Report of an Investigation

into the death of a donkeyman on

mv *P&OSL KENT*

on 10 November 1998

off the Port of Dover

MAIB 1/10/186

CONTENTS

			Page
GLOSSARIES of Abbreviations, Acronyms and Terms			3
SYNOPSIS			4
SECTION 1		**FACTUAL INFORMATION**	
	1.1	Particulars of Vessel and Incident	5
	1.2	Background to Voyage	6
	1.3	Narrative	6
	1.4	Crew Injuries	10
	1.5	Vessel Response	10
	1.6	Description of Vessel & Watertight Door System	11
	1.7	Operation of Watertight Doors	12
	1.8	Watertight Door Testing and Maintenance	16
	1.9	Previous Watertight Door Accidents	18
	1.10	Company Action	18
	1.11	The Responsibility for Safety	18
	1.12	"M" Notices	19
SECTION 2		**ANALYSIS**	
	2.1	Equipment Status	21
	2.2	Circumstances of the Accident	21
	2.3	Working Practices	23
	2.4	Other Issues	24
SECTION 3		**CONCLUSIONS**	
	3.1	Cause of Accident	26
	3.2	Contributory Causes	26
	3.3	Other Findings	26
SECTION 4		**RECOMMENDATIONS**	

ANNEX 1	Copy of Doctors Note
ANNEX 2	Merchant Shipping Notice No M.1283
ANNEX 3	Copy of approved Operational Instructions for the Control of Watertight Doors
ANNEX 4	Copy of company instructions, SI 1987 No 1298 and Certificate of Competence issued to J Williams
ANNEX 5	Copy of Weekly Planned Maintenance Test Sheets
ANNEX 6	Copy of three monthly Planned Maintenance Test Sheets
ANNEX 7	Merchant Shipping Notices Nos M.1151 & M.1326
ANNEX 8	Fleet Directive and Chief Engineer's Memo.

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

Bar	-	Unit of pressure, one atmosphere or 1.034 Kg/cm^2
CSH	-	Continuous Survey Hull
CSM	-	Continuous Survey Machinery
ECR	-	Engine Control Room
IMO	-	International Maritime Organisation
ISM	-	International Safety Management
M Notice	-	Merchant Shipping Notice issued by Department of transport, Marine Directorate (now MCA)
MSA	-	Marine Safety Agency (now the MCA or Maritime and Coastguard Agency)
RoRo	-	Roll on/Roll off [designed for the carriage of vehicles]
SI	-	Statutory Instrument
UTC	-	Universal Co-ordinated Time

GLOSSARY OF TERMS

Donkeyman	-	Historical title for chargehand rank.
Ear muffs	-	Noise protectors for ears.
Full away	-	Vessel changed from manoeuvring condition to normal seagoing condition.
Information desk	-	Administration centre for vessel.
Separator room	-	Compartment containing oil fuel separator machinery
Stabiliser fins	-	Retractable fins fitted to side of vessel to reduce rolling of vessel.
Tannoy Broadcast	-	Broadcast over public address system.

SYNOPSIS

This accident was notified to the Marine Accident Investigation Branch (MAIB) by P&O Stena Line by telephone on Thursday 12 November 1998. The investigation started on Monday 14 November and was undertaken by Mr A Rushton.

P&OSL Kent is a 20,446 gross tonnage passenger/roro cargo/ferry operating a regular ferry service between Dover and Calais. She is registered in Dover, UK and is managed by P&O Stena Line Ship Management Limited, UK. The vessel is fitted with bow and stern doors and is capable of carrying 525 cars and 1825 passengers.

The vessel completed loading at Calais at 1724, left the berth at 1735 and proceeded on passage for Dover. After full away was rung, the engine room staff gathered in the engine control room for a cup of tea. At about 1800, a third engineer left the control room to work in the generator room, followed shortly afterwards by the fourth engineer. On approaching watertight door No 6, the fourth engineer found the donkeyman trapped vertically in the door. He released the man, and summoned help.

At 1806 the engine room reported to the bridge that a motorman had collapsed unconscious in the engine room and that assistance from the first aid team was required. Meanwhile, in the engine room, resuscitation procedures were being carried out on the donkeyman by the engine room staff. The chief engineer was informed and, in turn, informed the master. Once the seriousness of the situation became known, the vessel's speed was increased and discussions held on the advisability of helicopter evacuation. Passenger medical assistance was sought and a doctor and two nurses attended at 1815. Resuscitation procedures continued until, at 1830, the doctor stated the donkeyman was dead.

Only later did it become known that the donkeyman had been trapped in the watertight door. Apart from the fourth engineer, everybody had only seen the donkeyman lying on the floorplates. The operation of the watertight door was checked and confirmed as being in working order. At the time of the accident the watertight door system was in "Local Control" mode. (closed but could open, and would stay open in position selected by control handle ie not automatic closure).

The watertight door system fully complied with the regulations, and was regularly maintained. All crew members using the doors were trained in their correct usage.

The cause of the accident was a failure on the part of the donkeyman to follow the correct operating procedure for power operated watertight doors. Contributory causes were a possible trip at the doorway, hitting his head on the steelwork and falling forward onto the operating handle causing the door to close, carrying bag of salt on his shoulder, and not fully opening the door before attempting to pass through.

Recommendations are aimed at re-assessing the recommended door operation procedure when using "Local Control" mode on a type "B" watertight door.

SECTION 1 FACTUAL INFORMATION (all times UTC)

1.1 PARTICULARS OF VESSEL AND INCIDENT.

Name	:	*"P&OSL Kent"*
Official No	:	379259
Port of Registry	:	Dover, UK
IMO Number	:	7820473
Gross Tonnage	:	20,446
Deadweight	:	3,614 tonne
Overall Length	:	163.40 metres
Breadth	:	26.18 metres
Maximum Draught	:	5.536 metres
Year of Build	:	1980 (Converted 1992)
Type	:	RoRo Cargo/Ferry
Main Engines	:	SULZER Diesel 12ZV40/48 3 off total 17,652kW
Propulsion	:	Three Controllable Pitch Propellers
Generators	:	2 x 1593kW 380V 50Hz 4 x 895kW 380V 50Hz
Owners & Managers	:	P&O Stena Line Ship Management Ltd, UK
Classification Society	:	Lloyd's Register +100 A1 Ferry
Date and Time	:	10 November 1998, at about 1800
Place of Incident	:	At sea, off the Port of Dover. Position 51^0 01'N, 1^0 40'E
Injuries	:	One dead, crushed in W/T door.
Damage	:	None.

1.2 BACKGROUND INFORMATION

1.2.1 *P&OSL Kent* is owned and operated by P&O Stena Line Ship Management Limited, UK. This vessel was originally named *Pride of Kent* but on the company's involvement with Stena, became *P&OSL Kent.*

The work pattern on *P&OSL Kent* is based on a day and night shift rota. The basic rota starts with the day shift boarding at 0945 and working through until 2315 the same day. This is followed by 24 hours off before reporting back for duty at 0930 on the third day. After two weeks working day-on/day-off, the crew work the night shift, 2315 to 0945 the following day. After seven consecutive nights, they revert to the day work routine. This three week pattern repeats indefinitely, broken by periods of annual leave

Officers work a similar rota but of reduced period, ie 10 or 11 days of day-on/day-off followed by three or four consecutive nights interspersed with periods of annual leave.

1.2.2 The day crew had joined *P&OSL Kent* at 0945 on 10 November 1998 and had complete the first round trip of the day between Dover and Calais by 1418. The voyage had been uneventful with the weather recorded as varying between north-west force 5 or 6 and westerly force 5, good visibility and moderate conditions.

The engine room watch usually consists of a second engineer, two third engineers, a fourth engineer, a donkeyman, and two motormen. The chief engineer is in the engine control room (ECR) for departures, and the second engineer for arrivals. On this particular day, a third motorman was on board for training purposes.

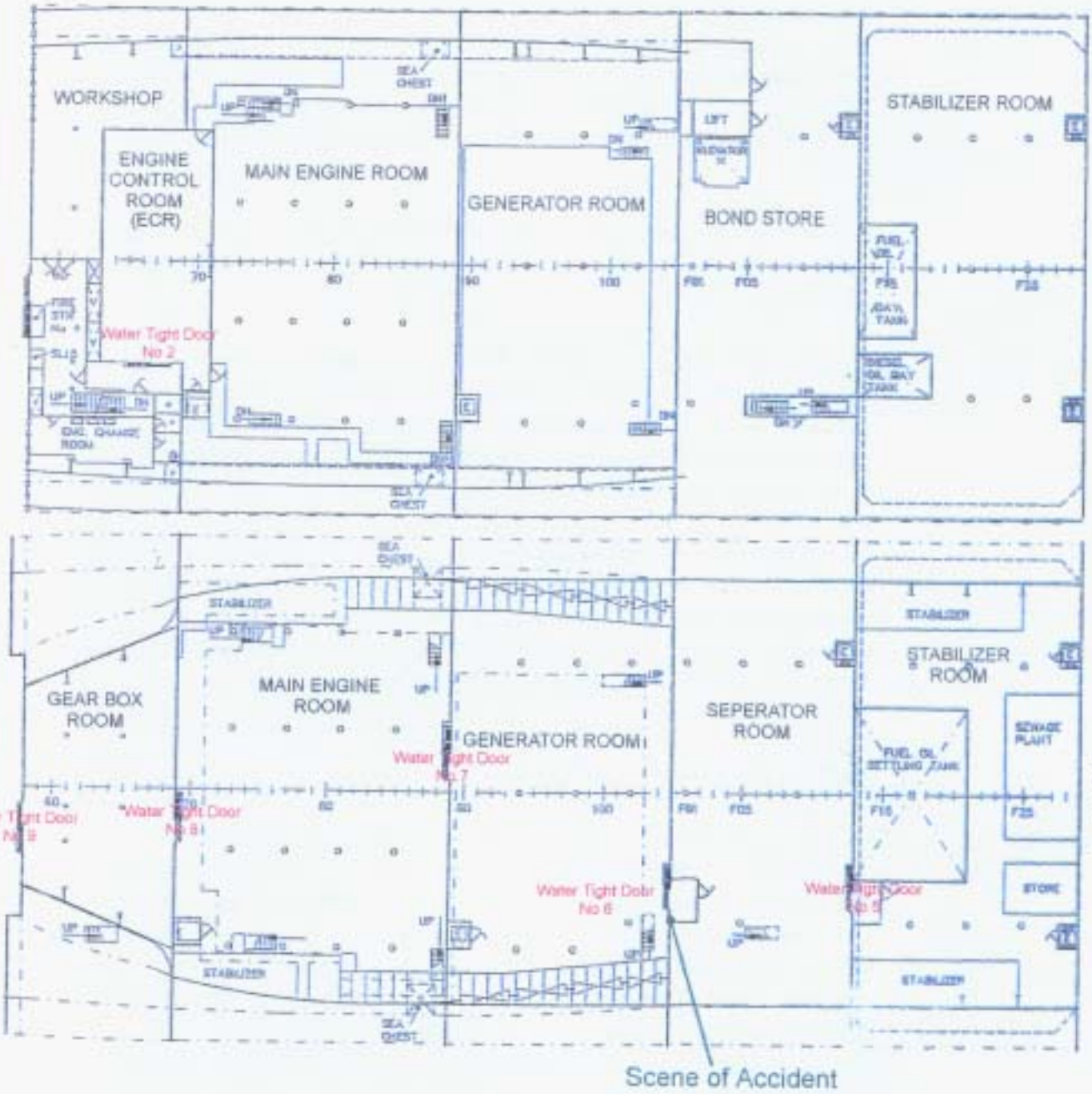
1.3 NARRATIVE

1.3.1 On leaving the berth at Calais at 1735, the staff in the engine room consisted of the chief engineer, two third engineers, the fourth engineer, the donkeyman, and three motormen. After full away had been rung at 1746 and the vessel was on her way back to Dover, the chief engineer left the engine control room and returned to his cabin. The second engineer, who had been in his cabin completing some paperwork, joined the chief engineer to discuss the Christmas holiday duty roster. This discussion lasted for some minutes before the second engineer returned to his cabin and the unfinished paperwork. The chief engineer was also engaged in paperwork at this time.

After full away had been rung, all the staff in the engine room, apart from the donkeymen, had a cup of tea before moving on to their duties. While one of the third engineers remained in the ECR watchkeeping, the other started the starboard inner generator and shut down the port

Figure 1

Engine Room Spaces - *Pride of Kent*



inner generator. This was to allow him to carry out maintenance work on the port generator. He then left the ECR and went forward through the main engine compartment into the generator or auxiliary room to start work, first isolating the starting circuits for the port inner generator. Two of the motormen were still in the ECR. The fourth engineer, having finished his tea, collected his tools and started to make his way forward to the generator room. The donkeyman, although known to be in the engine room, still had not arrived at the ECR for his tea. This was unusual but it was thought that he had delayed to complete a job, the nature of which was not known.

1.3.2 The fourth engineer left the ECR and passed through the main engine compartment into the generator room using No 7 watertight door in the process. Once in the generator room, he went past the port inner generator and saw the third engineer working on the camshaft doors. As he reached the end of the generators and turned to starboard, he immediately saw a bag of salt caught in No 6 watertight door. This watertight door is between the generator room and the separator room.

The fourth engineer rushed towards the doorway and saw the donkeyman upright in the partially open door. He was facing to starboard; the door behind him; with his right shoulder facing into the generator room. The bag of salt was on his right shoulder and trapped between the door and the door jamb. The gap between the door and the door jamb was between 150mm and 200mm.

The fourth engineer operated the door control from the generator room side; released the donkeyman from the doorway; and lowered him to the generator room floorplates. Realising that he needed help, he rushed back to the port side of the generator room and attracted the attention of the third engineer who was working on the port inner generator. He then returned to help the donkeyman.

1.3.3 The third engineer, who was wearing ear muffs, saw the fourth engineer shouting and waving his arms, but could not hear what he was saying. Putting his tools down, immediately he followed the fourth engineer round the aft end of the generator and saw the donkeyman lying on the floor plates. He was lying slightly on his right side with his head towards the generators and his feet towards the watertight door. The third engineer also noticed that the watertight door was about half open and stationary. As the fourth engineer was kneeling down beside the donkeyman, the third engineer returned to the ECR to seek help. On entering the ECR, he shouted that the donkeyman had collapsed in the generator room and telephoned the information desk for the first aid party. While he was telephoning, the watchkeeping third engineer and the two motorman quickly made their way forward to the generator room where they noticed the watertight door was fully open and that the donkeyman's helmet and ear muffs, together with a slightly torn,

25kg (55lb) bag of salt, were on the floor plates just inside the generator room.

1.3.4 The fourth engineer had, in the meantime, straightened the donkeyman's right leg, which had folded behind his left leg when he lowered him to the floor plates. He felt for a pulse on the donkeyman's neck, put his hand across the his mouth to check for breathing, and unzipped his overalls to see if he could see any signs of life. At that moment, the two motormen arrived and cleared the donkeyman's mouth of vomit and checked his tongue was clear by pulling it forward. The donkeyman's tongue was very swollen and there appeared to be an old operation scar across his body. The fourth engineer and one of the motormen then started mouth to mouth resuscitation and chest compressions. The other motorman, thought that a breathing apparatus set might be useful so returned to the ECR to get one.

The watchkeeping third engineer, seeing that he could not help at that moment and that other people were arriving, returned to the ECR. After telephoning the bridge to ask them to get to Dover as soon as possible as they had a very ill man in the engine room, he returned to the scene of the incident. The other third engineer, after telephoning for the first aid party, called the chief engineer in his cabin to tell him of the accident. He then remained in the ECR to handle any other messages and to maintain liaison with the bridge.

At that moment, the trainee motorman arrived in the ECR and was asked to remain there to assist as necessary. However, as he had been trained in resuscitation and first aid, he asked to go down to the donkeyman to assist. The third engineer agreed. The first aid party then arrived in the ECR and were led down by the third engineer to the generator room where the donkeyman lay. Following them was the motorman carrying the breathing apparatus set. He gave the set to one of the first aid party and then returned to the ECR together with the third engineer to await further orders.

1.3.5 The chief engineer received a telephone call from the third engineer at about 1800 and was told that the donkeyman had collapsed and was unconscious. He left his cabin immediately to go to the engine room. On the way, he told the master what had been reported and said he would update him when he had more details. On arriving in the ECR, he was told that the donkeyman was in the generator room. On entering the generator room he met the watchkeeping third engineer who showed him where the donkeyman was lying. The fourth engineer, together with the first aid party and others, were still carrying out resuscitation attempts. Realising that he could not assist directly, he returned to the ECR to be briefed about what had happened.

The chief engineer attempted to telephone the information office to ask for a tannoy broadcast to be made to ask passengers for medical

assistance. Finding the telephone line engaged, he called the master and said they needed to get to Dover as quickly as possible, and that he should broadcast to see if there was a doctor among the passengers.

Shortly after this, two nurses arrived in the ECR and were taken to the scene. The chief engineer noticed that while resuscitation attempts were being carried out, the donkeyman appeared to be vomiting. The chief engineer returned to the ECR and became aware that a doctor was on his way down. At about 1815, a doctor arrived in the ECR and was escorted to the donkeyman by the chief engineer. Present at that time were a number of the engine room crew; the first aid party; the stretcher party; two nurses, a paramedic, and the doctor. Having identified the doctor to the first aid party, the chief engineer returned to the ECR.

1.3.6 The chief engineer then spoke to the master and the bridge watchkeepers before increasing main engine power as well as withdrawing one set of stabiliser fins to gain a little extra speed. While the master and chief engineer were discussing whether to evacuate the casualty by helicopter, one of the engineers came into the ECR and said that the donkeyman had died. The doctor returned to the ECR shortly afterwards and confirmed that the donkeyman was dead.

All resuscitation attempts stopped and the body was carried by stretcher to the ECR where it was covered with blankets to await the arrival of the police and ambulance.

1.3.7 Main engine power was then reduced to normal and preparations made for arrival in Dover. The doctor wrote out his report of the death in the chief engineer's cabin and asked who would make a report to the coroner. He was told that the company would do this, and, at about 1940, the doctor returned to the passenger accommodation. Up to this time, the chief engineer, together with most of the people involved, had assumed that the donkeyman had had some form of heart attack as, apart from the fourth engineer, everybody had only seen the donkeyman lying on the floor plates. Shortly after the doctor had left, the fourth engineer telephoned the chief engineer and told him that he had found the donkeyman trapped in the watertight door. The master was given this new information immediately and was told that he, the chief engineer, would have a look at the watertight door during the standby for arrival Dover.

On arrival back in the ECR, the chief engineer went out into the generator room to examine the watertight door. He tested its operation and found that it functioned correctly. The trainee motorman was present when this preliminary testing took place. When the test was carried out, the watertight door was closed, the floor plates had been cleaned and the bag of salt, partly split open, was on the floor plates in the separator room.

The second engineer, who was still in the ECR, was asked to obtain the donkeyman's home details from the chief engineer's office and to pass them to the information office ready for arrival of the police.

The vessel eventually berthed in Dover at 1902. Two Kent police officers boarded to carry out an investigation into the death.

1.4 CREW INJURIES

The deceased donkeyman, John Williams, joined the company in June 1988 and had been on the *P&OSL Kent* since February 1994. He qualified as a motorman in March 1990 and had continued to serve at sea in that rank. When, because of staff leave or sickness, no donkeyman was available, he would be asked, and did, sail in that capacity. At the time of the incident he was sailing as the donkeyman.

At about 1800 on 10 November 1998, he was found by the fourth engineer found him trapped in No 6 watertight door. He was released from the doorway by normal operation of the door controls and laid on the floorplates in the generator room. The fourth engineer noticed at that time that he had a red mark running diagonally across his body from the left shoulder downwards.

Resuscitation attempts were made by a number of staff from about 1800 and continued until about 1830 when a doctor confirmed that Mr Williams was dead. The doctor's signed note shows that despite these resuscitation attempts there was no pulse; that the pupils of the eyes were fixed and dilated; and that there was no respiratory effort. The doctor's note was timed at 1840 and dated 10 November 1998. A copy of this note is Annex 1.

Before John Williams' body was removed from the vessel at 2045, the police examination found that he had swelling and bruising around his right eye. This suggested that his head had made contact with an object or part of the ship's structure prior to his death.

1.5 VESSEL RESPONSE

The response of the engine room crew on finding the donkeyman trapped in the watertight door should be commended. There was no hesitation on the part of any of the staff present at the time in applying resuscitation techniques, and every effort was made to save the life of Mr Williams.

The bridge watchkeepers and chief engineer were informed promptly at 1806. First aid parties were assembled immediately and directed to the

View of Typical Watertight Door Fitted in *Pride of Kent*

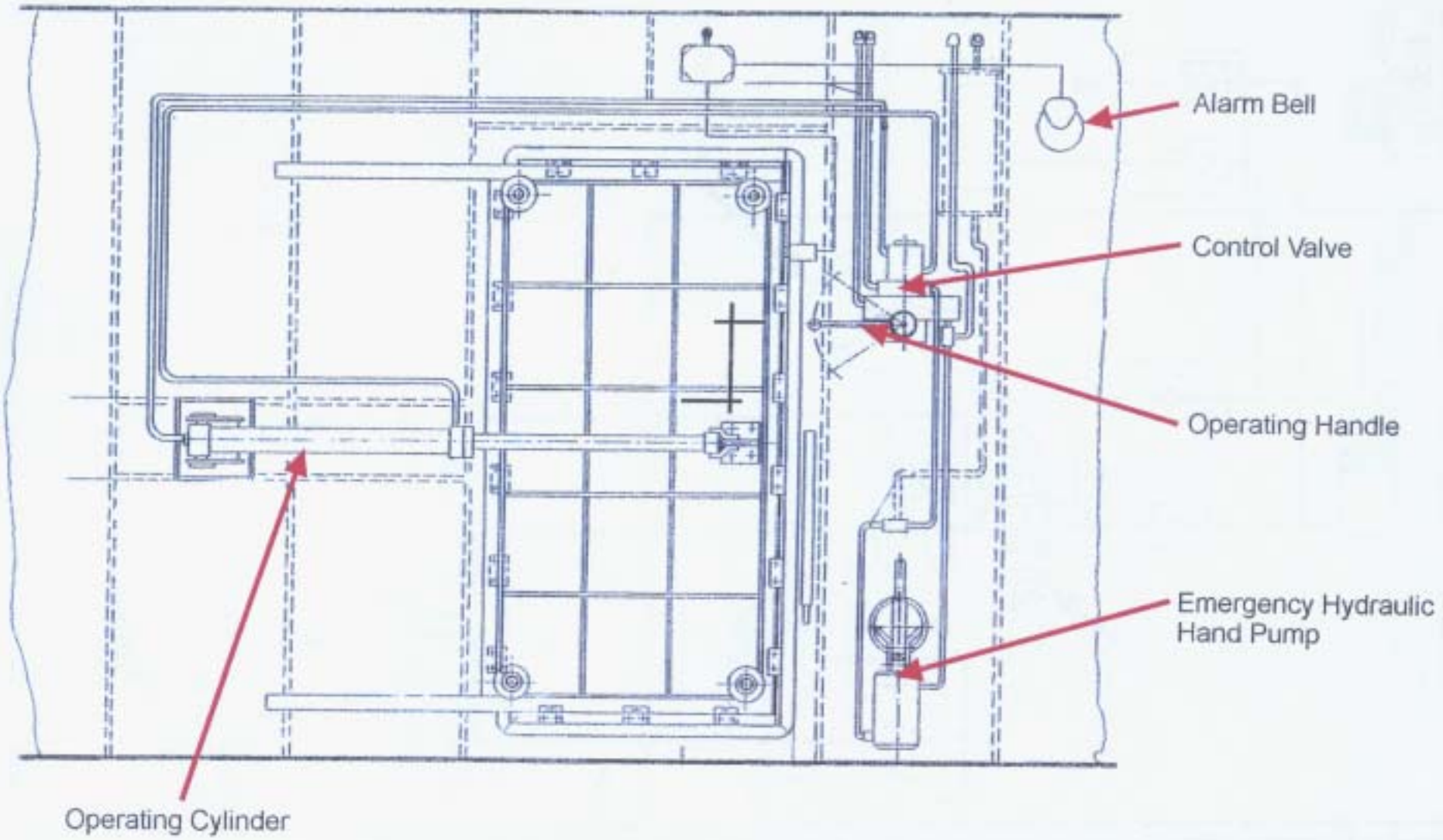
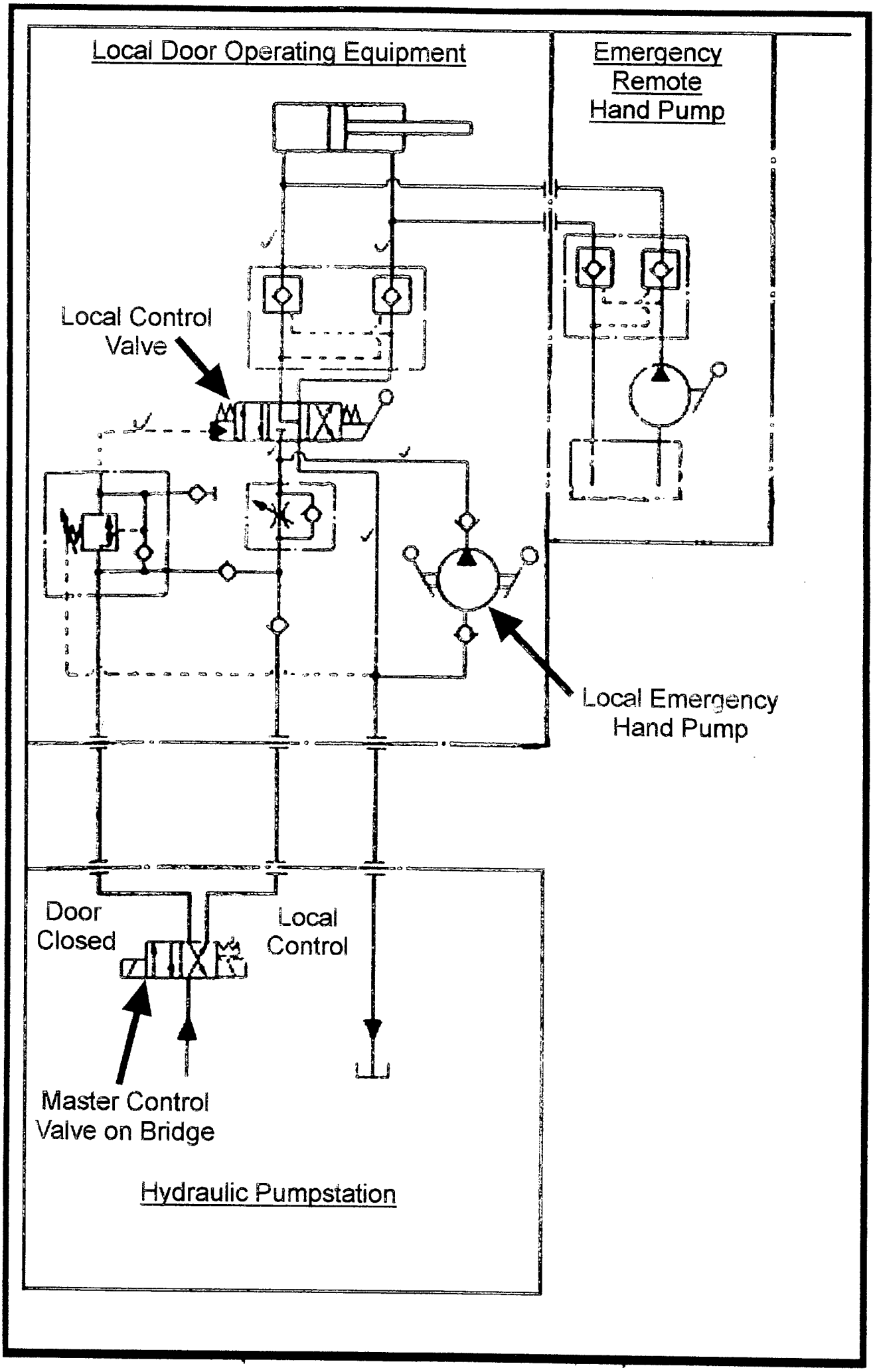


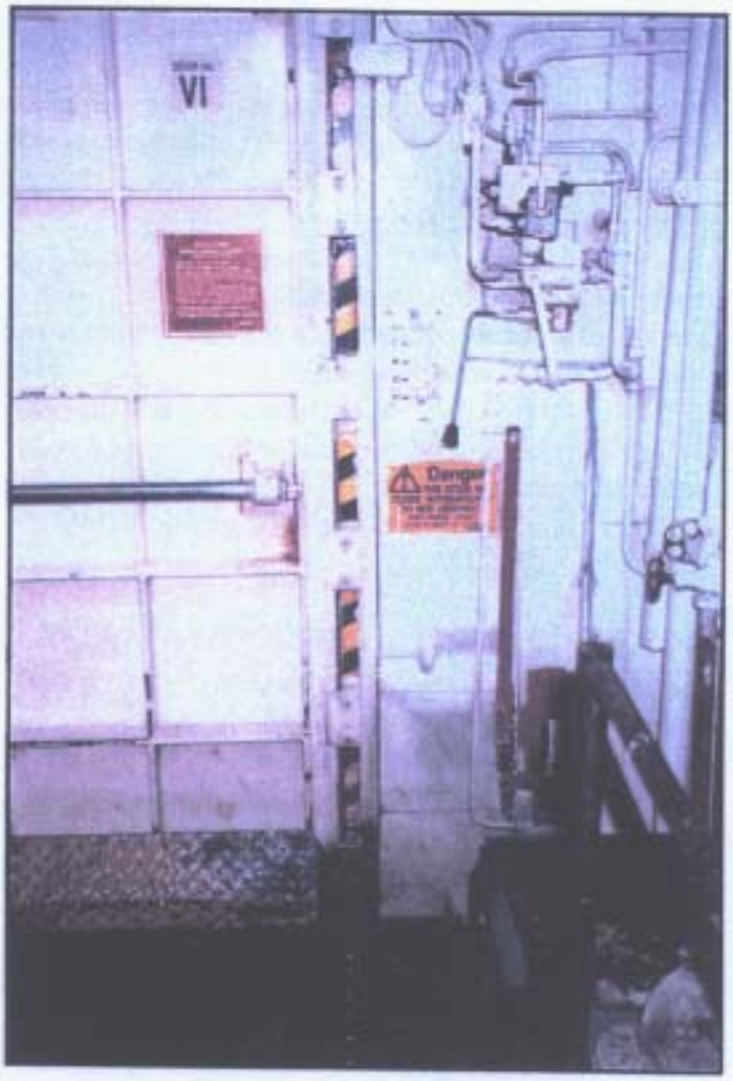
Figure 2

Line Diagram of Watertight Door Hydraulic Control System

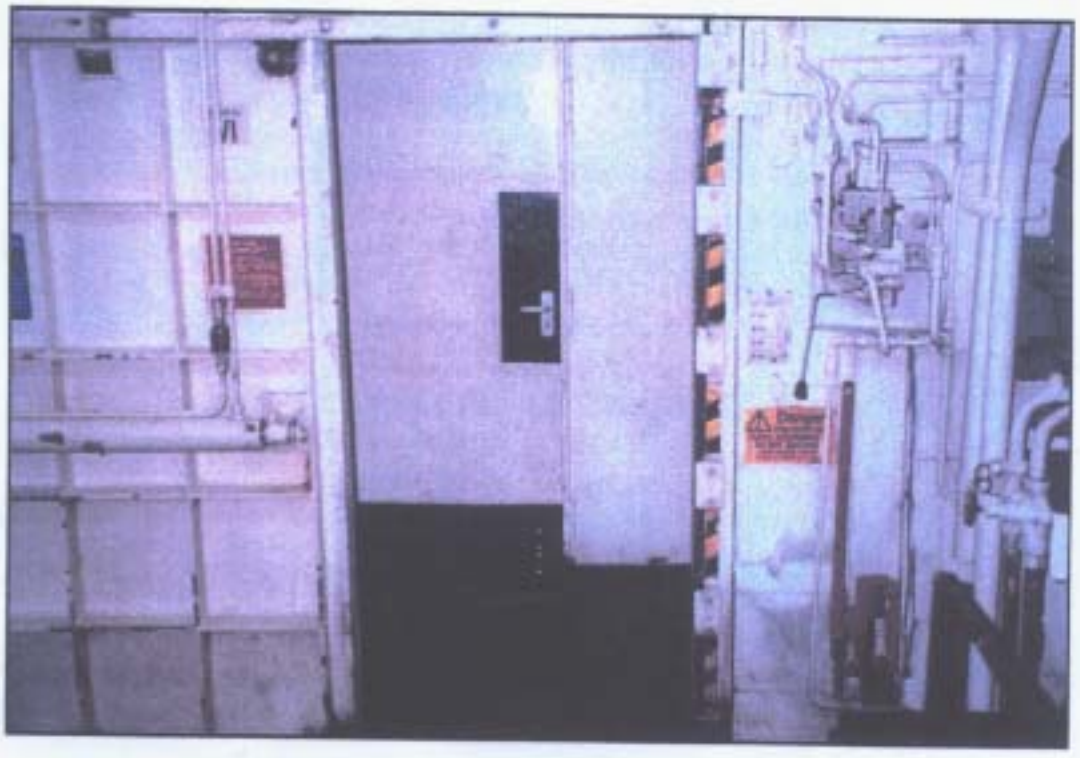
Figure 3



Photograph 1

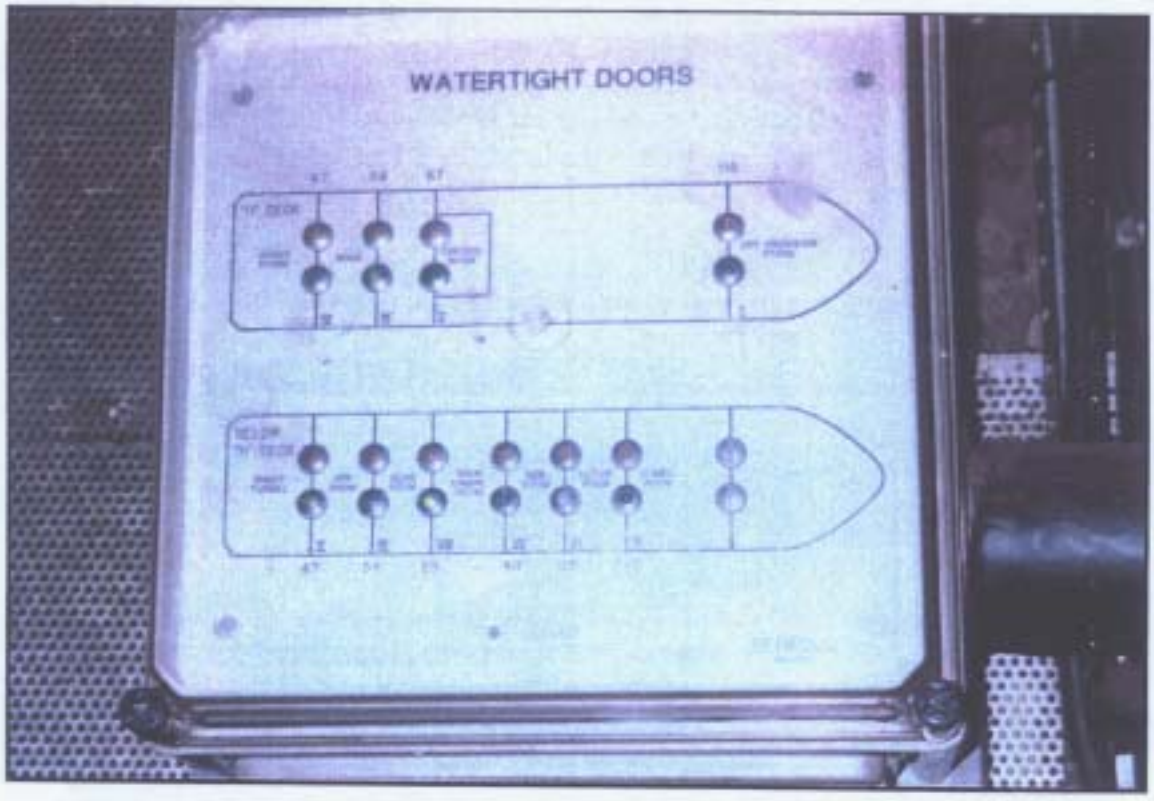


Watertight door No.6 viewed from generator room.



Watertight door No.6 viewed from seperator room.

Photograph 3



Indicator panel in Engine Control Room (ECR).

Photograph 4

"Cranked" operating lever on seperator room side of watertight door No.6.

Photograph 5

"Cranked" operating lever on generator room side of watertight door No.6.

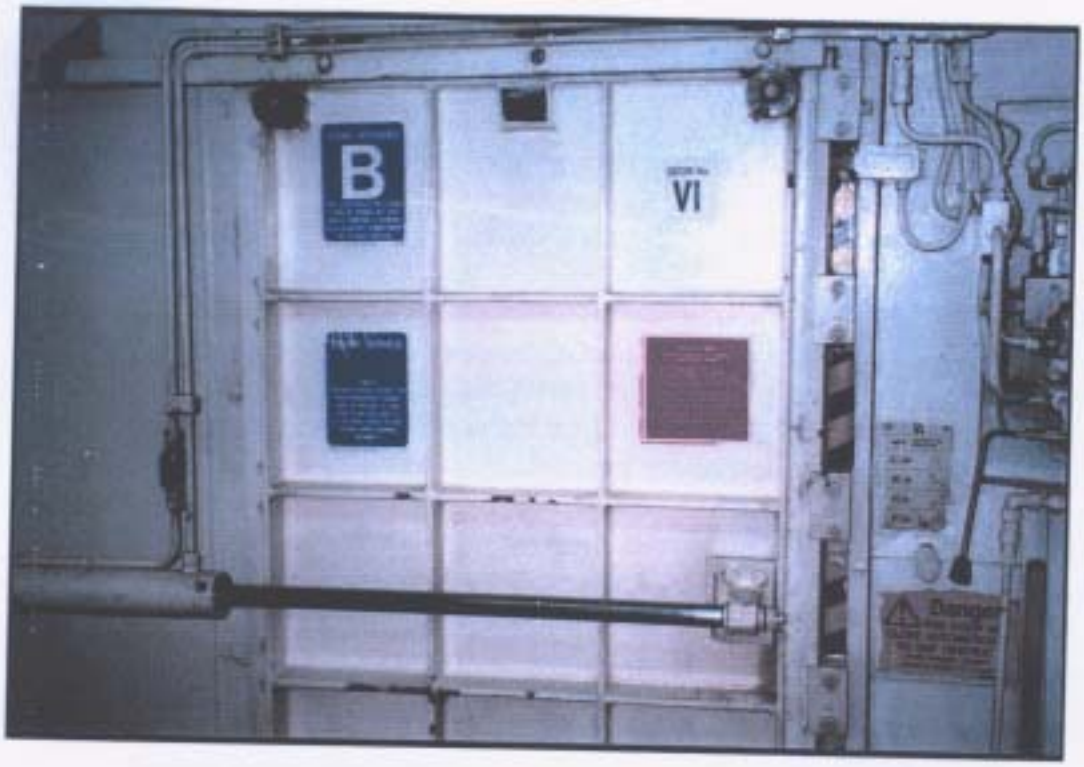
Photograph 6

View of raised floorplate when watertight door is partially open.

Photograph 7

Close-up view of floorplate section. Normally it lays against the door.

Photograph 8



Warning and Instructional signs on watertight door No.6.

Photograph 9

scene of the accident. Passenger assistance was invited as soon as the suspected extent and type of injury had been assessed. At 1815 a doctor, a paramedic and two nurses attended in the engine room.

The vessel's speed was increased and early evacuation of the casualty by helicopter was discussed while the doctor attended him. These responses were abandoned once the chief engineer was advised at 1830 that the casualty was dead. Both the company head office and the authorities were informed of the incident and the resultant death of Mr Williams. The vessel's response was timely and positive; the first aid team were at the scene by 1810 and a doctor attended the casualty within 10 minutes of the bridge being informed.

1.6 DESCRIPTION OF ENGINE ROOM & WATERTIGHT DOOR SYSTEM

1.6.1 The engine control room (ECR) is on Deck 2 aft of, and overlooking, the main engine room. Forward of the main engine room is the generator (or auxiliary) room. Between these two spaces is watertight door No 7. Forward of the generator room is the separator room with No 6 watertight door between them. The separator room contains two small enclosed spaces, one immediately forward of its entrance from the generator room, and one further forward for storage purposes. The space enclosing the watertight door entrance from the generator room is fitted with a self closing A60 fire door. The forward storage space has no door fitted; it is used for the storage of bags of salt necessary for the water treatment plant.

The main console in the ECR faces forward, and is built on to the aft bulkhead of the main engine room. This console is fitted with controls and instrumentation for the operation and control of both main and auxiliary machinery. On the right hand (or starboard) side of the console, just above eye level, is a status board for the watertight door condition. This panel gives a diagrammatic layout of the main structural divisions of the vessel with green and red indicator lights showing both the position and condition of the individual doors; red if they are open, green if they are closed. There is no control over the operation of the doors from this panel.

1.6.2 The watertight door arrangements fitted to this vessel are operated by an hydraulic system designed by *Schoenrock* and *MGN Hydraulics*. Modifications to the original system, to allow the hydraulic control system to be in either "Door Closed" or Local Control", were approved and carried out in late 1987.

The vessel is fitted with a total of ten watertight doors, all capable of being operated simultaneously from the bridge, but with local controls to allow access. The hydraulic system consists of two electrically

operated hydraulic pumps, only one of which is normally required to operate the system. In the event of electrical power failure, each watertight door has an emergency hand pump fitted in the hydraulic system next to, and on both sides, of the door. A remote hydraulic hand pump is also fitted to the local pipework to allow closure of the door from a position outside the two spaces linked by the watertight door. The powered system operating pressure is between 45 and 65 bar, that pressure being necessary to achieve the desired closing and opening speeds.

The control station for operation of the watertight doors is on the bridge with indicator light panels there and in the engine control room. Each watertight door is fitted with a flashing warning light and an audible alarm which operate when the door is opened or closed in the "Door Closed" condition. When in "Local Control" these alarms do not sound. The watertight doors are in two heights, 1900mm and 1940mm, but vary in width from 1250mm to 600mm. No 6 watertight door, the one involved in the incident, is 1900mm high and 900mm wide.

1.7 OPERATION OF WATERTIGHT DOORS

Operation of a watertight door involves two actions;

a. the technical operation, and

b. the procedural operation.

1.7.1 As described earlier, the hydraulic system is pressurised to between 45 and 65 bar by a electrically driven pump from a central sump tank. Pressure switches monitor the line pressure and start or stop the hydraulic pump so as to maintain the line pressure within the acceptable limits. The system is fitted with pressure accumulators, filters, check valves, and adjustable flow restrictors. The master hydraulic control valve is of a type that in the event of an electrical power failure, the water tight doors will remain in the same position they were in immediately before failure.

Each watertight door is fitted with a hydraulic control valve, the extended spindle of which passes through the watertight bulkhead enabling the valve to be operated from either side of the door. Attached to the hydraulic control valve spindle are two operating handles, one either side of the door. This control valve is fitted with a spring return as well as a pilot pressure control line. The hydraulic pressure exerted through the pilot pressure control line is much higher than that exerted by the spring return. When in "Door Closed" mode, pilot pressure of 15 bar is continuously applied to the control valve at the door, keeping the valve in that position. When the system is in this

mode, full line pressure is exerted and maintained on the door cylinder keeping the door closed. If the operating handle is moved locally against the pilot pressure, the control valve will move to the "Door Open" position causing the door to open. When the operating handle is released, the 15 bar pressure takes over and moves the control valve back into the "Door Closed" position.

When the watertight door system is in "Door Closed" mode, all movements of the doors are signalled by both sound and light alarms, both immediately before and during the actual movements

When in "Local Control" mode, there is no pilot pressure and the spring return mechanism has control. In this condition, movement of the local operating handle causes the door to move. The handle generally follows the required direction of door movement ie to open door to the right, handle is moved to the right etc. Similarly, if moving the door in the opposite direction, the handle is moved to the left.

Once the force moving the operating handle is removed, ie the hand is taken off the lever, the spring return mechanism within the control valve moves the control valve back into the neutral position and all door movement stops. The door will then remain in that position until the operating handle is again moved.

If, when in "Local Control", a number of doors are open or partly open, and the bridge need to switch to "Doors Closed", the visual and audible alarms will sound and all doors will automatically close.

The essential difference between "Door Closed" and "Local Control" modes is:

(i) In "Local Control" mode, the door will stop immediately the operating handle is released. The door will remain in that position until the handle is moved again.

(ii) In "Door Closed" mode, as soon as the operating handle is released, the door will start to close.

1.7.2 At the time of the accident, all watertight doors were in "Local Control" mode with all doors shut. Number 6 watertight door, the one at which the accident occurred, differs slightly in operation from other door controls, in that the control levers at the door have been extended to cope with the heavy steel structure next to the doorway. This means that the lever is "cranked" to place the end of the operating lever close to the door jamb. From the generator room side, the handle end is 1045mm (or 3ft 5") from the floor plates and about 130mm (or 5") inboard from the edge of the door frame. The hydraulic control valve for the door is on the bulkhead in the generator room with the operating arm on that side of the door facing downwards. Therefore to

open the door, the lever needs to be moved to the left or upwards. To close, the lever has to be moved to the right or downwards.

To operate the same door from the other side, (the separator room) the operating handle has to be moved in the same direction, ie upwards to open, downwards to close. The handle end on this side of the door is 1150mm (or 3ft 9") from the floor plates and about 150mm (or 6") inboard from the edge of the door.

The operating time for opening fully and closing number 6 door was found to be:

To open	6 seconds.
To close	20 seconds.

These closing speeds are in line with the recommended closure time given in Merchant Shipping Notice No M.1283, issued in July 1987. See Annex 2

The force needed to move the operate handle on the separator room side of No 6 watertight door into the closing position proved to be 860g [1lb 14oz]

In order that trolleys or wheeled containers can pass safely through the watertight door, a piece of hinged floorplate is fitted on the generator side of the doorway. This is so shaped, that as the door finally reaches the fully open position, the hinged floorplate falls down and bridges the gap between the generator room and the separator room. At any position other than fully open, the section of hinged floorplate remains in the vertical position across the doorway. The height of this floorplate section in the raised position is about 150mm (or 6").

1.7.3 The procedure under which the watertight door system is controlled and operated is given in a document called "*Operational Instructions for the Control of Watertight Doors*". This document was approved in July 1995 by the Marine Safety Agency (MSA). A full copy of this document is in Annex 3

In this document it is stated that the watertight doors on the *Pride of Kent* are designated as type B - that is "*a door which should be closed. It may be open, but only whilst someone is working in the adjacent compartment.*". This choice of door type, governs their use in "normal" conditions. These "normal" conditions are all conditions in which potentially hazardous situations do not exist. P&O European Ferries (Dover) Ltd have chosen to treat the vessel as always operating in a potentially hazardous situation and therefore the doors remain closed while on passage.

Unless the bridge requires it otherwise, the company state that the watertight door control must be set in "Local Control" mode at all times except during an emergency, a drill, or for testing purposes. The following instructions have been given:

a) *any door which is normally kept closed, if accessible, is to be opened and closed at least once every seven days; this operation may however be delayed or advanced if conditions of restricted visibility or other potentially hazardous situations prevail or are anticipated;*

b) *all doors to be opened and closed prior to departure if the ship is to remain at sea for more than seven days;*

c) *those doors which may be kept open or opened (ie Type B) during a voyage are to be opened and closed daily.*

1.7.4 Any member of the crew who use a watertight door is trained in its safe operation and is provided with written instructions. The instructions show that after operating the control handle on the entry side, the user must wait for the door to open FULLY He then retains a grasp of the operating handle on the entry side and reaches through the open doorway to grasp the operating handle on the exit side. While still retaining a grasp on both operating handles, he steps through the door and releases the entry door handle. Once though and clear of the door, he releases the exit operating handle. If the system is in "Door Closed", the door will automatically close; if in "Local Control" the door will remain in the open position until the operating handle is moved to the door closed position.

Crew members using the watertight door system are instructed in their operation and are issued with a certificate of competence on successful completion of their training. The donkeyman completed his training on 25 May 1994 and had been issued with his certificate of competency for the *Pride of Kent*. Apart from the company's approved operating instructions, the message is reinforced by the issue of the chief engineer's standing orders on the operation of watertight doors and the drills and tests to be carried out. Similarly, the master issues a set of standing orders, to all officers, containing particular reference to the requirements on watertight doors as outlined in the Merchant Shipping Regulations SI No 1298 1987.

Copies of these documents are included in Annex 4

In addition to the training requirements for crew members, each watertight door is fitted with a number of information and warning notices on both sides of the door. These notices consist of :

1. A white text on a red background giving explicit operating instructions on using the door.

2. A white text on a blue background identifying the door as a "B" type door and stating how the door can be used.

3. A white text on a blue background stating P&O require the door to be kept closed at sea except when passing through.

4. Black text on a yellow background warning of automatic closure of the door.

5. A notice identifying the door number.

Next to the control handles on both sides of the door is a diagrammatic notice illustrating which way the handle should be moved in order to open or close it. This notice is purely diagrammatic and does not include positive instruction on door movement.

All these notices and instructions accurately reflect the correct operation of the watertight door and the procedures listed in company training and instructional manuals.

1.8 WATERTIGHT DOOR TESTING AND MAINTENANCE

1.8.1 As part of the daily safety checks, all bridge equipment is tested and the results recorded. These include the watertight doors. These tests check for successful remote closing of the doors from the bridge. The last test was on 10 November 1998 with completion being recorded as 1013. These series of tests and checks were carried out by the day shift which had come on duty at 0945.

1.8.2 The regular testing and maintenance of the watertight doors is included in the vessel's planned maintenance system. Operational testing of all doors is carried out on a seven day frequency under the general heading of "Safety Routines". The tests are usually carried out on a Monday night and consist of the following:

[1] Isolate pumps.
[2] Vent pressure.
[3] Check alarm and lamp (on bridge mimic panel)
[4] Check operation of both main pumps.
(change over on bridge mimic panel)
[5] Check correct cut in and cut out pressures (45-65 bar).
[6] Check E.R. and bridge mimic lights.
[7] Complete the check list.

The check list requires confirmation that for each door, the green and red lights work, the bell sounds and that the door operates from both the remote and local positions. Any defects found and not corrected at the time must be rectified as soon as possible. The chief engineer is also told of any defects on the day that they occur. The results of that weekly test sheet are entered into the computerised planned maintenance system.

A print-out of test results from 17 May 1998 show that apart from one entry regarding the return of a repaired isolator transformer on 27 October 1998, the tests were satisfactory. A copy of the test results is in Annex 5.

1.8.3 The planned maintenance system also includes a check on the watertight door system itself, based on a 90 day frequency. This check includes the following:

> *Hydraulic Pump Unit Doors & Controls.*
> *Check over the system for hydraulic leaks, loose clips etc.*
> *Check oil level, clean filter six monthly.*
> *Record all repairs on this card.*

The results of these checks and repairs are entered in the computerised planned maintenance system. A print-out from the system covering the period 19 October 1994 to 16 October 1998 show that various parts, leaking pipes and broken operating levers have been replaced over the years, but the only defects found on No 6 door were oil leaks in May 1995 and seal replacement to the door ram in December 1995.

Copies of the maintenance print-out sheet are in Annex 6.

1.8.4 The vessel underwent a refit in Falmouth during October 1998 and completed her annual passenger certificate inspection. At that time, all the safety features on the vessel were checked by Maritime and Coastguard Agency surveyors. Amongst those items was the watertight door system. Only one defect was found and subsequently rectified, an "*inboard lower wheel on No 8 door was not turning.*" The Passenger Certificate was later renewed on 17 October 1998.

During this refit, Lloyd's Register progressed various surveys for the CSM (Continuous Survey - Machinery) and CSH (Continuous Survey - Hull). Included within the CSH, is a survey and operation test of the watertight doors. This survey was satisfactory and the item credited for inclusion on the surveys completed list.

1.9 PREVIOUS WATERTIGHT DOOR ACCIDENTS

There have been a number of accidents involving watertight doors which have resulted in the Department of Transport (as it was then) issuing two Merchant Shipping Notices M.1151 in 1984 followed by M.1326, in April 1988.

The 1984 notice was issued in response to a Court of Formal Investigation concerning the practice of keeping watertight doors open at sea, whereas the 1988 notice is directly concerned with accidents involving power operated watertight doors. This latter notice highlights the "essential" method of using power operated watertight doors;

1. Open the door fully before passing through; and

2. Always have both hands free to operate the controls.

The point on having both hands free is particularly relevant when the doors are in "Door Closed" mode as release of the local control handle causes the door close automatically. These two notices are in Annex 7.

1.10 COMPANY ACTION

Subsequent to the accident, P&O Stena Line Ship Management Limited issued a Fleet Directive on 13 November 1998 to the masters of all their vessels instructing them to reiterate watertight door operating procedures to all relevant personnel. The chief engineer of *P&OSL Kent* issued such a memo to all ships staff on 15 November 1998.

A copy of the Fleet Directive and chief engineer's memo is in Annex 8.

1.11 THE RESPONSIBILITY FOR SAFETY

1.11.1 Under the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997, generally under the International Safety Management Code (ISM), and the Code of Safe Working Practices for Merchant Seaman, both the company and the seaman have responsibility for the safety of the individual.

The company, by following the requirements of the Regulations and its own safety management policy, issued operational instructions for the watertight doors and undertook the training of individuals in the correct and safe operation of these doors. Operational guidance and warning notices were posted on both sides of the door together with high visibility strip attached to the opening door jamb.

In addition to the above, under the Health and Safety Regulations 1977, Part II, "General Duties", Section 5, part (1);

The employee shall ensure the health and safety of workers and other persons so far as is reasonably practicable, which duty shall be met by the application of the following principles-

(a) the avoidance of risks, which among other things include 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;

and, in part (2);

(c) such arrangements as are appropriate, having regard to the nature of, and the substances used in, the activities and size of the operation, for the effective planning, organisation, control, monitoring and review of preventive and protective measures:

1.11.2 Each individual was required to attend a training course during which he was instructed on the correct operating procedures for the watertight doors and the dangers associated with them. Subject to that individual satisfying the instructor that he correctly understood both the operation and the dangers, he was issued with a certificate stating that he had satisfactorily completed the course.

In addition to the above, under the Health and Safety Regulations 1977, Part V, General duties of workers; Section 21;

(2) No worker shall-

(a) use any machinery, equipment, dangerous substance, transport equipment, means of production or safety device provided by his employer or the company other than in accordance with any relevant training or instructions which have been received or provided by the employer or the company in compliance with these Regulations;

1.12 "M" NOTICES

1.12.1 The instructions and operating procedures used on the *P&OSL Kent* are derived from two Merchant Shipping Notices, M.1283 and M.1326.

The first of these two notices, M.1283, gives details of the requirements contained in The Merchant Shipping (Closing of Openings in Hulls and

in Watertight Bulkheads) Regulations 1987 (SI 1987 No 1298) which came into force in November 1987 and November 1988.

The "M" notice includes comment on the design and operational principles for watertight doors including guidance on operational instructions. It is in this notice that the type of doors are designated.

As stated earlier, the company opted to designate the watertight doors on this vessel as type "B".

1.12.2 The second of these notices, M 1326, comments on accidents involving the use of watertight doors. These comments include guidance on the contents of the written operating instructions. In paragraph 3 of the notice, it states that:

"It is absolutely essential therefore when using a watertight door which has been closed irrespective of the mode of closure, that both local controls, one on each side of the bulkhead, are held in the "open" position while passing through the door."

This instructional guidance applies irrespective of whether the door is operating in "Door Closed" or "Local Control" mode.

Photograph 10

Illustration of possible position of donkeyman immediatly prior to accident.

SECTION 2 ANALYSIS

2.1 EQUIPMENT STATUS

2.1.1 The watertight door system fitted on board *P&OSL Kent* fully complies with the regulations and, at the time of the accident, the system was in full and proper working order. Shortly before arrival Dover, the chief engineer checked No 6 watertight door for satisfactory operation and found it in good order with no mechanical defects or abnormalities in its operation.

All instruction and warning notices were fixed to the doors or adjacent parts and were in a good and readable condition.

The operational and maintenance regime on this vessel is soundly based. Regular daily operational system checks are carried out during testing of bridge equipment, checks on each watertight door every seven days, and a full hydraulic system check at 90 day intervals.

2.1.2 The training of staff in the safe operation of the watertight door system follows the regulatory requirements with all crew members likely to require access through watertight doors, attending the instructional courses.

2.2 CIRCUMSTANCES OF THE ACCIDENT

2.2.1 Immediately before the fourth engineer discovered the donkeyman trapped in the door, engine room personnel in and around the ECR knew that the donkeyman was somewhere in the engine spaces carrying out routine tasks that did not require direction or instruction from senior staff. His working clothes consisted of a boiler suit, safety shoes, hard hat and ear muffs, all of which were found either on, or near him after the accident.

The carrying of a bag of salt from the storage area in the separator room to the water softening plant in the starboard forward corner of the generator room was a routine requirement and one that the donkeyman would carry out himself. The daily salt usage records show that on the 10 November, only one 25kg bag of salt was used whereas it was more usual for two bags to be used. It is presumed that the donkeyman was carrying the second when the accident occurred. These 25kg bags of salt are awkward to hold and are more easily carried by placing the bag on one shoulder, and steadying it with a hand. This procedure can be seen in the photograph.

2.2.2 Without witnesses, it is impossible to state exactly how the accident occurred. However, a possible sequence of events suggests that the watertight door was <u>not</u> fully open when the donkeyman attempted to

pass through it. Had the door been fully open, he would not have needed to turn sideways to pass through the doorway nor would there have been any obstruction at foot level. As mentioned earlier, when the door is in any position other than fully open, the hinged floorplate section on the generator side, is retained in the upright position offering an 150mm (or 6") obstruction to free passage through the doorway.

With the watertight door only partly open, and a bag of salt on his right shoulder, Mr Williams would not only have had to ease his way round the door, but would have found it necessary to step over the raised floorplate. It may be that with his sight partially obstructed by the bag of salt on his shoulder and, when concentrating on easing through the doorway, he caught his leading foot on the raised floorplate. With the weight of the bag on his right, and leading shoulder, he could have stumbled and fallen towards the door jamb.

Trying to regain his footing, he may have banged his head on the door jamb (this would account for the bruises seen in the vicinity of his right eye when the police examined him on arrival Dover) and become momentarily dazed. It is also possible, that while negotiating the doorway, his free left hand retained a grip on the door operating handle on the separator room side of the door. On falling forward, given the shape and position of the operating handle relative to his height, he would have pushed the handle downwards. This downward action would have caused the door to start to close. In a slightly dazed condition, it is possible that he did not realise that the door was closing until it started to grip him. At that point, undoubtedly a degree of panic would set in, and it may be that he mistakenly continued to hold the handle downwards. On becoming unconscious, it is probable that his hand fell off the operating handle causing the door movement to stop. The door would have remained in that position until the fourth engineer discovered the donkeyman and operated the handle to release him.

2.2.3 The donkeyman was 1778mm (5ft 10") in height and with the watertight door having a clear height of 1900mm (6ft 3") he would have clear headroom to pass through the doorway. His normal hand height when upright would have been about 800mm (2ft 7"). The operating handle on the separator room is at a height of 1150mm (3ft 9"). This means that when grasping the operating handle, his arm would have been bent up to about or just above waist height. In this position, any stumble forward is likely to cause hand/arm movement downwards. With the operating handle requiring a minimum applied force of 850g (1lb 14oz) to move, such a downward movement will result in the door closing.

2.3 WORKING PRACTICES

2.3.1 Records aboard the vessel show that the carriage of a 25kg bag of salt from the storage space in the separator room to the water softening plant in the generator room was a daily occurrence. A regular routine which involves;

a. the use of a "timed" door operation, and

b. the carrying of a weight capable of being carried by one man,

tends to encourage a relaxed approach to the whole operation. It can lead to the development of at least two "bad or dangerous practices". The door would not be opened fully each time, and only one man would be used to carry a 25kg bag of salt through the doorway.

2.3.2 During the investigation, a number of comments were made that engine room staff frequently pass through watertight doors before they are fully open. This is not only an un-safe practice, but contravenes company instructions. This practice, although apparently carried out by both engineer officers and crew, should have been discouraged by senior officers. Senior engineer officers have a responsibility for the safety and well being of engine room staff and that requires them to ensure that safe working practices are followed.

The company regulations on the operation of watertight doors state that two men should be used when anything is to be carried through a watertight door. With this in mind, and aware that 25kg bags of salt needed to be moved from one compartment to another, the senior engineers should have ensured that two men were always available for this task and when passing through the doorway.

If the work requirement of moving bags of salt through the watertight door on a daily but irregular time basis gave rise to difficulties in the two man operation of the doors, the practice should have been drawn to the attention of the shore management for review and discussion by the safety representative and the company.

Alternatively, the task could be carried out in port, when the watertight door can remain open. The other watches on board are reported to replenish the water softener salt when in port.

2.3.3 The circumstances of the accident suggest that the donkeyman failed to follow the watertight door operating instructions on three counts:

1. He did not wait for the door to fully open before attempting to pass through;

2. He was passing through the door carrying a load and therefore unable to hold both operating handles;

3. He did not arrange for a second man to be present while passing through the doorway carrying a load. (As donkeyman, he had motormen under his control available to assist as necessary).

Regarding the issue of attempting to pass through the door before it was fully open, he would have been familiar with the practices of other engine room staff and was likely to have followed their lead. As to passing through the doorway carrying a load, the load was not excessive, and he had a hand free to operate the door control handle. This latter point was also the probable reason as to why a second man was not called to assist. John Williams had also probably done this particular job many times before without incident.

2.4 OTHER ISSUES

2.4.1 The practice of people using their own two hands when passing through a watertight door, as required by Regulation 3(1)(a) of Statutory Instrument 1987 No 1298, although soundly based on the grounds of personnel safety, is, in practical terms, not "user friendly".

When the system is operating in "Doors Closed" mode, ie release of the operating handle causes automatic closure of the door; then the two-handed system is the safest method of operation. However, when in "Local Control" mode with door movement stopping on release of the operating handle, a one-handed operation is considered both adequate and essentially more practical.

With the doors operating predominantly in "Local Control" mode (including, on this vessel, a power operated watertight door between the ECR and the accommodation), and frequent movements of engine room personnel between spaces, there is a natural inclination to "slip through the door" before it is fully open. This lack of attention or forgetfulness leads to the development of what might be called an "acceptable bad practice" by sea staff ie everybody does it without comment being made. Although an opening time of six seconds is a short period, it is longer than most people are prepared to wait particularly when they can see that there is enough space for them to pass through the opening.

2.4.2 By choosing to operate the watertight doors on their vessels as type "B" doors, the company had, by virtue of the definition describing the use of that door, freedom to issue practical working instructions.

Under this definition, the movement of salt between the separator room and the generator room could be undertaken by one man "*by leaving*

the door fully open while moving the bag from the store into the generator room." Crew training however, and the written instructions given by the company on the correct use of the watertight door system, does not, and cannot, differentiate between the procedures for "Door Closed" and "Local Control". This is as per Shipping Notice M.1326. Identical operating instructions for both modes of control can lead to misuse and nullifies the guidance instructions given for the use of type "B" watertight doors as stated in M.1283.

By applying the same operating procedure for both modes of operation, use of the door when in "Local Control" has become over-complicated and inappropriate. The result of this is that, when in "Local Control", the agreed procedure is disregarded and has fallen into disrepute. To correct this irregularity, a revised operating procedure needs to be devised making full allowance for leaving the door open for short periods while work and/or material movement is being carried on in the immediate vicinity of the open door. Such a revision will require careful consideration of the risk factors involved but it should reduce the likelihood of similar accidents recurring.

2.4.3 Although there is no direct evidence to show whether the donkeyman was confused as to which way the lever operated to open the door when he was trapped in the doorway, there is no clear and unequivocal sign saying which way the handle needed to be moved in order to open the door. On each side of the door is a sign illustrating which direction the handle needs to be moved in order to operate the door but it lacks positive identification in that nowhere does it state OPEN or CLOSE.

A more straightforward illustrative sign using just arrows and the words "open" and "close" would be simpler and easily understood. When in a stressful situation, the simpler the instruction the more likely it is that the correct response will follow.

SECTION 3 CONCLUSIONS

These conclusions identify the cause and factors contributing to the accident and should not be taken as apportioning either blame or liability.

3.1 CAUSE OF ACCIDENT

The accident was caused by the failure of the donkeyman to follow approved instructions for operating watertight doors.

3.2 CONTRIBUTORY CAUSES

3.2.1 It is probably that No 6 watertight door had not been fully opened when the donkeyman chose to attempt to pass through.
[Ref: 2.2.2. & 2.3.2.]

3.2.2 The donkeyman was carrying a 25kg bag of salt on his right shoulder when attempting to negotiate the doorway. This may have restricted his vision ahead while passing through the doorway.
[Ref: 2.2.2. & 2.3.2.]

3.2.3 With the watertight door only partially open, the 150mm (6") high hinged floorplate was still in the raised position offering an obstruction to free passage.
[Ref: 1.7.2. & 2.2.2.]

3.2.4 Damage to his head in the region of his right eye suggests that the donkeyman tripped, possibly over the raised floorplate, and banged his head on the steel door frame. The resultant stumble and dizziness caused him to fall accidentally on to the operating handle and push it down causing the door to start to close.
[Ref: 2.2.2.]

3.3 OTHER FINDINGS

3.3.1 The watertight door system as installed complied fully with the regulations and was in full and proper working order at the time of the accident.
[Ref: 2.1.1.]

3.3.2 All instructional warning and operational notices were in place and readable.
[Ref: 2.1.1.]

3.3.3 The watertight door system was regularly checked and tested on a daily, weekly and three monthly basis.
[Ref: 1.8. & 2.1.1.]

3.3.4 The operating time of No 6 watertight door was:

OPENING	6 seconds
CLOSING	20 seconds

This meets the regulation requirement of closing in 20 seconds and not more than 40 seconds.
[Ref: 1.7.2.]

3.3.5 A culture of passing through watertight doors when not fully open was present on board the vessel and apparently was practised by all levels of staff.
[Ref: 2.3.1. & 2.4.1.]

3.3.6 P&O Stena Line Ship Management Limited have chosen to designate all watertight doors as Type B and have applied the same operating procedure instructions when both "Door Closed" and "Local Control" conditions are applied.
[Ref: 2.4.2.]

SECTION 4 RECOMMENDATIONS

The Marine and Coastguard Agency is recommended to:

1. Re-assess their instructions regarding the operation of watertight doors when in "Local Control" as stated in **M.1326.**

P&O Stena Line Management Ltd is recommended to :

2. Re-assess the procedure for the use and operation of type "B" watertight doors when operating in "Local Control".

3. Emphasise to all its sea staff, that until such time as the re-assessment recommended above has been completed, current procedures for operating watertight doors must be followed and that watchkeepers should exercise supervision over any work requiring the movement of tools, parts or materials through a watertight door.

4. Remind personnel that, under current "Local Control" instructions, two men should be in attendance during the transfer of salt between the separator room and the generator room.

ANNEX 1

1. Copy of Doctor's Note.

P&OSL KENT
10 November 1998

Dr P.G. SMITH BSc MBBS MRCGP

John Williams.

Huthwaite H.C.
New St
Huthwaite.
01623 - 513 167.
NG17.

Rx.
HPC
(GMT)
18:15) Call to Sick crew → engine Room.

Found Collapsed on deck - ? 18:00.

O/e) No pulse
Pupils - fixed + dilated.
No respiratory effort

→ CPR - already commenced.
→ continued until 18:30.

No Cardiac output.
Pupils - fixed and dilated.
No respiratory effort.

Therefore dead. R.I.P.

P.G. Smith

Captain will inform coroner.
18:40
10/11/98.

ANNEX 2

2. Merchant Shipping Notice No M.1283

P&OSL Kent
10 November 1998

DEPARTMENT OF TRANSPORT MERCHANT SHIPPING NOTICE NO. **M.1283**

WATERTIGHT SUBDIVISION ARRANGEMENTS OF PASSENGER SHIPS—THE NUMBER, LOCATION AND OPERATION OF WATERTIGHT DOORS

Notice to Shipowners, Shipbuilders, Masters, Chief Engineers and Officers

(This notice should be read in conjunction with the Regulations referred to in paragraph 1, below).

1. The Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1987 (SI 1987 No. 1298), come into force on 1st November 1987, except for Regulation 3(1)(a)(ii) which comes into force on 1st November 1988. They revoke the Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1980 (SI 1980 No. 540).

2. These regulations apply to both new and existing United Kingdom passenger ships. They include such requirements as appear to the Secretary of State to be necessary to implement the provisions contained in regulation 15 of Chapter II–1 of the International Convention for the Safety of Life at Sea 1974 (Cmnd 7874), as amended, for the closing of watertight doors and other closing appliances and devices, for their inspection, for practice drills and for relevant entries in official log books.

3. Whilst one of the primary purposes of these Regulations is to ensure that doors in watertight bulkheads are kept closed during any voyage, regulation 3(1) provides for specific exceptions to this general requirement. In particular, it permits:—

(a) certain doors to be opened provided they are so opened in accordance with procedures laid down in written Operational Instructions carried on board the ship;

(b) any door to be opened on the express authority of the master for a specific purpose.

These exceptions are not applicable in conditions of restricted visibility or in any *potentially hazardous situation*. In such circumstances the doors must be kept closed except whilst briefly opened to permit access.

The Regulations (regulation 3(5)) do however permit the master to authorise the opening or closing of any watertight door in an emergency situation, provided he is satisfied that such action is essential for the overall safety of the ship.

4. In order to appreciate the importance of the proper operation of a ship's watertight doors it is necessary to understand the basic design principles which govern the fitting of such doors. A general outline of those principles is given in Annex 1 Paragraph 1. Annex 1 also contains an explanation of the correct operational procedures for watertight doors.

5. The Regulations referred to in paragraph 1 require ships to be provided with Operational Instructions based upon advice contained in this M Notice. That advice is set out in Annex 2. A recommended format for the operational instructions is also included in Annex 2. It is recommended that the instructions be drawn up in consultation with the ship's master and chief engineer. When they have been prepared a copy should be placed in the Ship's stability booklet, by 1st November 1987, ie the date when the Regulations come into force.

6. The Operational Instructions must be approved by the Secretary of State not later than 1st November 1988. Shipowners are therefore advised to submit their instructions for approval well in advance of that date. A copy of the Instructions so approved should be placed on the ship to replace the copy which is referred to in paragraph 5.

Department of Transport
Marine Directorate
London WC1V 6LP
July 1987

ANNEX 1

DESIGN AND OPERATIONAL PRINCIPLES FOR WATERTIGHT DOORS

GENERAL COMMENT

Most passenger ships are provided with internal watertight subdivision arrangements designed to withstand a specified volume of flooding in the event of the hull being breached. Whilst the effectiveness of these arrangements is dependent upon a number of factors, it is essential to ensure that any watertight door in the divisional bulkheads is closed when breaching occurs, or almost immediately afterwards. It is also essential to limit the number of access openings placed in the divisional bulkheads and also to exercise the strictest control over the operation of the watertight doors provided to close such openings.

1. Principles to be Observed when Fitting Watertight Doors in New Ships

1.1 *Number and Location of Doors (Applicable to New Ships)*

It has always been accepted that a number of access openings, closed by means of watertight doors, will be required in some watertight bulkheads for essential purposes, eg to inspect vital items of machinery, provide emergency or alternative means of escape, etc. Equally, however, it has always been stressed, both nationally and internationally, that the number of such openings should be kept to the absolute minimum compatible with the design and proper working of the ship.

Every effort should therefore be made to reduce, as far as practicable, the number of watertight doors fitted in any new passenger ship. This might be achieved in a number of ways. For example, in the accommodation spaces, efforts should be made to arrange access and escape routes in a manner which would minimise the need for people to pass through watertight bulkheads below the level of the bulkhead deck. In the case of service spaces and other working compartments, normal access should where possible be available without the need for continual passage through main bulkheads.

Acceptance of the location of any watertight door will however be dependent upon the Directorate being satisfied that its presence is essential for the proper working of the ship.

1.2 *The Position and Size of Watertight Doors (Applicable to New Ships)*

The possible effects of progressive flooding through an unclosed opening should always be taken into account when deciding upon the position and size of any watertight door. An unclosed door, lying wholly below the level of the waterline, obviously presents a great potential

hazard. To lessen such dangers, watertight doors should be kept as small as possible and be positioned, whenever practicable, close to the centreline with their sills as high as is possible and consistent with safe access and preferably above the level of the waterline.

2. OPERATION OF WATERTIGHT DOORS

2.1 *Means of Controlling Watertight Doors (Applicable to those Ships Fitted with Central/Local Control Facilities at Navigating Bridge Deck)*

The system adopted to give central control to the watertight doors fitted throughout the ship should be designed not only to ensure their efficient operation but also to reduce the risk of injury to personnel when passing through the doorway. To this end, the watertight door central control unit located in the navigating bridge should have two operating positions, one marked "local control" and the other "doors closed". When the "local control" position is selected any door should be capable of being opened or closed only by means of the local controller provided at each side of the door—automatic closure of the door should not be possible in this mode of operation.

Selection of the alternative position—"doors closed"—should cause all the doors to close. It should also ensure automatic closure of any door in the system if it is opened thereafter by the use of the local controllers. BECAUSE OF THE INCREASED RISK OF INJURY TO PERSONNEL WHEN USING THE DOORS IN THE AUTOMATIC CLOSING MODE use of the "doors closed" position should be restricted to emergency and drill or testing purposes, the latter always being preceded by an adequate warning signal.

2.2 *The Speed of closure of the Watertight Doors (Applicable to all Ships)*

All the power operated doors fitted in any ship must be capable of being closed from the navigating bridge within one minute. Whilst this is a relatively short period of time to close all doors, it should be borne in mind that recent studies have shown that progressive flooding through doorways, before effective closure of the watertight doors can be completed, could have disastrous results in some ships—in particular, ro-ro ferries. It follows, therefore, that prompt action must always be taken to close any watertight door which may be open when an emergency situation is imminent.

The speed of closure of an individual door should not cause unnecessary risk to the users. Where the closing mechanism permits, the doors should be adjusted so that they can be closed from the fully open position in not less than 20 seconds nor more than 40 seconds from first movement.

ANNEX 2

OPERATIONAL INSTRUCTIONS

1. Operational Instructions submitted for approval to the Secretary of State should specify in what circumstances, if any, and subject to what conditions, each watertight door in the ship may be opened. Two conditions of any voyage should always be catered for, ie those applicable in *potentially hazardous situations* when the highest standard of watertight integrity is required and those applicable in *normal conditions*, ie when *potentially hazardous situations* are not present. *Potentially hazardous situations* for this purpose include voyages:—

.1 in conditions of restricted visibility,

.2 during any part of a voyage within port limits, or within compulsory pilotage limits,

.3 where the depth of water is less than three times the ships draught, and

.4 in a situation which the master considers potentially hazardous due to,

(i) the proximity of underwater hazards (having regard to the degree of reliance that can be placed on the chart of the area—see Mariners Handbook Chapter 3, section 1), or

(ii) the density of the traffic in the vicinity, or

(iii) any other factor.

2. **Control Categories to be assigned to Watertight Doors for the purpose of Operational Instructions**

.1 Every watertight door, to which regulation 3(1) of the new Regulations applies, should be given a specific number and, depending upon the need there is for it to be opened or kept open in *normal conditions*, assigned one of the following categories:—

Type "A" — a door which may be open.

Type "B" — a door which should be closed. It may be open, but only whilst someone is working in the adjacent compartment.

Type "C" — a door which should be closed. It may be opened, but only for sufficient time to permit through passage.

.2 The Instructions must state that in *potentially hazardous situations* every watertight door must be closed except when a person is passing through it. They must also state that in *normal conditions* the doors are to be opened or closed in accordance with the category which has been assigned to them, see preceding paragraph.

.3 In deciding upon the appropriate category for each watertight door, account should be taken of the following factors:—

(a) for each watertight door, other than those fitted in machinery spaces:—

(i) whether there is a genuine need for the door to be kept open,

(ii) that whilst it may be very convenient to keep the door open for prolonged periods such an arrangement could put the safety of the ship at risk if the hull was suddenly breached,

(iii) whether a closed door can be opened and then closed again, safely and easily;

(b) for watertight doors fitted in machinery spaces:—

(i) the need for quick and easy surveillance of machinery spaces containing main propulsion machinery, essential auxiliaries, gear boxes, thrustblocks, CPP equipment, electrical power generating plant and fuel preparation and heating equipment; having regard to the fire risk and the critical nature of a machinery failure;

(ii) the increased risk of personnel being trapped by doors which do not have the improved facilities for local operation described in section 2.1 of Annex 1;

(iii) the extent to which fire detecting systems and bilge water level alarms are fitted;

(iv) whether a machinery control room is provided and the degree of remote control and remote surveillance that is possible; and

(v) the need to delay the onset of progressive flooding.

3. Supervision of Control Procedures at Sea

The Instructions should state that the operation of all those doors which are indicated on the bridge control unit should be supervised by the officer in charge of the watch by means of that unit.

4. Plans and Particulars required to be Submitted for All Ships

To enable the Directorate to make a proper assessment of the "Operational Instructions" being proposed the following plans and information should be submitted:

.1 the size, type and sill height of each door,

.2 (for new ships only) the reason why each door is to be fitted,

.3 a brief outline of the method of operation of the doors,

.4 The category of door proposed (as specified in paragraph 2.1) and the reason for selecting such a category,

.5 the draft Operational Instructions, entitled "Operational Instructions for the Control of Watertight Doors" to be issued to the master; such Instructions to be presented in the form of the Directorate's Model Instructions, appended to this Annex.

(Model Instructions relating to the control of Watertight Doors)

MV ..... **Official Number** .....

OPERATIONAL INSTRUCTIONS FOR THE CONTROL OF WATERTIGHT DOORS

1. These are the Operational Instructions for the control of the ship's watertight doors required by the Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1987, regulation 3.

2. All the watertight doors which may be opened during a voyage are to be operated (kept closed or opened) in accordance with the procedures given in these instructions and in the appended diagram entitled "Operation of the Ship's Watertight Doors".

3. **Marking and Categorisation of Watertight Doors**

Every one of the ship's [7*] doors has been given a specific number and if it is one which may be opened during a voyage assigned one of the following categories—Type A, Type B or Type C—to govern its use in *normal conditions*.

4. **Voyage Conditions**

The Instructions for the operation of the doors are given for two conditions of any voyage:

(a) those applicable in *potentially hazardous situations* and,

(b) those applicable in *normal conditions*.

5. For the purpose of these Instructions:

(1) *Potentially Hazardous Situations* are conditions where the ship is:

(a) in conditions of restricted visibility;

(b) on any part of a voyage within port limits or within compulsory pilotage limits;

(c) where the depth of water is less than three times the ship's draught;

(d) in a situation which the master considers potentially hazardous due to:

(i) the proximity of underwater hazards (having regard to the degree of reliance that can be placed on the chart of the area—see Mariner's Handbook Chapter 3 Section 1), or

---

* Insert appropriate number of doors.

(ii) the density of the traffic in the vicinity, or
(iii) any other factor.

(2) *Normal Conditions* are all conditions in which *potentially hazardous situations* do not exist.

6. Operation of Watertight Doors

The ship's watertight doors should be operated (opened and closed) as follows:

(1) In *Potentially Hazardous Situations* every watertight door must be closed except when a person is passing through it;

(2) In *Normal Conditions*:

(a) a Type A door may be kept open;

(b) a Type B door must be closed. It may be open but only whilst someone is working in the compartment adjacent to it;

(c) a Type C door must be closed. It may be opened but only for sufficient time to permit someone to pass through it.

(3) In addition to paragraph (2) any watertight door may be opened on the express authority of the master for a specific purpose and for no longer than a specific period of time. Where the master authorises the opening of any door in this way, details of the opening and authorisation must be recorded in the official Log Book.

7. Obstructions in Doorways

Any watertight door which is open must be kept clear of obstructions which might prevent its rapid closure.

*8. Control from the Bridge

The control for watertight doors at the navigating bridge can be set at either "doors closed" or "local control". It must be set at "local control" except during an emergency, a drill or for testing purposes.

9. Supervision from the Bridge

The operation of all watertight doors which are indicated on the bridge control unit must be supervised by the officer in charge of the watch by means of that unit.

---

* Delete when not applicable.

10. **Inspections**

All watertight doors (which are accessible while the ship is on a voyage), their controls and alarms, must be kept in efficient working condition and be inspected at intervals of not more than seven days.

11. **Drills**

The operation of the watertight doors must be tested at drills carried out as follows:

(a) any door which is normally kept closed, if accessible, is to be opened and closed at least once every seven days; this operation may however be delayed or advanced if conditions of restricted visibility or any other potentially hazardous situations prevail or are anticipated;

(b) all doors to be opened and closed prior to departure if the ship is to remain at sea for more than seven days;

(c) those doors which may be kept open or opened (ie Type A, B and C) during a voyage are to be opened and closed daily.

12. **Instructions in the use of the Watertight Doors**

ALL MEMBERS OF THE CREW WHO HAVE OCCASION TO USE ANY WATERTIGHT DOORS MUST BE INSTRUCTED IN THE SAFE OPERATION OF THOSE DOORS. IN ADDITION WRITTEN INSTRUCTIONS ON THE SAFE OPERATION OF THE DOORS, GIVEN IN EASILY UNDERSTOOD TERMS AND ILLUSTRATED WHEREVER POSSIBLE, SHALL BE AVAILABLE TO ALL MEMBERS OF THE CREW. SUCH INSTRUCTIONS SHOULD BE BASED ON THE CONTENTS OF THIS DOCUMENT.

13. **Emergency Situations**

These instructions govern the operation of watertight doors in either *normal conditions* or *potentially hazardous situations*. However when an emergency situation exists the master may ignore these instructions and authorise the opening or closing of any watertight door provided he is satisfied that such action is essential for the overall safety of the ship.

14. **Offences**

It is a punishable offence to contravene any of the provisions of the Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations, 1987.

The contents of this document satisfy the requirements of the Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1987, regulation 3.

Signed .....

The Marine Directorate, Department of Transport, London

Date .....

ANNEX 3

3. Copy of approved Operational Instructions for the Control of Watertight Doors

P&OSL Kent
10 November 1998

P&O
European Ferries

mv

Pride of Kent

Official Number 379259

OPERATIONAL INSTRUCTIONS FOR THE CONTROL OF WATERTIGHT DOORS

These Instructions are issued in compliance with Regulation 3(1)(a) of Statutory Instrument 1987 No. 1298.

The contents of this document satisify the requirements of

1. The Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1987, regulation 3.

and

~~2. The Merchant Shipping (Closing of Openings in Enclosed Superstructures and in Bulkheads above the Bulkhead Deck) Regulations 1988, regulation 8.~~ ACR

Signed....................................

Dept. of Transport - Marine Office ....

MARINE SAFETY AGENCY MSA MARINE SAFETY AGENCY

Date.................1995...File No. CM ....08.

1. OPERATIONAL INSTRUCTIONS FOR THE CONTROL OF WATERTIGHT DOORS

These are the Operational Instructions for the control of the ship's watertight doors required by the Merchant Shipping (Closing of Openings in Hull and in Watertight Bulkheads) Regulations 1987, Regulation 3.

2. PROCEDURES

All the watertight doors which may be opened during a voyage are to be operated (kept closed or opened) in accordance with the procedures given in these instructions and in the appended diagram entitled "Operation of the Ship's Watertight Doors".

3. MARKING AND CATEGORISATION OF WATERTIGHT DOORS

Every one of the ship's 10 doors has been given a specific number and, if it is one which may be opened during a voyage, assigned category:-

Type B - to govern its use in "normal" conditions.

4. VOYAGE CONDITIONS

The instructions for the operation of the doors are given for three conditions of any voyage;

a) those applicable to conditions which cannot be considered potentially hazardous within the meaning of the Regulations, ("normal");

b) those applicable in service to and from Dover (including any similar time chartered service), and

c) those applicable in potentially hazardous situations.

5. FOR THE PURPOSE OF THESE INSTRUCTIONS:

1. "Normal" Conditions are all conditions in which potentially hazardous situations do not exist.

2. Notwithstanding the fact that 'Dover' services are generally not considered as potentially hazardous, it is a P&O European Ferries (Dover) Ltd. requirement that doors be operated as if Dover services were potentially hazardous.

3. "Potentially Hazardous Situations" are conditions where a ship is:

   a) in conditions of restricted visibility;

   b) on any part of voyage within port limits or within compulsory pilotage limits;

   c) where the depth of water is less than three times the ship's draught;

   d) in a situation which the Master considers potentially hazardous due to;

      i) the proximity of underwater hazards (having regard to the degree of reliance that can be placed on the chart of the areas - (see Mariner's Handbook Chapter 3 section 1), or

      ii) the density of the traffic in the vicinity, or

      iii) any other factor.

6. OPERATION OF WATERTIGHT DOORS

The ship's watertight doors should be operated (opened and closed) as follows:

1. In Potentially Hazardous Situations every watertight door must be closed except when a person is passing through it.

2. In conditions which are not considered 'POTENTIALLY HAZARDOUS' within the meaning of the Regulations, ("normal"):

   a) a Type B door must be closed. It may be open but only whilst someone is working in the compartment adjacent to it.

3. In addition to paragraph 6(2) any watertight door may be opened on the express authority of the Master for a specific purpose and for no longer than a specific period of time. Where the Master authorises the opening of any door in this way, details of the opening and authorisation must be recorded in the Official Log Book.

4. P&O European Ferries (Dover) Ltd require that during all operating conditions in service to and from Dover, all watertight doors are closed. A door may be opened but only as sanctioned as per 6(5) hereunder.

5. Should it be necessary to open a watertight door at sea, except for passage through the door, permission must be sought **FROM THE MASTER.**

BEFORE GRANTING PERMISSION FOR WATERTIGHT DOORS TO BE OPENED IT MUST ALWAYS BE ENSURED THAT THE VESSEL CANNOT BE DEEMED TO BE IN A POTENTIALLY HAZARDOUS SITUATION WITHIN THE MEANING OF THE REGULATIONS.

WHENEVER SUCH PERMISSION IS GRANTED, ALL OTHER WATERTIGHT DOORS MUST REMAIN CLOSED. THEY MAY BE OPENED ONLY FOR SUFFICIENT TIME TO ALLOW THROUGH PASSAGE.

AT NO TIME MAY THE WATERTIGHT DOOR BE OBSTRUCTED BY ELECTRIC CABLES, HOSES OR ANY SOLID OBJECT.

Permission may be granted for a specific purpose and for no longer than a specific period of time.

Where authorisation for the opening of any door is given in this way, details of the opening and authorisation must be recorded in the Official Log Book.

7. OBSTRUCTIONS IN DOORWAYS

Any watertight door which is open must be kept clear of obstructions which might prevent its rapid closure.

8. CONTROL FROM THE BRIDGE

The control for watertight doors at the navigating bridge can be set at either "DOORS CLOSED" or "LOCAL CONTROL". It must be set at "LOCAL CONTROL", except during an emergency, a drill, or for testing purposes. By setting "LOCAL CONTROL", it allows the person passing through control of that door, thus reducing the possibility of injury to such person.

9. SUPERVISION FROM THE BRIDGE

The operation of all watertight doors which are indicated on the bridge control unit must be supervised by the Officer in charge of the watch by means of that unit.

10. INSPECTIONS

All watertight doors (which are accessible while the ship is on a voyage), their controls and alarms must be kept in efficient working condition and be inspected at intervals of not more than seven days.

11. DRILLS

The operations of the watertight doors must be tested at drills carried out as follows;

a) any door which is normally kept closed, if accessible, is to be opened and closed at least once every seven days; this operation may however be delayed or advanced if conditions of restricted visibility or any other potentially hazardous situations prevail or are anticipated;

b) all doors to be opened and closed prior to departure if the ship is to remain at sea for more than seven days;

c) those doors which may be kept open or opened (ie Type B) during a voyage are to be opened and closed daily.

12. INSTRUCTIONS IN THE USE OF THE WATERTIGHT DOORS

ALL MEMBERS OF THE CREW WHO HAVE OCCASION TO USE ANY WATERTIGHT DOORS MUST BE INSTRUCTED IN THE SAFE OPERATION OF THOSE DOORS. IN ADDITION, WRITTEN INSTRUCTIONS ON THE SAFE OPERATION OF THE DOORS, GIVEN IN EASILY UNDERSTOOD TERMS AND ILLUSTRATED WHEREVER POSSIBLE, SHALL BE AVAILABLE TO ALL MEMBERS OF THE CREW. SUCH INSTRUCTIONS SHOULD BE BASED ON THE CONTENTS OF THIS DOCUMENT.

Ship's Officers are advised that although the watertight doors in this vessel can be closed from the Bridge in an emergency, it is imperative that the siting of ALL the individual remote control positions is known, and the method of operation of said watertight doors at those positions is fully understood.

13. EMERGENCY SITUATIONS

These instructions govern the operation of watertight doors in normal conditions, Dover service and Potentially Hazardous Situations. However, when an emergency situation exists the Master may ignore these instructions and authorize the opening or closing of any watertight door, provided he is satisfied that such action is essential for the overall safety of the ship.

14. OFFENCES

It is a punishable offence to contravene any of the provisions of The Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1987.

The Operational Procedures as laid down in this document are applied to this vessel.

Signed .... Signed ....

Senior Master Senior Chief Engineer Officer

Date 6.7.95 Date 5\7\95

Department of Transport Official Stamp

The contents of this document satisfy the requirements of the Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1987, regulation 3.

Signed ....

Marine Safety Agency London District Marine Office

Date 31 JUL 1995 SM 4464/2/1/3

MARINE SAFETY AGENCY LONDON MSA MARINE SAFETY AGENCY

15. WATERTIGHT DOORS DETAILS

Door No.	Adjacent Compartments	H x W	Sill Height
1	Dry provision room/ Cold provision room	1900 x 1010	~~3320~~ 3230 M.Lagly
2	Engine control room/ Gear box room	1900 x 600	3460
3	Gear box room/ Store handling room	1940 x 1250	3200
4	Store handling room/ Tax free store	1900 x 1000	3200
5	Forward stabiliser room/ Separator room	1900 x 1000	600
6	Separator room/ Auxiliary room	1900 x 900	600
7	Auxiliary room/ Main engine room	1900 x 1250	~~720~~ 850 M.Lagly
8	Main engine room/ Gear box room	1900 x 900	~~530~~ 470 M.Lagly
9	Gear box room/ CPP room	1900 x 900	600
10	CPP room/ Shaft tunnel	1900 x 600	600

NB. All dimensions are in millimetres.
Height and width are measured inside door frame.
Sill heights are measured from the tank top or deck of the adjacent watertight compartment.

16.1 OPERATION OF THE SHIP'S WATERTIGHT DOORS

The main control panel on the bridge allows for the selection of one of two modes of operating the doors;

1 'LOCAL CONTROL' is the normal mode and each door is capable of being opened and closed from the local position on each side of the door;

2 'DOORS CLOSED' which results in automatic closure of all the doors on the ship and is used in emergency situations. During operation in this mode it is possible to open a door locally but the door remains open only so long as the control handle is held in the 'open' position. Therefore YOU ARE ADVISED OF THE INCREASED RISK OF INJURY WHEN USING THE DOORS IN AUTOMATIC CLOSURE MODE. See 16.2.1.

3 If a particular door does not operate for any reason, use the nearest alternative exit from the compartment (or emergency stairs or escape).

4 No crew member is allowed to operate a subdivision watertight door (WTD) until he has been trained and has received a 'Certificate of Competence to Operate Ship's Watertight Doors' which has been signed by a second engineer officer and a master.

16.2 MEANS OF OPERATION

16.2.1 "Local Control" & " Doors Closed" operation with power

1 Move the control lever to 'open' position and hold until door is fully open keeping the free hand clear of the door.

2 Still firmly holding the lever in the open position, reach through the door and grasp the lever on the other side of the bulkhead.

3 Holding both levers in the open position, pass through the door releasing the first lever when both feet are firmly on the deck on the other side of the door.

4 Stand well clear of the door, and for;

a) "Local Control" operation; move the lever to the closed position until door is fully closed; or for,

b) "Doors Closed" operation; release the lever; the door will now close automatically.

NB. i When more than one person is passing through the door, only one person is to operate the door;
a) all persons other than the operator must stand well back from the door until it is fully open;
b) only pass through the door once the operator signals to them that it is safe to do so;
c) after all persons have passed through the door and are well clear the door must be closed immediately.

ii During "Doors Closed" operation an alarm will sound as soon as the door begins to open. The alarm will operate continuously until the door is closed again. If the door is already open and the alarm operates it means that the door is about to close.

iii All personnel not involved in the operation of the door must stand well clear whilst the door is opening or closing as serious injury is possible in either case.

iv When carrying anything through a watertight door, at least two persons must be involved. One person must hold the control lever in the open position whilst the other person carries the object through the door.

16.2 MEANS OF OPERATION (continued)

16.2.2 "Local" operation during a power failure

1 In the event of loss of electrical power to the watertight door power pack there should normally be sufficient stored pressure in the system to open and close each door at least once. Doors can be opened and closed as described in 16.2.1 (above) until the stored pressure is exhausted.

2 When the stored pressure is exhausted, the doors can still be operated locally by use of the hand pumps. This operation can be carried out from either side of the door.

i Put the control lever in the direction in which the door is to move;

ii operate the hand pump whilst holding the control lever in the in the operating position, and continue pumping until the door is either fully opened or fully closed as required.

16.2.3 Remote operation during a power failure

In the event of a loss of electrical power to the watertight door power pack all doors can be closed from the remote hand pump stations which are situated on "G" Deck. To close a door from this control station, move the control lever for the door concerned to the "close" position and whilst holding the lever operate the hand pump. The open or closed status of the door is shown on the indicator panel.

16.2.4 Watertight door alarms

a) Sounding of the local warning alarm indicates that Bridge Remote Control has been put in the 'DOORS CLOSED' position. If the door is open it means that the door is about to close. No attempt should be made to pass through the door until the operating lever is moved first to the 'open' position; then the appropriate operating instructions should be followed. See 16.2.1.

b) Watertight doors which are situated in passenger accommodation areas have alarms that are activated when the door moves irrespective of operating mode.

References: SI 1987 No 1298,
M 1283, M1326,
CSWP 9.9
FR 3.13, 3.13.2, 2.6.10, 2B.8.11, 2B.9.15

ANNEX 4

4. Copy of Company Instructions, SI 1987 No 1298 and Certificate of Competence issued to J Williams

P&OSL Kent
10 November 1998

3.6 OPERATIONAL ROUTINES

TESTING OF EQUIPMENT AND GEAR

The testing of Bridge Equipment is to be carried out at least once every 24 hours and as per FLEET REGULATIONS 10.8, and required checklists to be completed. Other equipment to be tested as specified in Senior Master's and Senior Chief Engineer's Standing Orders.

A Deck Officer and an Engineer Officer will be responsible for carrying out the Bridge Equipment tests, at a time so decided by the Senior Master and Senior Chief Engineer which will be dependent on the vessel's sailing schedules.
(Ref: Steering Gear SMSO/10.4.1. Bridge Equipment SMSO/4.6 Checklist SMSO/10.1.)

DAILY SOUNDINGS

Soundings of all oil; water and void spaces are to be taken daily. Copies of these sounding sheets are to be placed for display on the Bridge and in the Engine Control Room.

WATERTIGHT DOORS

STATUTORY INSTRUMENT 1987 NO.1298 - THE MERCHANT SHIPPING (CLOSING OF OPENINGS IN HULLS AND IN WATERTIGHT BULKHEADS) REGULATIONS 1987

The operational instructions for the control of watertight doors as required under regulation 3 of the above statutory instrument are to be adhered to at all times.A full copy of these instructions are contained in section 10.3.1 of these Standing Orders.

OPERATION OF CARDECK RAMPS

Regardless of department, only properly Certificated Personnel are allowed to operate the cardeck ramps. The Chief Officer will maintain a record of all such personnel on board,and to oversee the instruction, examination and issue of new Certificates as necessary.

When operating a Car deck ramp or platform a second person must always be in attendance to ensure that no other person passes under or on to the moving platform. Operator and observer must be continually in sight and communication with each other. For engine personnel if called to the car deck to operate ramps with passengers anywhere present, a deck officer also is to be in attendance.

8D WATERTIGHT DOORS

8D.1 OPERATION

General Instructions

The water tight doors on this vessel are category "B" although while on the Dover service they are all treated as being category "C" which means that they must be closed at sea and only opened for sufficient time to allow passage through. THE WATERTIGHT DOORS MUST ALWAYS BE CLOSED AT SEA OR ON STAND BY. EXCEPT WHEN PASSING THROUGH. DISCIPLINARY ACTION WILL BE TAKEN AGAINST OFFENDERS TO THIS REQUIREMENT.

The normal mode of operation (selected from the bridge) is "local control" which means the doors are only capable of being opened and closed from the local position on each side of the door. However, during an emergency the bridge can select "doors closed" which results in automatic closure.YOU ARE ADVISED OF THE INCREASED RISK OF INJURY WHEN USING THE DOORS IN AUTOMATIC CLOSURE MODE.

Operating Instructions

1 Move lever to "open" position and hold until door is fully open keeping your free hand clear of the door.
2 Still firmly holding the lever in the open position, reach through the door and grasp the lever on the other side of the bulkhead.
3 Holding both levers in the open position, pass through the door releasing the first lever when both feet are firmly on the deck.
4 Stand well clear of the door and move the lever to the closed position until door is fully closed.

8D.2 TESTING/DRILLS

Drills/Training

Each member of the engine room staff must be trained in the above procedure on first joining the vessel and acknowledge that he has understood by signing the familiarisation form. Training must include the following points and when completed satisfactorily a certificate will be issued:-

1 A general understanding of the hydraulic system.
2 Passing through the door when it is on local control.
3 Passing through the door when it is on Bridge control/closed mode.
4 Passing through the door when there is no power available.
5 Closing the door from the remote position.
6 Keeping clear of the door during opening.

Testing

The doors are to be tested each day to check that they can be closed from the bridge. The duty motorman to prepare for this by opening all the engine room doors on arrival A.M. Dover. Weekly testing of the doors must include all mechanisms (power and hand pump), indicators and warning devices.

8D.3 INSPECTION

See testing above.

8D.4 CARGO ACCESS DOORS and HATCHES

See Senior Masters Standing Orders.

10A.2.2

M.V. PRIDE OF KENT OFFICIAL NUMBER 379259

OPERATIONAL INSTRUCTIONS FOR THE CONTROL OF WATERTIGHT DOORS

TO BE FOUND WITH SHIP'S OFFICIAL CERTIFICATES AND DOCUMENTS MASTER'S CABIN.

1987 No. 1298

MERCHANT SHIPPING

SAFETY

The Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1987

Made - - - -	*23rd July 1987*
Laid before Parliament	*24th July 1987*
Coming into force	
Regulation 3(1)(a)(ii)	*1st November 1988*
All other Regulations	*1st November 1987*

The Secretary of State, after consulting with the persons referred to in section 22(2) of the Merchant Shipping Act 1979(a) in exercise of the powers conferred on him by section 21(1)(a), (3), (4) and (6) of that Act, and of all other powers enabling him in that behalf, hereby makes the following Regulations:

Citation, interpretation, application and revocation

1.—(1) These Regulations may be cited as the Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1987 and shall come into force on 1st November 1987, except for regulation 3(1)(a)(ii) which shall come into force on 1st November 1988.

(2) In these Regulations the following expressions have the following meanings respectively –

"locked" means secured by a device which prevents unauthorised operation;

"margin line" has the same meaning as in the Merchant Shipping (Passenger Ship Construction and Survey) Regulations 1984(b);

"passenger ship" means a ship carrying more than 12 passengers and propelled by electricity or other mechanical power;

"required to be watertight" means required by the Merchant Shipping (Passenger Ship Construction and Survey) Regulations 1984 or the Merchant Shipping (Passenger Ship Construction) Regulations 1980(c) to be watertight;

"restricted visibility" means any condition in which visibility is restricted by fog, mist, snow, rainstorms, sandstorms or any other similar causes;

"United Kingdom passenger ship" means a passenger ship which is a United Kingdom ship.

(3) A voyage for the purpose of these Regulations commences when a ship leaves its berth or anchorage at a port.

(a) 1979 c.39; section 21(6) was amended by section 49(3) of the Criminal Justice Act 1982 (c.48). (b) S.I. 1984 1216; a relevant amendment is S.I. 1985/660. (c) S.I. 1980 535; a relevant amendment is S.I. 1985/660.

(4) The reference to Merchant Shipping Notice No. M 1283 shall include a reference to any subsequent Merchant Shipping Notice amending or replacing it which specifies the date on which such subsequent Notice takes effect and which the Secretary of State considers relevant from time to time.

(5) For the purpose of these Regulations a closing appliance shall be deemed to be below the margin line if the sill of the opening with which it is associated is below that line.

(6) These Regulations apply to United Kingdom passenger ships.

(7) The Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1980(a) are hereby revoked.

(8) A reference in these Regulations to a numbered regulation is a reference to the regulation of that number in these Regulations.

Closure of hull openings, watertight doors, openings in watertight bulkheads, etc.

2.—(1) The following closing appliances are to be securely closed before the ship proceeds on any voyage and are to be kept so closed until the ship has been secured at a berth or anchorage:

(a) watertight doors below the margin line fitted in bulkheads which are required to be watertight and which separate cargo spaces;

(b) sidescuttles which can be opened and which are situated below the margin line;

(c) deadlights of any sidescuttles which are situated below the margin line and which –

(i) will not be accessible whilst the ship is at sea; or

(ii) are situated in spaces appropriated for use sometimes for the carriage of cargo and sometimes for use by passengers, while such spaces are being used for the carriage of cargo; and

(d) gangway and cargo loading doors below the margin line.

(2) No closing appliance described in sub-paragraphs (a), (b), (c) or (d) of paragraph (1) of this regulation shall be considered as being securely closed unless it is locked.

3.—(1) Watertight doors below the margin line fitted in bulkheads which are required to be watertight, other than those doors described in regulation 2(1), shall be kept closed whilst the ship is on any voyage except:

(a) when opened in accordance with the procedures laid down in written operational instructions which are –

(i) based upon the advice contained in Merchant Shipping Notice No. M 1283;

(ii) approved by the Secretary of State;

(b) when opened for the purposes of drill required by regulation 6; or

(c) when any such door is opened on the express authority of the master for a specific purpose and for no longer than a specific period of time provided that all other watertight doors below the margin line, except those opened in accordance with the provisions of sub-paragraph (a), are closed during that period.

(2) The operational instructions referred to in paragraph (1)(a) shall be kept on board the ship at all times in the custody of the master.

(3) Notwithstanding sub-paragraphs (a), (b) and (c) of paragraph (1) above, every watertight door of the type described in that paragraph shall, except where there is an immediate need to pass through, be kept closed whilst the ship is on a voyage–

(a) S.I. 1980/540.

(a) in conditions of restricted visibility;

(b) within port limits or compulsory pilotage limits;

(c) where the depth of water is less than 3 times the ship's draught; and

(d) in any other conditions which the master considers potentially hazardous owing to–

(i) the proximity of underwater hazards,

(ii) the density of traffic, or

(iii) any other factor

and if any such door is opened in such circumstances then it shall be closed immediately after passage through it has been effected.

(4) Any watertight door which may be opened in accordance with the requirements of paragraphs (1) or (3) of this regulation shall be kept clear of obstructions which might prevent its rapid closure.

(5) Notwithstanding the requirements of this regulation or regulation 2, in an emergency situation the master may authorise the opening or closing of any watertight door, provided he is satisfied that such action is essential for the overall safety of the ship.

4. Every portable plate closing an opening below the margin line in any portion of the internal structure of the ship which is required to be watertight shall be fitted in place before the ship proceeds on any voyage and shall be kept in place, except in case of urgent necessity, until the ship has been secured at a berth or anchorage. In replacing any such plate all reasonable precautions shall be taken to ensure that the joints are watertight.

5. Both the watertight cover and the automatic non-return valve of any ash-shoot, rubbish-shoot or other similar device on the ship having its inboard opening below the margin line shall be kept closed and secured when such device is not in use.

Drills and inspections

6.—(1) All deadlights which are accessible, all watertight doors to which regulation 3 applies, all valves and closing mechanisms of scuppers and the devices referred to in regulation 5 shall be opened and closed for purposes of drill –

(a) at intervals of not more than seven days except so far as is necessary to avoid drills being conducted in any of the situations described in regulation 3(3); and

(b) immediately before the ship proceeds to sea if the ship is intended to remain at sea for a period of more than seven days.

(2) All watertight doors fitted in bulkheads required to be watertight which may be opened for the working of the ship in accordance with the requirements of regulation 3 shall be opened and closed for the purposes of drill once in every period of 24 hours.

(3) All closing appliances and devices referred to in regulations 2 and 5 shall be inspected by a person appointed by the master for that purpose –

(a) before the ship proceeds on any voyage; and

(b) at intervals of not more than seven days if the ship is intended to remain at sea for a period of more than seven days, except when they are not accessible.

7.—(1) The following closing appliances and mechanisms are to be inspected at intervals of not more than seven days by a person appointed for that purpose either generally or on any particular occasion by the master:

(a) all watertight doors other than those of the type described in regulation 2(1);

(b) all mechanisms, indicators and warning devices connected with such doors;

(c) all valves, the closing of which is necessary to make watertight any compartment below the margin line; and

(d) all valves, the operation of which is necessary for the efficient operation of damage-control cross-connections.

(2) Suitable notices and signs shall be provided on, or in the vicinity of, all the closing appliances referred to in paragraph (1) to indicate, as necessary, the procedures for operating the appliances, the purpose of the controls and any precautions to be observed.

Training

8. All members of the crew who would have occasion to use any watertight doors shall be instructed in the safe operation of watertight doors. In addition written instructions on the safe operation of the doors, given in easily understood terms and illustrated wherever possible, shall be available to all members of the crew. Such instructions shall be based upon the operational instructions referred to in regulation 3(1)(a).

Entries in official log book

9. Entries shall be made in the official log book recording the following:

(a) the times of the last closing, before the ship proceeds on any voyage, of the watertight doors and other closing appliances referred to in regulation 2 and of the next opening of such doors and closing appliances;

(b) the times of the opening and closing of any watertight door pursuant to regulation 3(1)(c);

(c) the times when the portable plates referred to in regulation 4 are fitted in place and the times of any removal and replacement of such plates whilst the ship is on any voyage; and

(d) the occasions on which drills are held and inspections made in compliance with these Regulations and whether or not the closing appliances and devices to which any such drill or inspection relates are in good working order when the drill or inspection takes place.

Penalties

10.—(1) If there is a breach of any of the provisions of these Regulations then the master and owner of the ship shall each be guilty of an offence and liable on summary conviction to a fine not exceeding £1,000 or on conviction on indictment, to imprisonment for a term not exceeding two years and a fine.

(2) Any person who fails to carry out an inspection which he has been appointed by the master to carry out under regulations 6(3) or 7 shall be guilty of an offence and liable on summary conviction to a fine not exceeding £500.

(3) It shall be a good defence to a charge under these Regulations to prove that the person charged took all reasonable steps to avoid commission of the offence.

Paul Channon
Secretary of State for Transport

23rd July 1987

EXPLANATORY NOTE

(This note is not part of the Regulations)

These Regulations supersede the Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1980. They apply to United Kingdom passenger ships and include such requirements as appear necessary to the Secretary of State to implement the provisions contained in regulation 15 (which relates to openings in watertight bulkheads) of Chapter II-1 of the International Convention for the Safety of Life at Sea 1974 (Cmnd 7874) as amended, and impose additional, more precise requirements for the control of watertight doors and other closing appliances and devices, for their inspection, for practice drills and for relevant entries in the official log book.

The Regulations also require the provision of operational instructions for watertight doors.

Certificate Of Competence To Operate Ships Watertight Doors and Cargo Access Doors

Name of Holder J. Williams *Discharge Book No.* R 759331

Signature of Holder J Williams

This is to certify that the above named person has received adequate theoretical instruction and practical training in the use of the equipment specified below. He has been tested in the use of such equipment and is competent to use them when so authorised by a responsible ship's officer.

This certificate applies ONLY to the operation of the following equipment on the vessel named below:

Name of Vessel **Pride of Kent**

Details of Equipment	*Date of Test*	*Signature of Examining Officer*
★*Subdivision Watertight Doors*	25th May 1994	3/E/O
~~★*Cargo Access Doors: Bow*~~		
~~★*Cargo Access Doors: Stern*~~		
~~★*Bridge Front*~~		

Signed _____ *Master* *Date* 25/5/94

★*Delete those not applicable*

P&O European Ferries

ANNEX 5

5. Copy of Weekly Planned Maintenance Test Sheets

P&OSL Kent
10 November 1998

PLANNED MAINTENANCE JOB WORKSHEET

12th November 1998

Title : Safety Routines

Task No : 0085

Task : WTD's - Test operation of water tight doors as per instructions

PM Code : M953004
Date Due : 17/11/1998
Frequency: 7 Days

---- TASK HISTORY ----

Planned : Y

Completion Date : 10/11/1998
Name: R.J. & P.D.

Completed Satisfactorily

Planned : Y

Completion Date : 03/11/1998
Name: B.S.& M.J.

Completed Satisfactorily

Planned : Y

Completion Date : 27/10/1998
Name: PJG

Awaiting return of repaired isolator transformer.

Reference Note : CLEANING ACC 9 APPLICATION LANCES.

Title : Safety Routines

Task No : 0025 Task : WTD's - Test operation of water tight doors as per PM Code : M953004

--- TASK HISTORY ---

PM Comp. Date	Planned	Updated	Comp Hours	Name		Inspect Date
10/11/1998	Y		0	R.J. & P.D.	*****	11/11/1998
	Completed Satisfactorily					
03/11/1998	Y		0	B.S.& M.J.	*****	04/11/1998
	Completed Satisfactorily					
27/10/1998	Y		0	PJG		29/10/1998
	Awaiting return of repaired isolator transformer.					
29/10/1998	Y		0	GEB		29/10/1998
	DEFI					
30/09/1998	Y		0	R.J.	*****	30/09/1998
	Completed Satisfactorily					
30/09/1998	Y		0	R.J.	*****	30/09/1998
	Completed Satisfactorily					
22/09/1998	Y		0	PJG/C.E.	*****	22/09/1998
	Completed Satisfactorily					
14/09/1998	Y		0	MIKE	*****	15/09/1998
	Completed Satisfactorily					
07/09/1998	Y		0	PD & MJ	*****	08/09/1998
	Completed Satisfactorily					
01/09/1998	Y		0	BD & PC (days)	*****	02/09/1998
	Completed Satisfactorily					
31/08/1998	Y		0	B.D.	*****	03/09/1998
	Completed Satisfactorily					
25/08/1998	Y		0	P Delaney	*****	26/08/1998
	Completed Satisfactorily					

Title : Safety Routines

Task : WTD's - Test operation of water tight doors as per PM Code : M953004

--- TASK HISTORY ---

PM Comp. Date	Planned	Updated	Comp Hours	Name		Inspect Date
[illegible]	Y		0	MIKE		15/09/1998
	Wrong date put in opps!					
15/08/1998	Y		0	BD & K-B	*****	18/08/1998
	Completed Satisfactorily					
11/08/1998	Y		0	PC CE	*****	11/08/1998
	Completed Satisfactorily					
[illegible]	Y		0	PC & CE		21/08/1998
	Completed Satisfactorily - OOPS forgot backdate again!					
02/08/1998	Y		0	MIKE	*****	04/08/1998
	Completed Satisfactorily					
[illegible]	Y		0	MIKE/Brett	*****	29/07/1998
	Completed Satisfactorily					
[illegible]	Y		0	G.Underwood.	*****	21/07/1998
	Completed Satisfactorily					
[illegible]	Y		0	MIKE/AM	*****	14/07/1998
	Completed Satisfactorily					
[illegible]	Y		0	M.T.	*****	08/07/1998
	Completed Satisfactorily					
29/06/1998	Y		0	M.T.	*****	30/06/1998
	Completed Satisfactorily					
[illegible]	Y		0	G.U.7	*****	23/06/1998
	Completed Satisfactorily					
[illegible]			0	BAS/L.CLEAVER	*****	16/06/1998
	Completed Satisfactorily					

Title : Safety Routines

Task : WTD's - Test operation of water tight doors as per PM Code : M953004

--- TASK HISTORY ---

PM Comp. Date	Planned	Updated	Comp Hours	Name		Inspect Date
09/06/1998	Y		0	MIKE/TED	*****	09/06/1998
	Completed Satisfactorily					
02/06/1998	Y		0	B.D.& G.U.	*****	02/06/1998
	Completed Satisfactorily					
26/05/1998	Y		0	D.S.& E.K-B.	*****	26/05/1998
	Completed Satisfactorily					
19/05/1998	Y		0	A.M. & P.D.	*****	20/05/1998
	Completed Satisfactorily					

PRIDE OF KENT.

RECORD OF WEEKLY INSPECTION OF WATERTIGHT DOORS.

The following list of watertight doors are to be tested on a weekly basis. (normally on a Monday night).

(1). Isolate pumps.
(2). Vent pressure.
(3). Check alarm and lamp (on bridge mimic board).
(4). Check operation of both main pumps. (change over on bridge mimic board).
(5). Check correct cut in and cut out pressures. (45 - 65 bar).
(6). Check E.R. and bridge mimic lights.
(7). Complete the following check off list.

Week No : - 45

Pump pressures	Cut in	Cut out
Pump 1	45	63
Pump 2.	47	65

Door No	Green lamp	Red lamp	Bell	Operation from remote position	Operation from local position	Initial
I	✓	✓	✓	✓	✓	
II	✓	✓	✓	✓	✓	
III	✓	✓	✓	✓	✓	
IV	✓	✓	✓	✓	✓	
V	✓	✓	✓	✓	✓	
VI	✓	✓	✓	✓	✓	
VII	✓	✓	✓	✓	✓	
VIII	✓	✓	✓	✓	-	
IX	✓	✓		✓	✓	
X	✓	✓	✓	✓	✓	

The following defects were found (complete defect chit if not rectified on day of test) : -

Test conducted by : - B. Standard 3/E Engineer officer 4-11-98 Date.

..... Deck officer ..... Date.

Chief engineer is to be informed of any defects on the day of test.
(This sheet is to be retained in the ECR file for 3 months).

PRIDE OF KENT.

RECORD OF WEEKLY INSPECTION OF WATERTIGHT DOORS.

The following list of watertight doors are to be tested on a weekly basis. (normally on a Monday night).

(1). Isolate pumps.
(2). Vent pressure.
(3). Check alarm and lamp (on bridge mimic board).
(4). Check operation of both main pumps. (change over on bridge mimic board).
(5). Check correct cut in and cut out pressures. (45 - 65 bar).
(6). Check E.R. and bridge mimic lights.
(7). Complete the following check off list.

Week No : - 46

Pump pressures	Cut in	Cut out
Pump 1	45	64
Pump 2.	46	63

Door No	Green lamp	Red lamp	Bell	Operation from remote position	Operation from local position	Initial
I	✓	✓	✓	✓	✓	RB
II	✓	✓	✓	✓	✓	RB
III	✓	✓	✓	✓	✓	RB
IV	✓	✓	✓	✓	✓	RB
V	✓	✓	✓	✓	✓	RB
VI	✓	✓	✓	✓	✓	RB
VII	✓	✓	✓	✓	✓	RB
VIII	✓	✓	✓	✓	✓	RB
IX	✓	✓	✓	✓	✓	RB
X	✓	✓	✓	✓	✓	RB

The following defects were found (complete defect chit if not rectified on day of test) : -

Test conducted by : - ..... Engineer officer ..... Date.

..... ~~Deck officer~~ 11/1/98 Date.

Chief engineer is to be informed of any defects on the day of test.
(This sheet is to be retained in the ECR file for 3 months).

ANNEX 6

6. Copy of three monthly Planned Maintenance Test Sheets

P&OSL Kent
10 November 1998

PLANNED MAINTENANCE JOB WORKSHEET 14th November 1998

Title : Watertight Door System

k No : 0705 Task : Hydraulic Pump Unit Doors & Controls PM Code : M200501
Check over the system for hydraulic leaks, loose clips etc. Date Due : 30/10/1998
Watch: BD Check oil oil level, clean filter 6 monthly Frequency: 90 Days
Record all repairs on this card

leted Date :

ents :

:

---- TASK HISTORY ----

ned : N Completion Date : 16/10/1998
Name: BD

£5 Watertight door control spindle bulkhead penetration cut out and new drilled plate welded in to improve alignment with control block. AT REFIT!

ed : N Completion Date : 01/08/1998
Name: BD

New rocking lever (Item No3) fitted to No VII WTD. Old one had sheared after 15months!

ed : Y Completion Date : 10/05/1998
Name: BD

All OK

---

ce Note : CLEANING ACC 9 APPLICATION LANCES.

Title : Watertight Door System

Task No : 0705 Task : Hydraulic Pump Unit Doors & Controls PM Code : M200501

--- TASK HISTORY ---

PM Comp. Date	Planned	Updated	Comp Hours	Name		Inspect Date
01/11/1998	N	N	0	BD pp M Pearce		
	S5 WTD control block loosened on holding down bolts and allowed to find its own position relative to bulkhead spindle. Mounting packed out with washers No leaks at present and handle moves freely. Defect R 360 cleared.					
16/10/1998	N	N	0	BD		
	S5 Watertight door control spindle bulkhead penetration cut out and new drilled plate welded in to improve alignment with control block. AT REFIT!					
21/08/1998	N	Y	0	BD		21/08/1998
	New rocking lever (Item No3) fitted to No VII WTD. Old one had sheared after 15months!					
15/05/1998	Y		0	BD		15/05/1998
	All OK					
17/02/1998	Y		0	BD		17/02/1998
	Handle to No. VII WTD control (MER side) refitted securely. Pump unit filter checked clean.					
09/11/1997	Y		0	BD	PDP	09/11/1997
	Corroded pipes on G Deck replaced at refit. Several operating levers at local controls re-aligned to suit MSA Surveyor. New cross connecting drain valve fitted at power pack.					
19/07/1997	Y		0	BD		19/07/1997
	No VII watertight door operating handle (MER) resecured.					
23/04/1997	Y		0	BD		23/04/1997
	Checks completed.					
17/04/1997	N	N	0	R.Parker		23/04/1997
	No.7 door. Item 3 rocking lever broke. New lever & 7b end cover fitted. Steel pipe at G deck on opening line leaking, fixed.					
19/12/1996	N	N	0	BD		03/01/1997
	Section of corroded pipe on G Deck, supplying No X door, renewed. Several similar pipes are badly corrode and will need attention soon. Pipe and fittings ordered.					

Title : Watertight Door System

[illegible] No : 0705 Task : Hydraulic Pump Unit Doors & Controls PM Code : M200501

--- TASK HISTORY ---

PM Comp. Date	Planned	Updated	Comp Hours	Name			Inspect Date
[illegible]/12/1996	Y		0	BD			03/01/1997
	OK						
[illegible]/08/1996	Y		0	BD	PDP		24/08/1996
	Checks completed - filter clean.						
[illegible]/05/1996	Y		0	BD			28/05/1996
	Sealing arrangements (rubber rings and collars) fitted to several control-handles where passing thro' bulkheads. No.II door operating valve block leaking so replaced with spare.						
1[illegible]/12/1995	N	N	0	BD (&GU)			13/12/1995
	No VI WTD oil and dust seals renewed at piston rod entry to ram.						
05/12/1995	Y		0	BD			05/12/1995
	No II WTD control block end cover (for operating lever) replaced with spare No VI WTD ram seals to change when opportune.						
[illegible]5/12/1995	Y		0	BD			13/12/1995
	Further to previous comment - filter inspected and cleaned of metallic particles (1/2 teaspoon). Suggest further check soon after refit!						
29/08/1995	Y		0	BD			30/08/1995
	PM completed. Still awaiting spares to remedy leaks on door operating v/v.						
[illegible]1/05/1995	Y		0	BD			02/06/1995
	PM Completed,						
[illegible]/05/1995	N	N	0	BD	GEB		02/06/1995
	#6 W/T Door pipework leaking at deck fitting on G Deck. Nipped up! (ref Defect D0340)						
[illegible]/03/1995	N	N	0	BD pp GU			01/04/1995
	5I W/T Door leaks dealt with. (ref Defect H 602).						

Title : Watertight Door System

Task : Hydraulic Pump Unit Doors & Controls PM Code : M200501

--- TASK HISTORY ---

PM Comp. Date	Planned	Updated	Comp Hours	Name	Inspect Date
11/03/1995	N	N	0	M.T.	11/03/1995
	New flow control regulating valve fitted in closing supply pipe line,of all doors,to control closing speed of door.				
22/01/1995	Y		0	GEB	22/01/1995
	Serviced at refit by Maselec aft accumulator MT bag replaced an one low pressure restored to 35 bar, 3 off accumulators have small schrader fitting and were unable to be checked. to be changed.				
10/11/1994	Y		0	B D	10/11/1994
	PM completed.				
19/10/1994	N	N	0	BLD	19/10/1994
	No 2 W.T. door operating leaver seals renewed, new end cover fitted				
19/10/1994	Y		0	BLD	19/10/1994
	All checked and OK.				

ANNEX 7

7. Merchant Shipping Notices No's M.1151 & M.1326

P&OSL Kent
10 November 1998

DEPARTMENT OF TRANSPORT MERCHANT SHIPPING NOTICE NO. **M.1151**

THE OPERATIONAL CONTROL OF WATERTIGHT DOORS IN PASSENGER SHIPS

Notice to Shipowners, Masters and Chief Engineers of Passenger Ships

The Court of Formal Investigation* into a recent casualty involving a passenger ferry made a number of recommendations, one of which expressed the view that the practice of closing watertight doors at sea should comply with Regulation 3 of the Merchant Shipping (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1980. (SI 1980 No. 540). This regulation states that when a passenger ship proceeds to sea the master shall ensure that every watertight door (not being a door fitted in a watertight bulkhead dividing cargo between deck spaces) shall be kept closed while the ship is at sea, except when it is required to be open for the working of the ship.

On the question of door closure the Court found (paras 21.40 and 21.41 of the Report) that:

> "The current practice of indiscriminately keeping all doors in machinery spaces open in clear visibility cannot be justified"; and also
>
> "The threat to the watertight integrity of a vessel fitted with power operated doors of a collision is not, in clear visibility, sufficient to justify a practice of indiscriminately keeping all watertight doors closed except when required to be open for the working of the ship."

It is considered essential that Shipowners and Masters take careful note of these findings and also that they take what measures they consider necessary to provide against the possibility of progressive flooding through open watertight doors in the event of collision or grounding.

Shipowners should therefore examine the present arrangements in their ships and provide each master with instructions relating to the operational control of all the watertight doors fitted in his ship. The objective of these instructions being to ensure the highest practicable degree of watertight subdivision having regard to the risks of collision or grounding on different parts of the route, which may be affected by the prevailing or forecast weather conditions, and to the practical difficulties of ensuring:

(*a*) the effective monitoring and safe operation of machinery;

(*b*) the safety of the persons using the doors;

(*c*) the maintenance of satisfactory conditions of habitability in passenger and crew spaces below the bulkhead deck, and

(*d*) the efficient working of the ancillary services.

*Report of Court No. 8072 published by HMSO.

The Department intends to amend the "closure of openings" regulations as appropriate. In the meantime, shipowners are hereby invited to discuss with the Department any problems they encounter when assessing the operational control procedures for the watertight doors in any of their ships.

The Department of Transport
Marine Directorate DSG(c)
Sunley House
90/93 High Holborn
London WC1V 6LP

Printed by HMSO, Edinburgh Press
Dd 9610479 14M 12/84 (221748)

ACCIDENTS WHEN USING POWER OPERATED WATERTIGHT DOORS

Notice to Shipowners and Masters, Officers, Crew, Safety Officers and Safety Representatives

This Notice Supersedes Notice No. M.830

1. In recent years there have been a number of avoidable accidents involving people being seriously injured or killed by the closing of power operated watertight doors when they have been incorrectly operated.

2. With the introduction of the MS (Closing of Openings in Hulls and in Watertight Bulkheads) Regulations 1987 and MS Notice No. M.1283, a greater number of watertight doors will be closed at sea for longer periods. In order to reduce the otherwise increased risk of injury to personnel passing through the doorway some watertight door central control units located on the navigating bridge have two operating positions, one marked "local control" and the other "doors closed". Under normal conditions and in potentially hazardous situations the central control should be set to "local control". The "doors closed" position should be used only in emergencies and for drill or testing purposes. In the "local control" mode—ie when the bridge central control is set at "local control", any watertight door can be locally opened and locally closed after use without automatic closure of the door. Since in this mode closure of the door will require deliberate action it is anticipated that the risk of a person being trapped will be eliminated or at least very much reduced. The "doors closed" mode will also permit doors to be opened locally, but the doors will automatically reclose upon release of the local control mechanism.

3. Some older ships and many cargo ships are not provided with a "local control" mode as described above and most of the accidents have occurred when crew members were using the controls provided at the door to pass through watertight doors which had been closed from the navigating bridge; under those circumstances if the control is released the door closes automatically with a force sufficient to crush anybody caught in its path. It is *absolutely essential* therefore when using a watertight door which has been closed irrespective of the mode of closure that both the local controls one on each side of the bulkhead, are held in the "open" position while passing through the door. That can easily be done by first fully opening the door using the nearside control with one hand, then reaching through the opening to the control on the far side and using the far side control to keep the door fully open until passage through is complete. A person when unaccompanied must have both hands free to operate the controls and should *never* attempt to carry any load through unassisted. To avoid potentially fatal slips, the accumulation of oil leakage in the vicinity of the watertight doors should not be permitted.

4. If further accidents are to be avoided the watertight doors should be operated using the "local control" mode where provided and otherwise in the manner described in pargraph 3 above, allowing the door to fully open before passing through the opening. MS Notice No. M.1283, Annex 2, paragraph 12 highlights the need for written instructions on the safe operation of the doors and it is essential that all crew members who may use the doors:

(i) know what type of control system is fitted in their ship,

(ii) are well trained in the correct operating procedure for the system,

(iii) fully appreciate the crushing power of watertight doors.

This crushing power, together with expeditious closing, is necessary to ensure that watertight doors fulfil their primary purpose of ensuring maximum safety of the ship and its crew but if accidents to personnel using the doors are to be avoided it is essential that the operating instructions are strictly observed. Permanent notices clearly stating the correct operating procedures must be prominently displayed on both sides of every watertight door.

Department of Transport
Marine Directorate
London WC1V 6LP
April 1988

Dd 8030856 12,000 5/88 Ed(256737)

ANNEX 8

8. Fleet Directive and Chief Engineer's Memo

P&OSL Kent
10 November 1998

memo

P&O Stena LINE

to: All Ships Staff

from: G E Batey Chief Engineer
Pride of Kent

date: 15 November 1998

cc: Master

WATERTIGHT DOOR OPERATION

After the accident on board this vessel and following Fleet Directive 01/20/98 all ships personnel who operate ny of the under deck subdivision watertight doors are reminded of the need to strictly follow the operating procedures in order to ensure safe transit through these doors.

Watertight doors must remain closed when the vessel is at sea except when passing through.

Under normal conditions doors are in LOCAL CONTROL giving manual door operation, in emergency or when testing door operation, the doors will be in BRIDGE CONTROL giving AUTOMATIC closing of the doors.

The operating procedure for both conditions is as follows:-

1 Facing the door move the control lever to 'open' position and hold until door is FULLY OPEN keeping clear of the door, ensure that the bridging plate has lowered fully to the deck. If the door is in BRIDGE CONTROL the warning alarm and light will operate.

2 Still firmly holding the lever in the open position, reach through the door and grasp the lever on the other side of the bulkhead.

3 Holding both levers in the 'open' position pass through the door releasing the first lever when both feet are firmly on the deck on the other side of the door.

4 Stand well clear of and facing the door and for;

a) "LOCAL CONTROL" operation; move the lever to the closed position until the door is fully closed; or for

b) BRIDGE CONTROL condition; release lever; door will now close automatically.

P&O Stena Line Ltd
Channel House
Channel View Road
Dover CT1[illegible] 9TJ

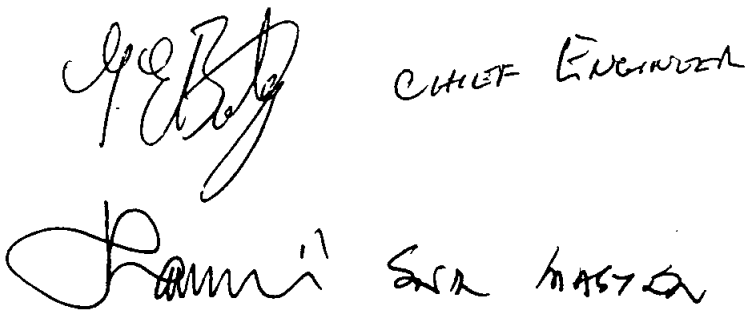
Tel: +44 (0)1304 863000
Fax: +44 (0)1304 863223
Telex: 965104

FS 23973

Registered Office: Channel House
Channel View Road, Dover CT1[illegible]
Registered in England No. 25[illegible]

DO NOT pass through a watertight door without both hands freeto operate levers. When moving stores or items of equipment through a watertight door at least two people must be available so that one person can operate the door correctly.

Moving stores or items of equipment through a watertight door should be carried out with the vessel in port where the risk of BRIDGE CONTROL being activated is greatly reduced.



To:Master
European Highway/Pathway/Seaway
Pride of Bruges/Burgundy/Calais/Dover
Stena Cambria/Fantasia/P&OSL Provence
P&OSL Kent/P&O Stena Elite

From: Fleet Managers

Date: 13 November 1998

FD: 01/20/98
Circulation: Master

Watertight Door Incident

Background

An accident occurred on a Company vessel which resulted in the death of a Motorman.

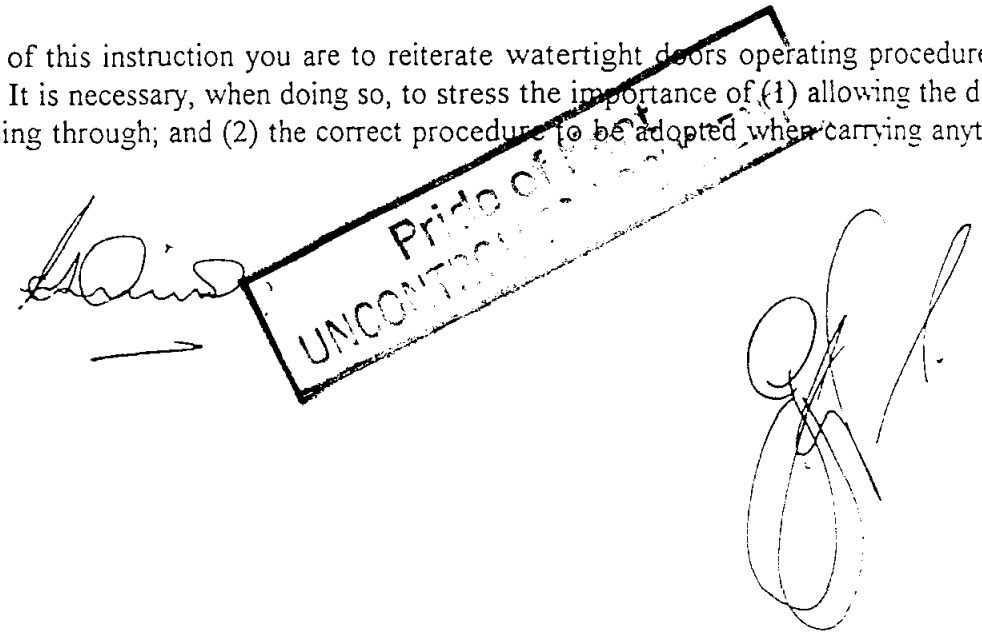
In view of the seriousness of the accident this Fleet Directive is issued as soon as possible after the event. The matter remains under investigation by the authorities and until these deliberations are complete it would be inappropriate to publish any conclusions.

Application

This Fleet Directive applies to all ships.

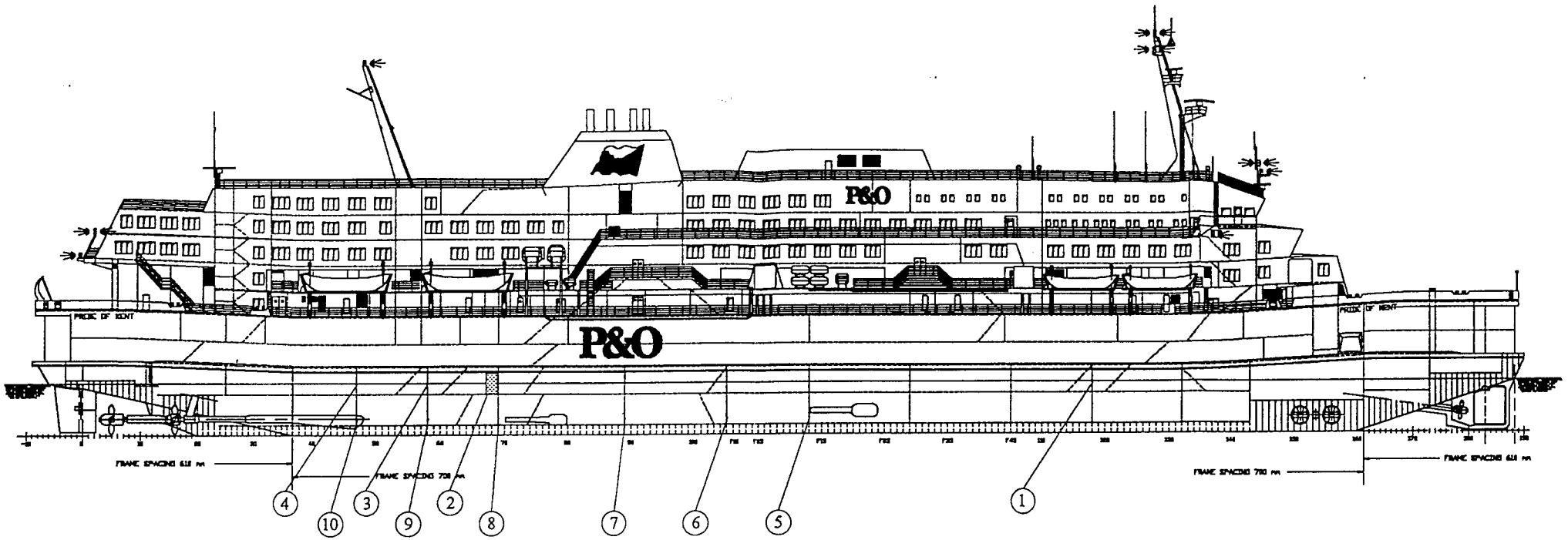
Instruction

By receipt of this instruction you are to reiterate watertight doors operating procedures to all relevant personnel. It is necessary, when doing so, to stress the importance of (1) allowing the door to open fully before passing through; and (2) the correct procedure to be adopted when carrying anything through the door.



FMs/jgk

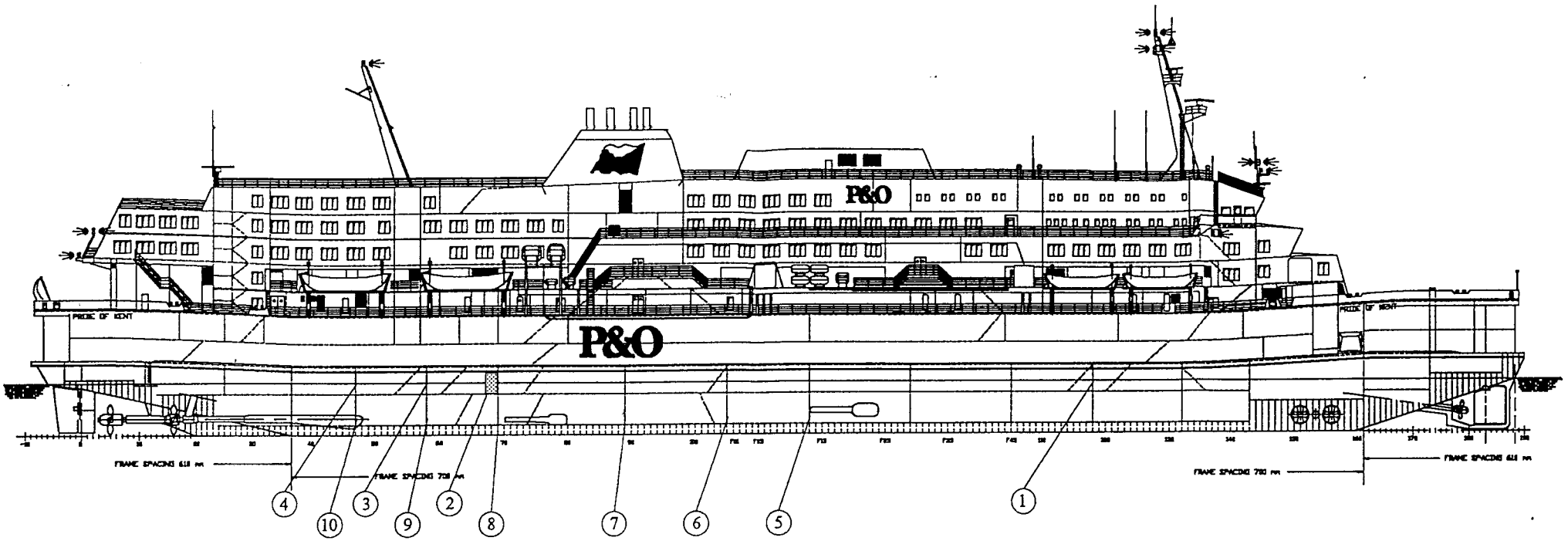
OPERATION OF THE SHIP'S WATERTIGHT DOORS



		DOOR CATEGORY Voyage Condition	
DOOR No	ADJACENT COMPARTMENT	NORMAL	DOVER SERVICES & POTENTIALLY HAZARDOUS SITUATIONS
1	Dry provision room/ Cold provision room	B	
2	Engine control room/ Gear box room	B	
3	Gear box room/ Store handling room	B	
4	Store handling room/ Tax free store	B	
5	Forward stabiliser room/ Separator room	B	ALL DOORS CLOSED
6	Separator room/ Auxiliary room	B	
7	Auxiliary room/ Main engine room	B	
8	Main engine room/ Gear box room	B	
9	Gear box room/ CPP room	B	
10	CPP room/ Shaft tunnel	B	

DOOR CATEGORY AND CONTROL PROCEDURE	
TYPE 'B'	A DOOR WHICH SHOULD BE CLOSED. IT MAY BE OPEN BUT ONLY WHILST SOMEONE IS WORKING IN THE ADJACENT COMPARTMENT.

OPERATION OF THE SHIP'S WATERTIGHT DOORS



		DOOR CATEGORY Voyage Condition	
DOOR No	ADJACENT COMPARTMENT	NORMAL	DOVER SERVICES & POTENTIALLY HAZARDOUS SITUATIONS
1	Dry provision room/ Cold provision room	B	
2	Engine control room/ Gear box room	B	
3	Gear box room/ Store handling room	B	
4	Store handling room/ Tax free store	B	
5	Forward stabiliser room/ Separator room	B	ALL DOORS CLOSED
6	Separator room/ Auxiliary room	B	
7	Auxiliary room/ Main engine room	B	
8	Main engine room/ Gear box room	B	
9	Gear box room/ CPP room	B	
10	CPP room/ Shaft tunnel	B	

DOOR CATEGORY AND CONTROL PROCEDURE

TYPE 'B' A DOOR WHICH SHOULD BE CLOSED. IT MAY BE OPEN BUT ONLY WHILST SOMEONE IS WORKING IN THE ADJACENT COMPARTMENT.