing in of survival craft;

.9 the supervision of passengers;

.10 the orderly evacuation of passengers under supervision;

.11 crew checking that all passengers have left the craft;

.12 the evacuation of crew;

.13 releasing the survival craft from the craft; and

.14 the marshalling of survival craft by the rescue boat, where provided.

4.8.3 Achievement of the required evacuation time (as ascertained in accordance with 4.8.1) shall be verified by a practical demonstration conducted under controlled conditions in the presence of the Administration, and shall be fully documented and verified for passenger craft by the Administration.

Reference should be made to MCA Procedure 928. In determining when to proceed with a trial the wind direction and wind force is to be considered. The trial should not take place if the wind is blowing excessively from ahead or astern as the Marine Evacuation Systems will not have been tested for wind loads in this direction. Due regard should be taken of the risks involved in evacuating a vessel and appropriate actions should be taken to mitigate these risks (without detracting from the realistic nature of the test). This should include appropriate arrangements relating to safety and emergency services.

4.8.4 Evacuation demonstrations shall be carried out with due concern for the problems of mass movement or panic acceleration likely to arise in an emergency situation when rapid evacuation is necessary. The evacuation demonstrations shall be dry shod with the survival craft initially in their stowed positions and be conducted as follows:

.1 The evacuation time on a category A craft shall be the time elapsed from the moment the first abandon craft announcement is given, with any passengers distributed in a normal voyage configuration, until the last person has embarked in a survival craft, and shall include the time for passengers and crew to don lifejackets.

.2 The evacuation time on a category B craft and cargo craft shall be the time elapsed from the moment the order to abandon the craft is given until the last person has embarked in a survival craft. Passengers and crew may be wearing lifejackets and prepared for evacuation, and they may be distributed among assembly stations.

.3 For all craft the evacuation time shall include the time necessary to launch, inflate and secure the survival craft alongside ready for embarkation.

4.8.5 The evacuation time shall be verified by an evacuation demonstration which shall be performed using the survival craft and exits on one side, for which the evacuation analysis indicates the greatest evacuation time, with the passengers and crew allocated to them.

4.8.6 On craft where a half trial is impracticable, the Administration may consider a partial evacuation trial using a route which the evacuation analysis shows to be the most critical.

4.8.7 The demonstration shall be carried out in controlled conditions in the following manner in compliance with the evacuation plan.

.1 The demonstration shall commence with the craft afloat in harbour, in reasonably calm conditions, with all machinery and equipment operating in the normal seagoing condition.

.2 All exits and doors inside the craft shall be in the same position as they are under normal seagoing condition.

.3 Safety belts, if required, shall be fastened.

.4 The evacuation routes for all passengers and crew shall be such that no person need enter the water during the evacuation.

4.8.8 For passenger craft, a representative composition of persons with normal health, height and weight shall be used in the demonstration, and shall consist of different sexes and ages so far as it is practicable and reasonable.

4.8.9 The persons, other than the crew selected for the demonstration, shall not have been specially drilled for such a demonstration.

4.8.10 Where the Administration is satisfied that the evacuation time determined in accordance with 4.8.1 to 4.8.9 can thereby be accurately estimated, the Administration may accept an evacuation demonstration in which persons are not required to descend through MES or equivalent means of evacuation, provided the time required to embark into the survival craft can be determined using:

.1 data obtained from the type-approval tests of the equipment, increased by a factor based on the guidelines developed by the Organization*; or

.2 time extrapolated from trials using a limited number of participants.

* Refer to the Guidelines for a simplified evacuation analysis of high-speed passenger craft (MSC/Circ.1166), in particular paragraph 3.5.1 thereof.

According to MSC/Circ.1166 Deployment time TM is multiplied by 1.3 and Embarkation time TE is multiplied by 1.14. The full evacuation demonstration of persons up to the point of embarkation is required to be carried out.

4.8.11 An emergency evacuation demonstration shall be carried out for all new designs of high-speed craft and for other craft where evacuation arrangements differ substantially from those previously tested.

4.8.12 The specific evacuation procedure followed during the craft's initial demonstration on which certification is based shall be included in the craft operating manual together with the other evacuation procedures contained in 4.8.2. During the demonstration, video recordings shall be made, both inside and outside the craft, which shall form an integral part of the training manual required by 18.2.

4.9 Baggage, stores, shops and cargo compartments

4.9.1 Provision shall be made to prevent shifting of baggage, stores and cargo compartment contents, having due regard to occupied compartments and accelerations likely to arise. If safeguarding by positioning is not practicable, adequate means of restraint for baggage, stores and cargo shall be provided. Shelves and overhead shelves for storage of carry-on baggage in public spaces shall be provided with adequate means to prevent the luggage from falling out in any conditions that may occur.

4.9.2 Controls, electric equipment, high-temperature parts, pipelines or other items, the damage or failure of which could affect the safe operation of the craft or which may require access by crew members during a voyage, shall not be located in baggage, store and cargo compartments unless such items are adequately protected so that they cannot be damaged or, where applicable, operated inadvertently by loading, by unloading or by movement of the contents of the compartment.

4.9.3 Loading limits, if necessary, shall be durably marked in those compartments.

4.9.4 Having regard to the purpose of the craft, the closures of the exterior openings of the luggage and cargo compartments as well as special category spaces shall be appropriately weathertight.

4.10 Noise levels

4.10.1 The noise level in public spaces and crew accommodation shall be kept as low as possible to enable the public address system to be heard, and shall not in general exceed 75 dB(A).

Refer also to para. 2.2.2.6 on noise levels and alarms.

4.10.2 The maximum noise level in the operating compartment shall not in general exceed 65 dB(A) to facilitate communication within the compartment and external radiocommunications.

EU Directives on Noise and Vibration (2003/10/EC and 2002/44/EC)

The following EC Directives should be addressed: 2003/10/EC *On the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise)* and 2002/44/EC *On the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration)) Directives*. For implementation see S.I. 2007 No. 3075 - *The Merchant Shipping and Fishing Vessels (Control of Noise at Work) Regulations 2007*, supplemented by MGN 352, and S.I. 2007 No. 3077 - *The Merchant Shipping and Fishing Vessels (Control of Vibration at Work) Regulations 2007*, supplemented by MGN 353.

The guidance laid down in The Code of Practice for Noise Levels on Ships, Code of Safe Working Practices for Merchant Seamen (CoSWoP) and Health and Safety at Work should also be followed.

4.11 Protection of the crew and passengers

4.11.1 Efficient guard rails or bulwarks shall be fitted on all exposed parts of decks to which crew or passengers have access. Alternative arrangements such as safety harnesses and jack-stays may be accepted if they provide an equivalent level of safety. The height of the bulwarks or guard rails shall be at least 1 m from the deck, provided that where this height would interfere with the normal operation of the craft, a lesser height may be approved.

Guard rails or bulwarks should not be required on exposed decks to which access is very seldom required, for example wheelhouse tops, or the open decks of ACVs. Alternative measures may however be deemed appropriate in some cases.

4.11.2 The opening below the lowest course of the guardrails shall not exceed 230 mm. The other courses shall be not more than 380 mm apart. In the case of craft with rounded gunwales the guard rail supports shall be placed on the flat of the deck.

4.11.3 Satisfactory means (in the form of guard rails, life lines, gangways or underdeck passages, etc.) shall be provided for the protection of the crew in getting to and from their quarters, the machinery space and all other parts used in the necessary work of the craft.

4.11.4 Deck cargo carried on any craft shall be so stowed that any opening which is in way of the cargo and which gives access to and from the crew's quarters, the machinery space and all other parts used in the necessary work of the craft, can be properly closed and secured against the admission of water. Effective protection for the crew in the form of guardrails or life lines shall be provided above the deck cargo if there is no convenient passage on or below the deck of the craft.