



**The Bahamas  
Maritime Authority**

**THE COMMONWEALTH OF THE BAHAMAS**

**Majesty of the Seas**

**IMO Number 8819512**

**Official Number 9000118**



**Report of the investigation into a crew member  
fatality on a passenger vessel  
on 5 April 2017**

*The Bahamas conducts marine safety or other investigations on ships flying the flag of the Commonwealth of the Bahamas in accordance with the obligations set forth in International Conventions to which The Bahamas is a Party. In accordance with the IMO Casualty Investigation Code, mandated by the International Convention for the Safety of Life at Sea (SOLAS) Regulation XI-1/6, investigations have the objective of preventing marine casualties and marine incidents in the future and do not seek to apportion blame or determine liability.*

*It should be noted that the Bahamas Merchant Shipping Act, Para 170 (2) requires officers of a ship involved in an accident to answer an Inspector's questions fully and truly. If the contents of a report were subsequently submitted as evidence in court proceedings relating to an accident this could offend the principle that a person cannot be required to give evidence against themselves. The Bahamas Maritime Authority makes this report available to any interested individuals, organizations, agencies or States on the strict understanding that it will not be used as evidence in any legal proceedings anywhere in the world. You must re-use it accurately and not in a misleading context. Any material used must contain the title of the source publication and where we have identified any third-party copyright material you will need to obtain permission from the copyright holders concerned.*

Date of Issue: 02 January 2020  
The Bahamas Maritime Authority  
120 Old Broad Street  
LONDON  
EC2N 1AR  
United Kingdom

## CONTENTS

1. Glossary of Terms
2. Summary
3. Details of Involved Vessel(s) and Other Matters
4. Narrative of events
5. Analysis
6. Conclusions
7. Recommendations
8. Actions Taken

### List of Appendices:

- I. Watertight door classification
- II. RCCL Watertight door policy
- III. MS (Official Logbooks) Regulations 1981 Extract relating to Watertight door entries

## 1. GLOSSARY OF TERMS

#	Number
Amps	Amperes
CCTV	Closed Circuit Television Camera
Code Alpha	Code for medical emergency
Code Bravo	Code for fire or serious incident
GMTS	Global Marine Technical Service
GOLD Anchor standards	RCCL's internal customer service training
GPS	Global Positioning System
HR	Human Resources
ISPS	International Ship and Port Security
PDST	Pre-departure Familiarization, Safety & Security training
RCCL	Royal Caribbean Cruise Lines
RCMT	Royal Caribbean Maintenance Team
SMS	Safety Management System
SQM	Safety and Quality Management
SSOT	Shipboard & Safety Orientation Training
VDR	Voyage Data Recorder
WTD	Watertight door

All times noted in the report are same as CCTV footage time stamp onboard, which was 1 minute and 36 seconds slower than the VDR/GPS. The times are in the style of the standard 24-hour clock without additional annotation.

## 2. SUMMARY

The Bahamas registered passenger vessel Majesty of the Seas was undertaking a 3-night cruise with 2680 guests and 900 crew members. The vessel departed Port Canaveral at 1600 hours on 4<sup>th</sup> April 2017 with a voyage scheduled to Nassau and Coco Cay in the Bahamas before returning to Port Canaveral on 7<sup>th</sup> April 2017 at 0700 hours. The vessel arrived at Nassau, Bahamas on 5<sup>th</sup> April 2017 and was all fast<sup>1</sup> at 0812 hours.

A crew fire and boat drill was scheduled on 5<sup>th</sup> April whilst alongside. A fire was simulated at a locker on deck 10. RCCL required crew members to attend the drill in accordance to SOLAS requirements, the Royal Caribbean Maintenance Team (RCMT) member was not required to attend this drill .

The fire drill commenced at 0942 hours. The closing of watertight doors as part of the drill was preceded by two warnings over the public address system that all watertight doors would be closed from the panel located in the wheelhouse. These warnings were given at 09:47:20 (5-minute warning) and again at 09:53:01 advising that the doors would be closed following the announcement. Subsequently, the watertight doors were closed from the wheelhouse panel. The fire drill was considered complete with the simulated fire being extinguished at 1025 hours. The signal for abandon ship was sounded at 1035 hours and a boat muster was held.

At 1039 hours two engine crew members were returning from the drill and entered the engine room from the starboard side workshop. They noticed an RCMT member trapped between the door and the frame of watertight door (WTD) #18. The crew members raised the alarm at 1041 hours using the telephone in the workshop. Subsequently, an announcement of *Alpha, Engine Room<sup>2</sup>* was made.

The crew members inside the engine room were unable to operate the release lever for the watertight door as the team member was trapped against the controls. Subsequently, the watertight door was opened from outside the engine room by engine crew responding to the Code Alpha announcement at 1043 hours.

The vessel's medical crew attended the engine room and the injured team member was moved by stretcher direct to the Deck 1 gangway. The local port authorities were notified and an ambulance arrived to transport the team member to a hospital in Nassau.

No marine pollution occurred as a result of the incident.

\*\*\*

---

<sup>1</sup> All fast indicates the completion of mooring operations when the vessel has been safely moored to berth

<sup>2</sup> The onboard code for an accident or similar emergency is Code Alpha, to be followed by the location.

3

## DETAILS OF INVOLVED VESSEL(S) AND OTHER MATTERS

### Details of vessel

The vessel had the following principal particulars:

Owner	Majesty of the Seas Inc
Operator	Royal Caribbean Cruise Lines
Built	Ch. De L'Atlantique (Alsthom)
Year of build	1992
Registry	Nassau, Bahamas
Official Number	9000118
Type	Passenger vessel
IMO Number	8819512
Class	DNV GL
Class Notation	+1A1 Passenger Ship
Gross Tonnage	73,937
Nett Tonnage	47,515
Overall length	268.3 meters
Breadth	32.6 meters
Operating draft	7.70 meters
Air draft	53.6 meters

# Majesty of the Seas -Marine Safety Investigation Report

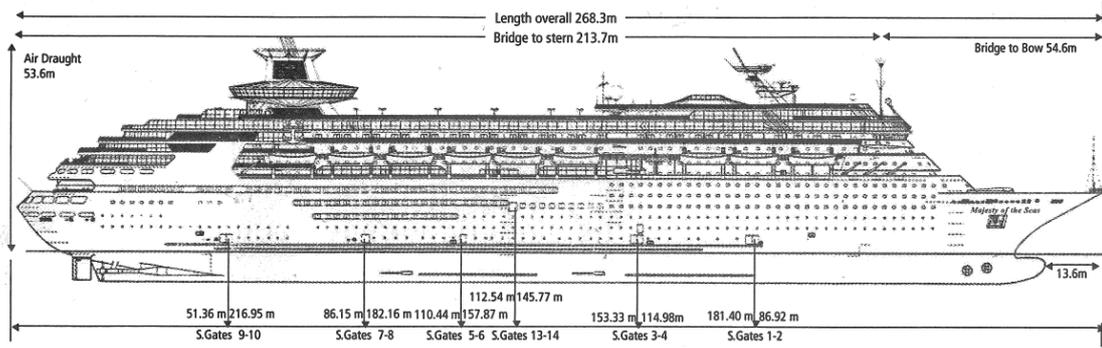


Figure 1: Majesty of the Seas general layout

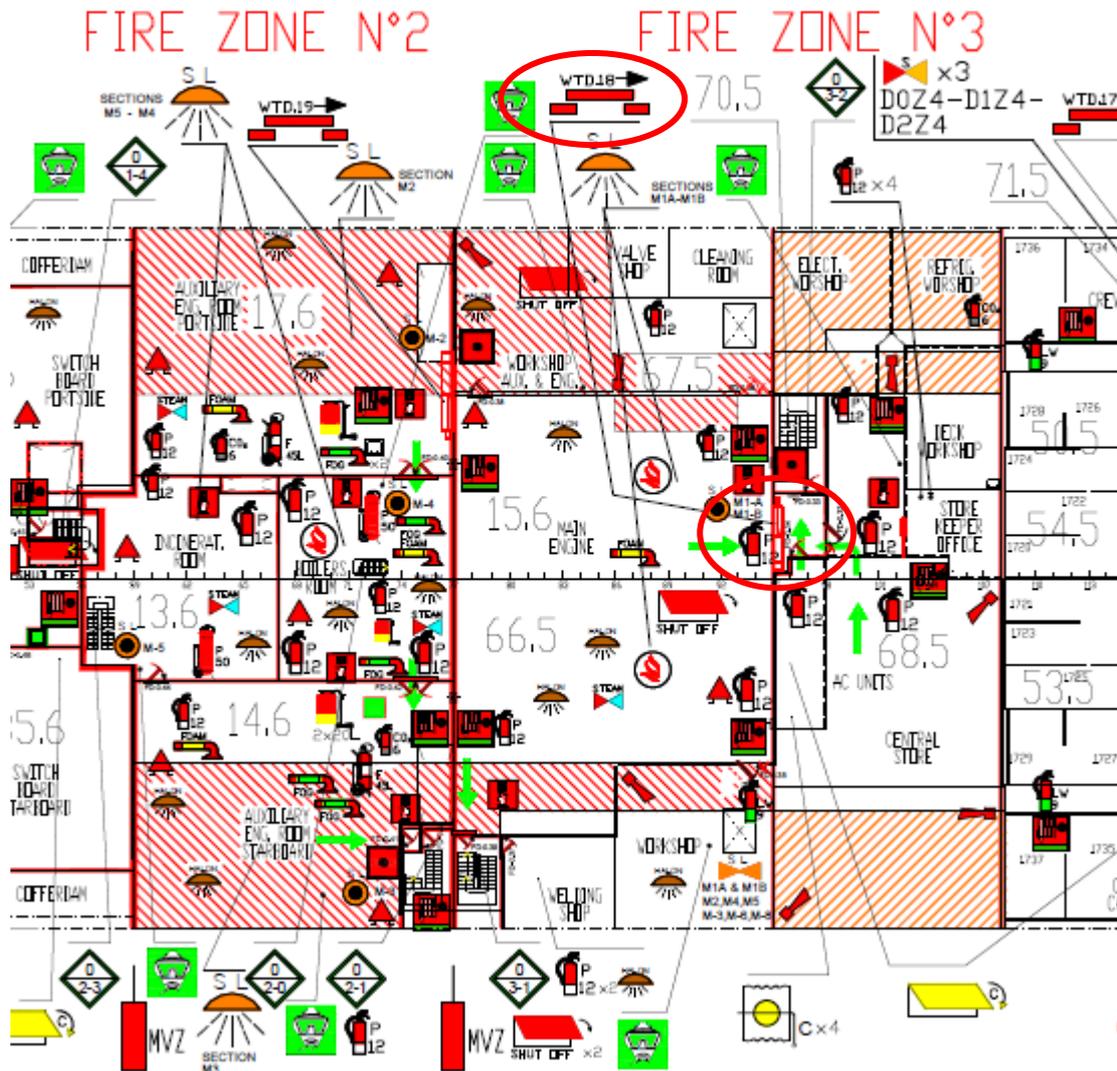


Figure 2: The layout of the engine spaces at Deck Zero and watertight door #18 marked

## Crew Member Details

The deceased team member was a 48-year-old Romanian citizen. He was a member of a riding team referred to on RCCL vessels as Royal Caribbean Maintenance Team (RCMT). RCMT is deployed based on individual vessel's needs and special projects. Team members are RCCL employees and are subject to the same safety training as crew members on each vessel.

The team member's application for employment with RCCL was completed on 8<sup>th</sup> April 2015 and lists the position sought as Global Marine Technical Service (GMTS) Mechanic.

The team member attended a vocational school between 1984 -1986 and in April 1986 a diploma as a qualified cutting machine operator was issued.

Prior to joining RCCL his professional qualifications issued by CERONAV (Romanian Maritime Training Center) included:

- I. Fitter – issued 12<sup>th</sup> November 2014
- II. Security training for seafarers – issued 21<sup>th</sup> November 2014
- III. Maritime English Language – issued 27<sup>th</sup> November 2014
- IV. Basic Safety Training – issued 18<sup>th</sup> December 2014

The team member was engaged as a Mechanic by RCCL in April 2015 and subsequently underwent additional RCCL specific training:

- I. Security awareness – issued onboard Celebrity Constellation on 22<sup>nd</sup> May 2015
- II. Crowd Management – issued onboard Celebrity Constellation on 25<sup>th</sup> May 2015.
- III. George Fischer Piping Systems – one day Marine Products training seminar onboard Majesty of the Seas on 20<sup>th</sup> August 2015. The crew member was issued a qualification badge as a Pipefitter.
- IV. The RCCL in-house maintenance crew familiarization form for personnel working in technical areas lists annual training required for RCMT members.

This form requires annual training in the following areas:

- i. Review SQM job description with supervisor
- ii. Environmental Policy
- iii. Procedure for Garbage Handling

## Majesty of the Seas -Marine Safety Investigation Report

- iv. Procedure for Handling Chemicals
- v. Handling of Hazardous Materials
- vi. Shipboard Safety Orientation (SSOT)
- vii. ISPS Training
- viii. GOLD Anchor Standards
- ix. Rules for Fire in Engine Spaces
- x. Procedure for Hot work
- xi. Procedure for Entering Confined Spaces
- xii. Procedure for using Cylinder Central
- xiii. Safety Protection Gear
- xiv. Familiarization with Workshop Tools
- xv. Save the Waves training

The most recent completed form was dated 8<sup>th</sup> December 2015 and training under the annual requirement was due to be completed in December 2016. Each team member is required to retain the original copy of the training record, a blank copy dated 6<sup>th</sup> November 2016 indicates annual training was overdue in this instance.

The team member signed RCCL policies on 8<sup>th</sup> April 2015 for Life Insurance Beneficiary Designation, Drug and Alcohol Policy.

In his most recent employment, the team member signed an employment contract on 2<sup>nd</sup> February 2017. This contract identified the first date of hire as 20<sup>th</sup> April 2015 and indicates a position aboard Adventure of the Seas as GMTS Mechanic.

The team member underwent a medical exam in January 2017 which indicates a prior bout of chickenpox and the need for reading glasses. The doctor's conclusion was "Fit for Duty". The following prescribed medicines were declared by the team member:

- I. Zomen (30mg), an ACE inhibitor, prescribed for hypertension.
- II. Indapamide (1.5), a diuretic, prescribed for hypertension.
- III. Crestor (10mg) Prescribed for Cholesterol

None of these medicines had any mood-altering effects.

A drug test was completed on 18<sup>th</sup> January 2017 and was negative. This test included the test for Amphetamines, Methamphetamine, Cocaine, Opiates, Phencyclidine, Marijuana, Benzodiazepine, Methadone, Barbiturates, TCA's and MDMA (Ecstasy).

## Majesty of the Seas -Marine Safety Investigation Report

The team member boarded a flight from Bulgaria, via Paris and New York, arriving in San Juan Puerto Rico on 3<sup>rd</sup> February 2017. He joined the Adventure of the Seas on 4<sup>th</sup> February 2017.

Every crew and RCMT member joining an RCCL vessel is required to undergo initial Pre-departure Familiarization, Safety & Security Training (PDST).

The team member attended PDST on the Adventure of the Seas on 4<sup>th</sup> February 2017. Included in this training are the following:

- I. Emergency procedures and codes
- II. Emergency, Fire, Man overboard and Medical procedures
- III. Lifejacket storage and use
- IV. Close and open watertight doors
- V. Locate escape routes
- VI. Locate and use fire extinguishers
- VII. Locate emergency and muster stations
- VIII. Reporting security incidents
- IX. Procedures to follow in event of a security threat
- X. Emergency instructions in event of a security incident

A database of training is maintained aboard each vessel. Vessel records indicated that he attended the ship specific training on 5<sup>th</sup> February at sea from 1000 hours to 1200 hours on Adventure of the Seas.

On 11<sup>th</sup> February the team member boarded a flight from San Juan, Puerto Rico to Orlando, Florida for a transfer to the Majesty of the Seas.

The team member joined the Majesty of the Seas on 13 February 2017 in the role of GMTS Mechanic. He joined a team that was replacing sections of black water piping affected by internal sedimentation.

Following the requirements for initial familiarisation before the vessel sails, upon boarding the Majesty of the Seas on 13<sup>th</sup> February 2017 the team member repeated the training he had attended on the Adventure of the Seas on 4<sup>th</sup> February 2017.

The team member also attended Shipboard & Safety Orientation Training (SSOT) onboard Majesty of the Seas on 14<sup>th</sup> February 2017. The sign-in sheet for this training included the crew member's name and position but was lacking a signature confirming attendance. The crew member's roommate attended the same training and confirmed that they both were present.

## Majesty of the Seas -Marine Safety Investigation Report

SSOT includes the following:

- i An extensive review of shipboard routines and emergency plan
- ii Practical demonstration of fire fighting
- iii Life raft training
- iv Escape chute training (if installed)
- v Ship safety orientation walk detailing structural fire protection, evacuation/escape routes, guest and crew muster points, LSA arrangements, operation and precaution for the use of watertight and fire doors.
- vi Emergency escape breathing device (EEBD) training

\*\*\*

## 4 NARRATIVE OF EVENTS

On 5<sup>th</sup> April 2017, the team member was working in the passenger's accommodation area with five other RCMT members. With two team members per deck and displaced over decks 2, 3 and 4, the team members were replacing black water piping in corridors outside cabins 2019, 3023 and 4033.

Cabins 2019, 3023 and 4033 are aligned vertically above each other towards the forward of the vessel. The black water piping is common over the three decks outside cabins 2019, 3023 and 4033.

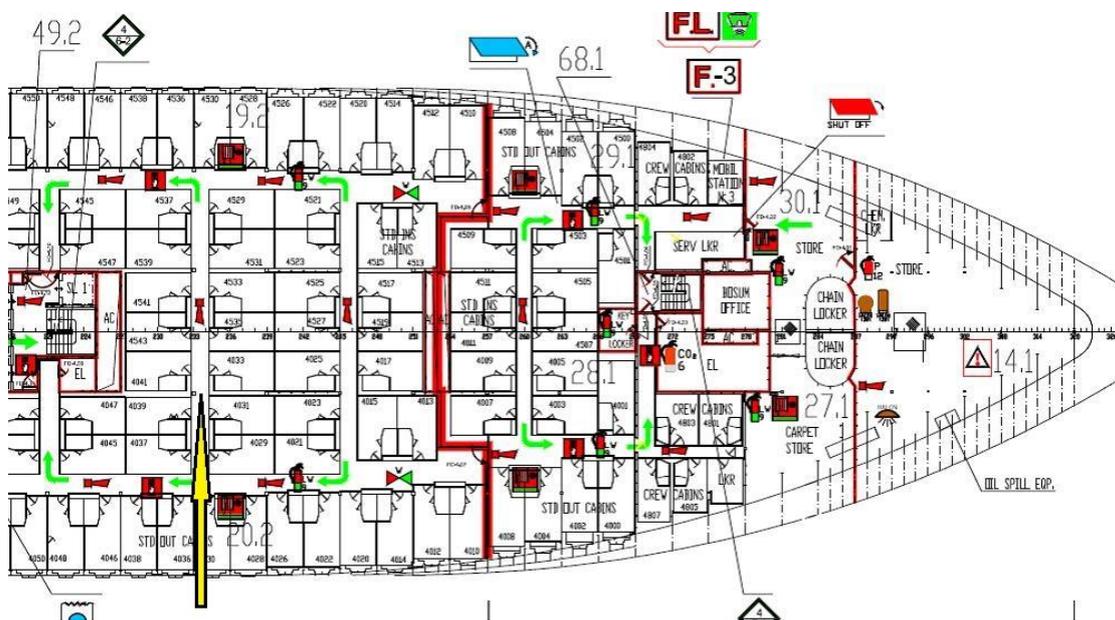


Figure 3: Crew member work location indicated by the yellow arrow:

On 5<sup>th</sup> April 2017 at 0730 hours, a daily work meeting was held outside the Human Resource office. The RCMT team leader assigned tasks and work locations to the team. The team discussed the required materials and tools and collected them from a forward locker on deck 2. The site preparation was completed by removing deckhead panels and identifying pipes to be replaced.

Daily personal protection equipment (PPE) required the use of gloves, goggles, dust masks and coveralls. These were issued to each team member. Extra gloves, goggles and masks were kept at each work site. Plastic sheeting was laid to protect carpeting prior to removing deckhead panels.

The deceased team member commenced his work outside passenger cabin 4033 on deck 4.

At 0900 hours the vacuum system to the branch line involved was isolated and cutting of the pipe commenced. Once the isolated line was exposed, the plastic piping was cut

and removed from the position, new piping was cut to fit and existing clamps were used where possible.



**Figure 4: Similar worksite photographed on 10<sup>th</sup> April to show pipe replacement work**



**Figure 5: Pipe sections removed due to internal build-up of sediments**

## Majesty of the Seas -Marine Safety Investigation Report

At 0942 hours, a fire drill commenced for all crew members listed on crew manifest to attend the drill. The fire was simulated at a locker on deck 10. The RCMT members were not required to attend the drill.

As part of the drill, watertight doors in the engine room were closed from the wheelhouse panel preceding by two warnings over the public address system that all watertight doors would be closed from the panel at the wheelhouse. These warnings were given at 09:47:20 (5-minute warning) and at 09:53:01 advising that the doors would be closed following the announcement.

The RCMT team member left his worksite on deck 4 at approximately 1015 hours. Investigation revealed that he needed to cut a clamp retaining bolt to a shorter length and this required the use of a hacksaw and a vice. Both were available in the engine room workshop.

The team member's route to the engine room workshop was observed on CCTV located throughout the vessel. His movement to and from the engine room workshop is summarized in table 1 and marked in figure 6.

TIME	EVENT
10:19	Enters and leaves the incinerator room
10:20	Exits the incinerator room and enters main "I95" corridor on deck 1
10:20	Enters staircase to go up from deck 1 to deck 2 – direct passage to engine room access blocked by a closed watertight door
10:20	Exits crew staircase onto deck 2 and turns left to head forward to crew lobby
10:20	Crosses crew lobby on deck 2 and passes into the guest corridor
10:20	Seen headed forward along port side guest corridor
10:21	Enters the elevator lobby from the port side guest corridor, crosses to the staircase to descend to deck 1
10:21	Seen on the deck 1 gangway area, crosses the vessel to the "I-95" corridor and then reappears at 10:22 having faced closed fire doors. Exits gangway area on the starboard side to the "I-94" corridor and turns to head aft.
10:23	Exits "I-94" into Human Resources (HR) square
10:23	Exits HR Square to "I-95" walking towards aft. At this point, he is on the other side of the watertight door he encountered at 10:20 outside the incinerator room. Walks to the staircase to descend to deck 0. At deck 0 he was directly in front of WTD #18 and had to

## Majesty of the Seas -Marine Safety Investigation Report

	open it to pass through into the engine room.
10:24	Having passed through WTD #18 he is seen walking to the workshop on the starboard side of the engine room.
10:38	Crew member exits the workshop and approaches WTD #18

**Table 1: Crew member's movement in the engine room workshop as observed from CCTV footage onboard**



**Figure 6: Crew member's route on deck 1 indicated by yellow arrows**

At 1025 hours, the drill was completed and at 1035 hours an abandon ship signal was sounded and a boat muster was held.

At 1039 hours, two engine crew members were returning from the drill and entered the engine room from the starboard side workshop. They noticed the team member trapped between the door and the frame of WTD #18. They subsequently raised the alarm by calling the bridge using the telephone in the workshop.

The sequence of events from that point forward was extracted from CCTV records and summarized in table 2 below.

TIME	EVENT
10:39	Two crew members exit the engine room workshop and discover the team member trapped in WTD #18.
10:41	The alarm was raised by a 911 call to the bridge and to the engine control room
10:43	Engine crew members respond to the emergency announcement. They were unable to operate the WTD's release lever from inside the engine room as the team member was trapped against the controls. The WTD was opened from outside the engine room and the team member was removed from the door at 1044 hours. Resuscitation commenced by the Chief

## Majesty of the Seas -Marine Safety Investigation Report

	Engineer and the Doctor who was already on the other side of the door, prior to a medical team arriving on the scene.
11:04	The team member is placed on a stretcher
11:06	Stretcher team on deck 1 starboard side passing bunker station
11:07	Stretcher team passing HR square on deck 1
11:09	Stretcher team at deck 1 gangway port side
11:09	Stretcher team reached the pier and placed team member in an ambulance

**Table 2: Sequence of events as observed from CCTV footage onboard**

\*\*\*

### **Watertight Doors Location and Classification**

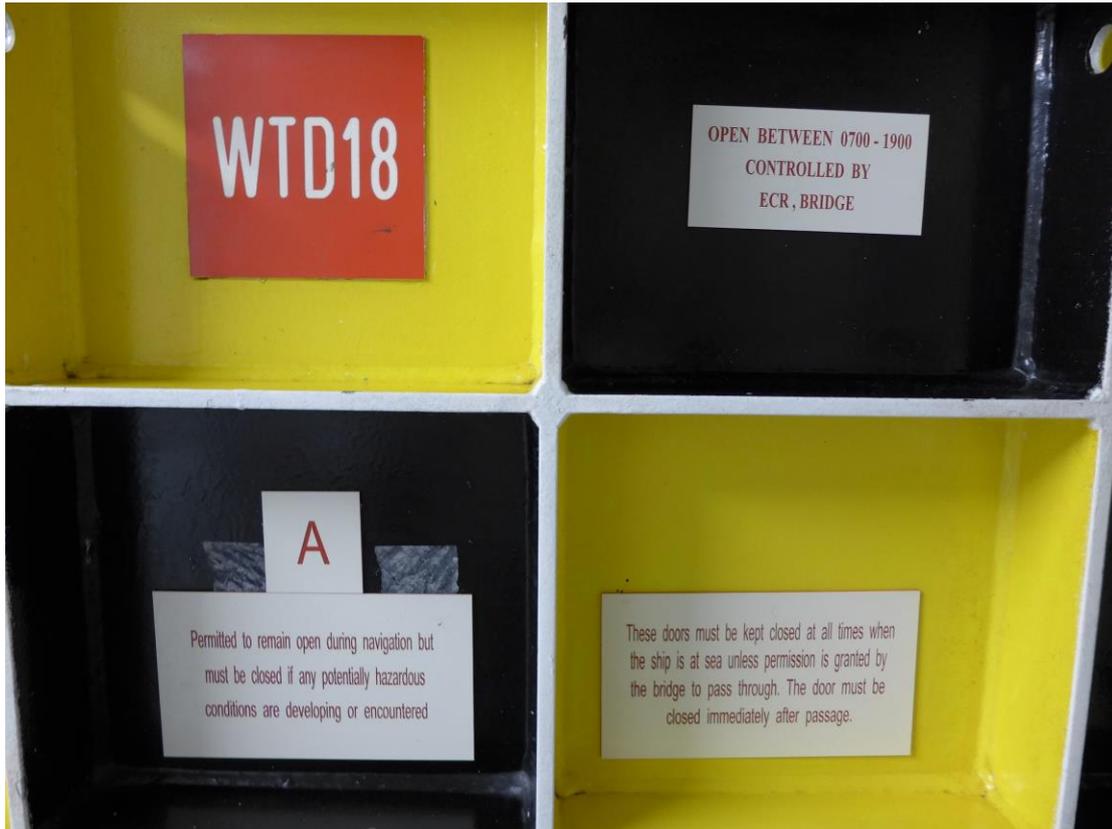
Majesty of the Seas has 28 watertight doors, these are located on the tank-top deck, deck zero and at provisions areas on deck one.

Doors were classified “A”, “B” or “C” according to whether they may be kept open, maybe opened when personnel are working in a space and when they may be opened only to permit passage.

In areas of high-density traffic, restricted visibility, water depths less than 3 times of maximum draught and within port limits or under compulsory harbour pilotage limits all the watertight doors must be kept closed.

Watertight door #18 is located at the forward end of the engine room. The printed schedule for all watertight doors is attached to this report as Appendix 1.

As shown in figure 7 below, WTD #18 door signage comprises of a number of statements and instructions; the sign reads that the door can remain open from 0700-1900 (Class B) the sign below that requires the door be closed at all times except for passage (Class C) and the sign to the bottom left indicates the door is permitted to remain open during navigation (Class A). The signs on the door qualify the door for Class “A”, “B” and “C” at the same time.



**Figure 7: Signage on the door indicates the door belongs to all three classifications**

A review of both the vessel's type (Mega Class) and individual door schedule indicates that WTD #18 should have been classified as:

- I. Class "A" – A door that may be kept open
- II. Class "B" – Maybe open from 0700-1900

### **Watertight Door Operation**

To open the WTD required the operating lever to be pushed down and held, to close the WTD required the operating lever to be pulled up. To lock the WTD in the closed position, pull the locking lever (shorter of the two levers) down to secure the door (figure 8). Emergency hand pumps are located on each side of the door.

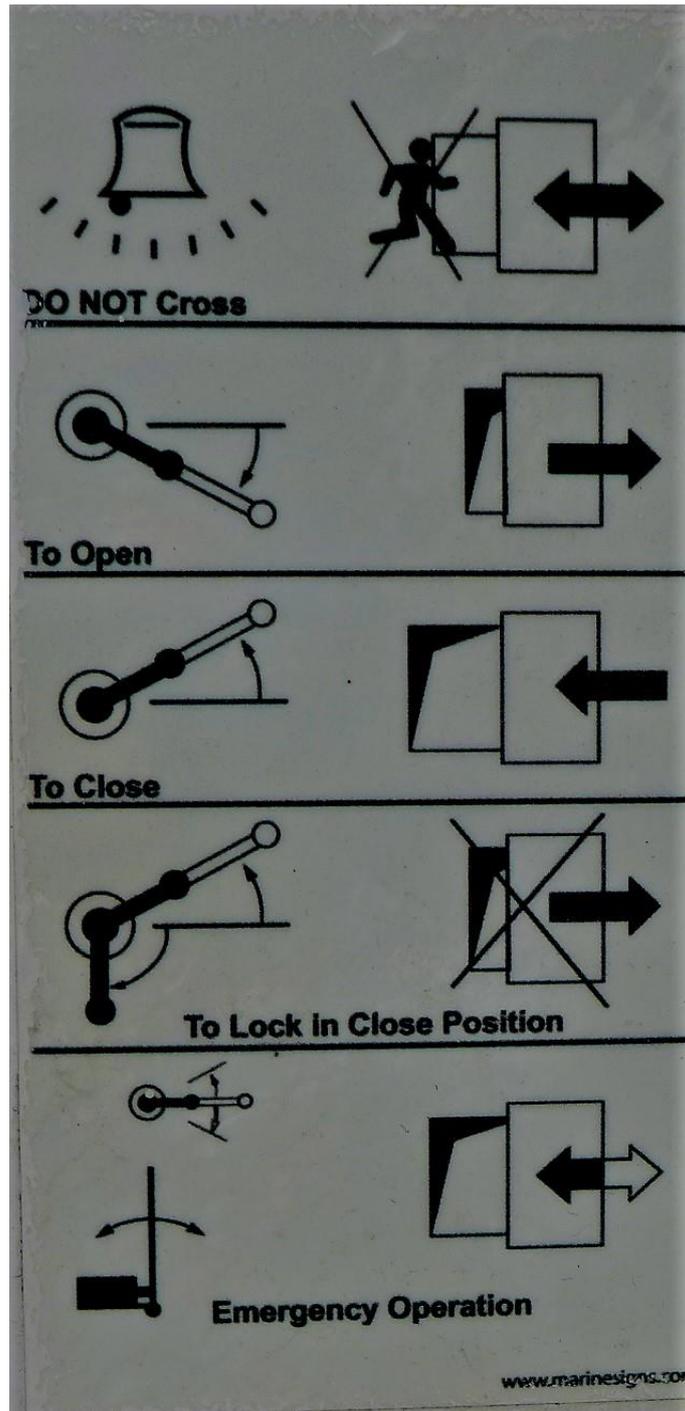


Figure 8: Posted signage indicating operation of the WTD

The procedure requires that the operating lever be held down until the door is fully open, the operator then reaches through the door and moves the operating lever on the opposite side down to the open position and holds both levers in the fully open position. The door can then be safely passed through before releasing the initial lever.

The remote operation of the watertight doors was possible from the panel located on the bridge. The system design onboard enabled the doors to automatically open once the remote closing button was put on local operation mode on the bridge panel.

## Majesty of the Seas -Marine Safety Investigation Report

The Resolution MSC.13(57) (adopted on 11 April 1989), Regulation 15, section 8.3 states: *'It shall not be possible to remotely open any door from the central operating console.'* This regulation applies to all vessels constructed on or after 1 February 1992. As the Majesty of the Seas has a construction date of 1 January 1992, the vessel doesn't require to comply with this regulation and was in compliance with the regulation as required at the time of the construction.

For the purpose of the drill, the doors were remotely closed following the announcements made on the PA system. The system design onboard enabled the door to stay in the closed position (even without using the locking lever on the door) if the door was closed from the bridge. To open the door, then the operating lever had to be used and once the operating lever is released the door would begin to close again.

From the available evidence, it could not be determined how the team member operated the door. However, as the doors were remotely closed from bridge and he accessed the door successfully while going towards the workshop and on his way back he was holding the tools on each hand (as seen on CCTV footage), it is highly probable that while accessing the door on his return, he did not have a proper control on the operating handles and the door closed while the team member was trying to pass through.

Post-incident watertight door operating times were checked, with the door closed from the bridge panel it was opened locally and timed closing from fully open and half-open positions. The timings recorded were as per below:

- |     |                         |            |
|-----|-------------------------|------------|
| I.  | Full open to full close | 23 seconds |
| II. | 50% open to full close  | 12 seconds |



Figure 9: Watertight door #18 viewed from the outside engine room



Figure 10: Watertight door #18 viewed from the inside engine room

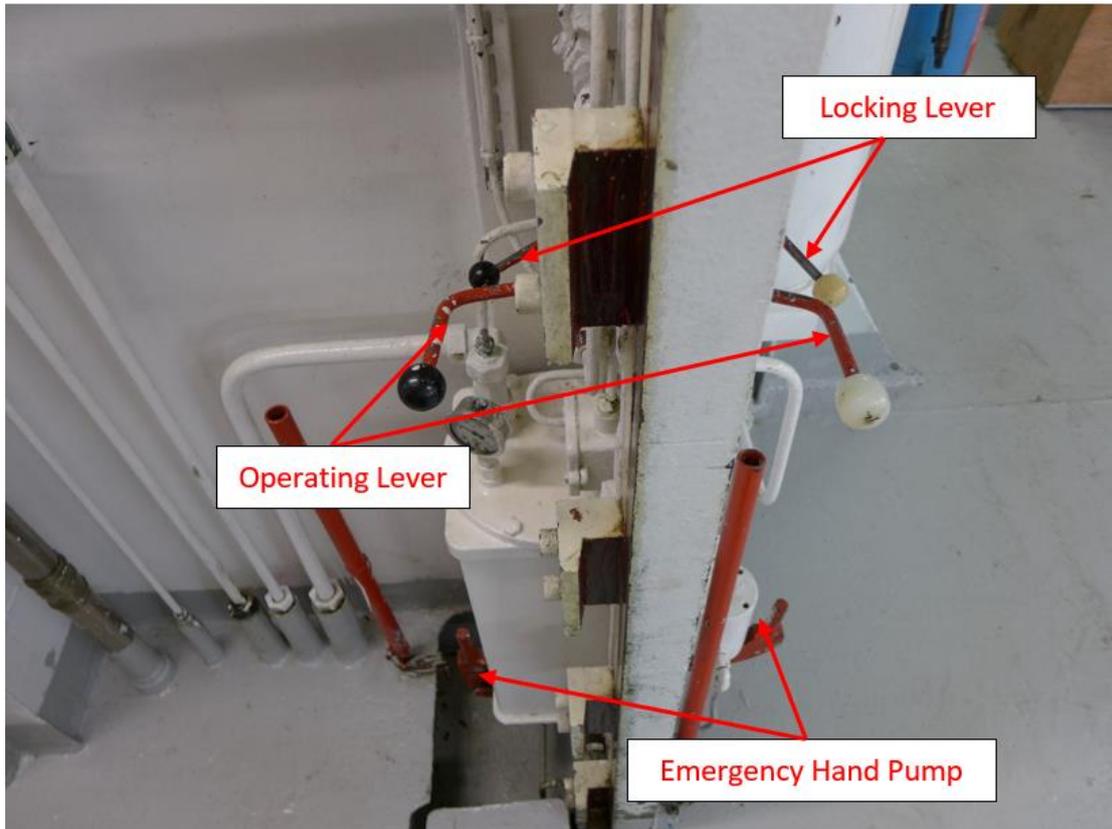


Figure 11: Watertight door #18 operating levers

As part of this investigation, watertight door #18 was examined, the door was operated and the controls seen to function as designed and according to posted instructions. Lights and bells were noted to be working. No defects were found in the door's operation.

### Training Requirements

The closing and opening of watertight doors is included in PDST required to be completed by all crew and RCMT members before the vessel leaves port on the day they joined as per RCCL's SMS.

The team member attended the PDST onboard Majesty of the Seas on 13<sup>th</sup> February 2017 after boarding the vessel.

As per RCCL's SMS, SSOT is required to be completed by RCCL crew members including the RCMT members, within 48 hours of signing on the vessel and once every 6 months. The SSOT was conducted onboard on 14<sup>th</sup> February 2017. The signoff sheet for the training didn't have the sign of the deceased team member. However, his roommate who attended the same training confirmed that the team member was also present during the training.

The RCCL has in-house annual training required to be completed by the RCCL crew members including the RCMT members. The training records are maintained in the familiarization form. The deceased team member's training record showed the last

training completed on 8<sup>th</sup> December 2015. The training record dated 6<sup>th</sup> December 2017 was black, which indicated the training was overdue at the time of the incident.

### **Operating Policy**

The RCCL's SMS included the watertight door policy. Some pertinent points and observations of non-compliance of the watertight door policy are summarised as follows (the policy is attached to this report as Appendix II):

- I. All crew members are to be trained on the operation of watertight doors.
- II. Operating a WTD in any situation without permission from the Master or delegate on the bridge is subject to disciplinary action. The requirement to request permission from the bridge was neither enforced nor followed on board the vessel. This is contrary to the RCCL's Safety Management System (SMS), the Bahamas Merchant Shipping Act and posted signage on the door.
- III. The lack of notification resulted in an absence of written records of doors being opened, similarly required by the Safety Management System and the Bahamas Merchant Shipping Act.
- IV. Under "Testing and Drills" section of the policy it is stated that WTD categorizations and opening times/rules do not apply to a vessel that is safely berthed. This section continues to require that the Master or his delegate on the bridge must still authorize the opening.
- V. The lack of enforcement of the watertight policy by the vessel's senior staff may have led to complacency amongst the crew in operating watertight doors. The high importance of following the correct procedure outlined in training and the severity of risks in the improper use of these doors was not adequately impressed upon the crew members.
- VI. The vessel's Master has the authority under the WTD policy to exempt reporting requirements for reporting to the bridge in hazardous conditions if a door is opened for passage and immediately closed. This is to reduce the permission requests to the bridge. However, such an exemption was not in place on this occasion. The Master was under the impression that requests were being made to the bridge.

### **Watertight Door Maintenance Schedule**

The maintenance reports for watertight door #18 were reviewed, these are contained in the vessel's planned maintenance system records. Annual maintenance was completed on 7<sup>th</sup> December 2016 and prior to this, also on 9<sup>th</sup> December 2015.

## Majesty of the Seas -Marine Safety Investigation Report

On the 24<sup>th</sup> January 2017 watertight doors were checked, cleaned and lubricated. A leaking O-ring at the reversing slide valve on WTD #18 was replaced and oil at the substation tank refilled.

On 25<sup>th</sup> February 2017 watertight doors were inspected, lubricated as needed and cleaned. Oil levels were checked.

On 21<sup>st</sup> March 2017 watertight doors were inspected, lubricated as needed and cleaned. Oil levels were checked.

No pending defects were observed and recorded in any of the planned maintenance schedules.

### Human Element

The team member was involved in scheduled work activity involving the replacement of black water piping in corridors outside cabins 2019 (deck 2), 3023 (deck 3) and 4033 (deck 4). The three cabins are vertically aligned above each other.

The team member was working outside passenger cabin 4033 on deck 4 on the day of the incident. From the CCTV footage, it was found that prior to the incident the team member was carrying a pipe clamp in one hand and its rubber washer in the other hand as he approached WTD #18.



**Figure 12: CCTV footage of the team member walking from the workshop towards WTD #18 prior to the incident**

The inspection of the pipe clamp revealed that the retaining bolt had been cut to a shorter length. The rest of the RCMT team members were interviewed and it was determined that to do this would involve the use of tools located in the engine room workshop. The same clamp was pictured in the team member's hand as he passed through the incinerator room on his way to the engine room at 1019 hours (figure 12). A drill bit was also recovered from the accident scene.



**Figure 13: The pipe clamp carried by the crew member is pictured below (fully assembled)**



**Figure 14: Image of the shortened bolt**

CCTV footage is not available in the location of WTD #18. However, it was observed that the team member was carrying the pipe clamp in the right hand and a rubber washer in the left hand.

## Majesty of the Seas -Marine Safety Investigation Report

The team member passed through the WTD #18 once to access the equipment from engine workshop and on his return, he was observed to have taken the same path to pass through the WTD #18. From the evidence available, it could not be determined how the crew member operated the WTD. However, considering he was seen holding the pipe clamp and rubber washer in each hand before approaching the WTD #18, it is considered likely that the crew member lost full control of the operating handles of watertight door #18 as he passed through the door, which may not have been fully opened before attempting to pass through, thus compounding the situation.

The company watertight door policy requires that the bridge be notified prior to opening any closed watertight door. This policy was not adhered to by the team member. The panel on the bridge does not alarm if a door is opened and the bridge team would be unaware a door was operated unless standing at the panel.

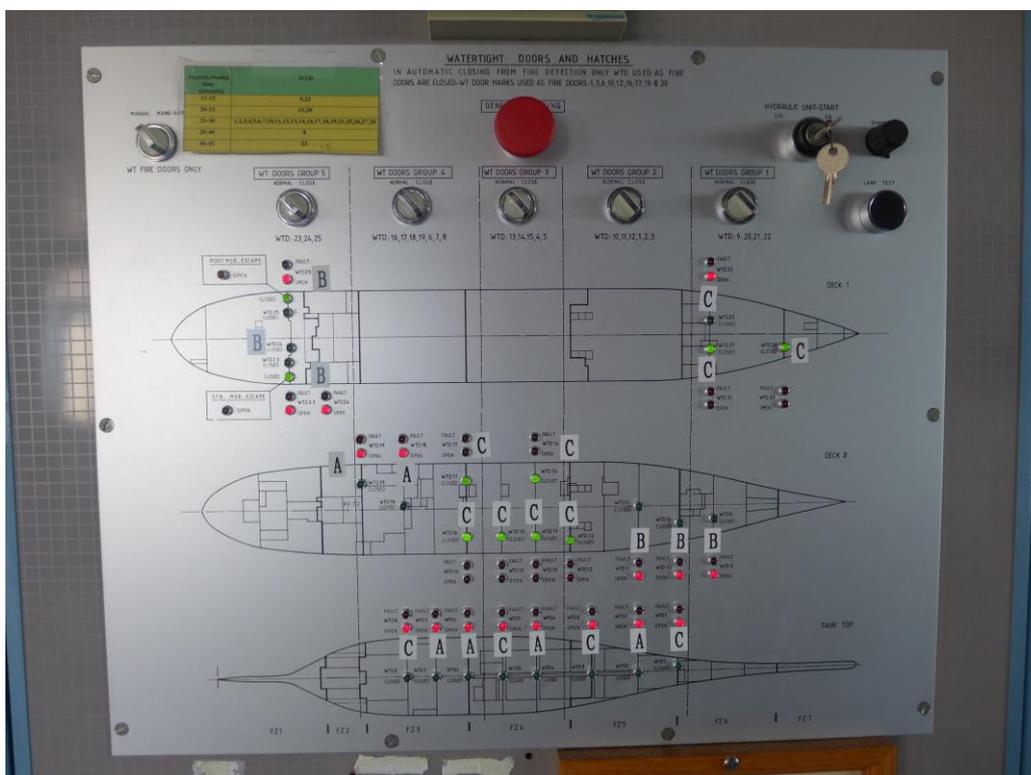


Figure 15: The vessel's navigating bridge watertight door control panel

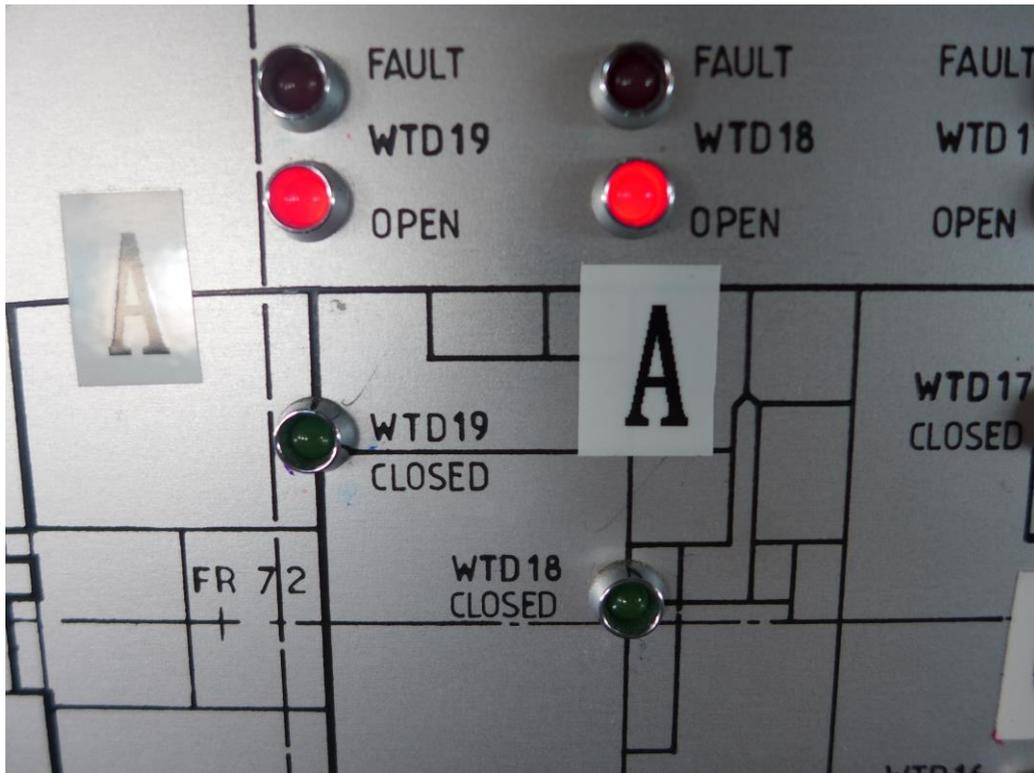


Figure 16: The wheelhouse panel indicator for watertight door #18

### Logbook Entries

The Merchant Shipping (Official Log Books) Regulation of 1981 came into force on 6<sup>th</sup> May 1982. The regulation is mandated as part of the second schedule (section 289) applied regulations, etc. of the Merchant Shipping Act.

The regulation consist of the list of entries required to be made in the official logbook kept in [Bahamian ships] not exempted from the requirements of section [143(1) of the merchant shipping act 1976].

Under Part 1 (Entries relating to every ship), Item 38 requires an entry is to be made regarding the circumstances, nature, treatment and progress of any injury to a crew member. Such an entry was not made in this instance.

There was no entry made in the vessel's Deck Logbook regarding this incident. Also, there was no entry made in the Bahamas Official Logbook regarding this incident. The last entry made in the narrative section involved a fire at Auxiliary Engine #6 on 14 March 2017.

Under Part IV (Entries relating to passenger ships), Item 46 (b) requires a record of the times of opening and closing of any watertight door is required. The failure to enforce the bridge permission for passage thus failing to enter times doors are opened or closed violates the Merchant Shipping Act. The RCCL WTD policy contains the following *“All WTD openings and closings shall be logged in the appropriate logbook. (Not applicable when transiting through a category A, B or C door and immediately closing it after passage).* This latter instruction violates the Merchant

## Majesty of the Seas -Marine Safety Investigation Report

Shipping (Official Log Books) Regulation reporting requirements which require a record to be maintained of the times of opening and closing of any watertight door.

### **Medical Records**

Medical records indicate that the team member injured by watertight door #18 was healthy and fit for duty. Prescribed medicines are not of the type likely to cause dizziness or carry the warning “do not operate machinery”.

He had not purchased any alcohol in the 4 days prior to this incident. There is no indication that his judgment was in any way impaired at the time of this accident, the particular prescription medicines taken by the team member for hypertension and cholesterol do not have any side effects that might impair judgment.

\*\*\*

## CONCLUSIONS

The vessel's watertight doors were closed from the bridge after making PA announcements as per the crew fire and boat drill procedure. The RCMT members are exempted from many onboard drills. They are not included in the Chief Engineer's monthly safety meetings nor are they subject to daily or weekly toolbox talks which should address routine safety requirements. Attendance at the PDST which includes; watertight doors training is required on each vessel and the SSOT is required once every 6 months. RCMT members were required to undergo annual in-house familiarisation training for the maintenance team and to carry the original copy of the training form with them.

The team member was part of RCMT and was involved in scheduled work activity involving the replacement of black water piping in accommodation corridors. From the CCTV footage, it was observed that he went to the engine room workshop. The team member did not inform the bridge team before operating the WTD. He passed through the WTD #18 on his way to the engine room workshop and on his return, he was carrying pipe clamp in one hand and its rubber washer in the other hand as he approached WTD #18.

The team member was alone and there was no CCTV covering the site of WTD #18. Hence, it was not possible to determine how the team member accessed WTD #18 on his return. However, considering he was seen holding the pipe clamp and rubber washer in each hand before approaching the WTD #18, it is highly likely that the team member lost full control of the operating handles of watertight door #18 as he passed through the door.

Signage on watertight door #18 was misleading as to the required status of the door. Notices qualify the door for Class "A", "B" and "C" at the same time. A review of both the vessel's type (Mega Class) and individual door schedule indicates the door should be marked as Class A and B: to be closed when underway in restricted areas and may be open from 0700 to 1900 when in unrestricted navigation.

Post-incident investigation indicates that the door was fully functional, alarm lights and bell in working order and that if fully opened there would be 23 seconds before the door closed after the control handles were released.

\*\*\*

**Recommendations for the Company:**

The individual specification of all watertight doors should be reviewed and their signage on each door brought into line with the door's classification.

Consider adding signage next to each watertight door reminding all users of the operating requirements in accordance with Company's Safety Management System (SMS).

It is recommended that a review of the training module for the safe operation of watertight doors for all crew and RCMT members is undertaken. Discussions should aim to reinforce the following requirements:

- I. The procedure for passage through watertight doors is strictly followed.
- II. The crewmember should have both hands free when passing through a watertight door in order to maintain proper control of operating levers.

Conduct a review of the SMS requirements related to entries in the vessel's Logbook and ensure they meet statutory reporting requirements.

\*\*\*

**Actions taken by the Company:**

A safety bulletin was issued to the fleet.

The company's policy was updated highlighting the dangers of WTD with particular emphasis on the conditions surrounding this event.

DNVGL/GARD WTD safety videos utilized in addition to the company's WTD safety video.

A signage check was performed on the ships and local issues corrected.

General closing drill changed to monthly from weekly. Further added that safety sentries are to be present in view of the doors for the duration they are in remote close.

Initiated an investigation into identifying the means to upgrade the doors to Resolution MSC.13(57) (adopted on 11 April 1989), regulation 15 for this class of vessel with construction date prior to the enforcement date.

Newbuild vessels are being standardized to have a warning light indication with standard text when doors are closed and remaining in self-closing mode.

\*\*\*

# Majesty of the Seas -Marine Safety Investigation Report

## APPENDIX I: Watertight door classification:

Royal Caribbean		MEGA CLASS				
WATERTIGHT DOORS - INTERNAL EXEMPTION						
Door No	Frame	Category	Open Hours as per Flag Exemption	Scheduled Internal Exemption Opening Times	Scheduled Internal Exemption Opening Hours	Internal Exemption Opening Hours - CREDIT LIMIT
----- TANK TOP DECK -----						
WTD1	215	C	0	NONE	0	0
WTD2	197	A	24	NONE	0	0
WTD3	176	C	0	NONE	0	0
WTD4	152	A	24	NONE	0	0
WTD5	137	C	0	NONE	0	0
WTD6	122	A	24	NONE	0	0
WTD7	108	A	24	NONE	0	0
WTD8	95	C	0	NONE	0	0
----- DECK 0 -----						
WTD9	230	B	18.5			16
WTD10	215	B	18.5			16
WTD11	197	B	18.5			16
WTD12	167	C	0	NONE	0	0
WTD13	152	C	0	NONE	0	0
WTD14	152	C	0	NONE	0	0
WTD15	137	C	0	NONE	0	0
WTD16	122	C	0	NONE	0	0
WTD17	122	C	0	NONE	0	0
WTD18	95	A	24			12
WTD19	77	A	24			12
----- DECK 1 -----						
WTD20	260	C	0	NONE	0	0
WTD21	227	C	0	NONE	0	0
WTD22	227	C	0	NONE	0	0
WTD23	46	B	18.5			18
WTD24	47	B	18.5			18
WTD25	46	B	18.5			18
WTD26	86	A	24			24
WTD27	85	A	24			24
WTD28	86	B	12			12
WTD ENHANCEMENT RESULTS = 48% REDUCTION IN OPENING HOURS			315		0	186

**Note:**  
Scheduled Internal Exemption Opening Hours per door must not exceed the respective credit limit, regardless of categorization (does not include passage time)

The master or his/her designee on the bridge has overriding authority to close the doors at any time based on a risk assessment that takes into consideration criteria contained in the approved documentation and company policy such as:  
Density of traffic, proximity to the grounding line, inclement weather, during every arrival / departure, etc...

**Category A Doors:**  
Permitted to remain open during navigation but must be closed if any potentially hazardous conditions are developing or encountered

**Category B Doors:**  
These doors must remain closed at sea but may be opened while crew are working in the adjacent spaces.

**Category C Doors:**  
These doors must be kept closed at all times when the ship is at sea unless permission is granted by the bridge to pass through. The door must be closed immediately after passage.

# Majesty of the Seas -Marine Safety Investigation Report



## MAJESTY OF THE SEAS WATERTIGHT DOOR OPENINGS UNDERWAY

	UNDERWAY CONDITION 1	UNDERWAY CONDITION 2
NOTE		
The opening of WTDs other than under the conditions set forth in this matrix can only be done with the expressed authority of the Master for a specific purpose and period of time. Details of all such openings shall be recorded in the ship's Deck Log Book.	In Areas with high density traffic: When operating with restricted visibility. When water depth is less than 3 times the maximum draft. Underway within port limits or within compulsory harbor pilotage limits.	Only when none of the Underway condition 1 criteria are present.

Tank Top				
DOOR#	CLASS	LOCATION		
WTD TT .1	C	Engine Space	Must be closed	Open only for Passage
WTD TT .2	A	Engine Space	Must be closed	May remain open
WTD TT .3	C	Engine Space	Must be closed	Open only for Passage
WTD TT .4	A	Engine Space	Must be closed	May remain open
WTD TT .5	C	Engine Space	Must be closed	Open only for Passage
WTD TT .6	A	Engine Space	Must be closed	May remain open
WTD TT .7	A	Engine Space	Must be closed	May remain open
WTD TT .8	C	Engine Space	Must be closed	Open only for Passage

Deck 0				
DOOR#	CLASS	LOCATION		
WTD 0.09	B	Laundry	Must be closed	May be Open from 0700-2359
WTD 0.10	B	Laundry	Must be closed	May be Open from 0700-2359
WTD 0.11	B	Laundry	Must be closed	May be Open from 0700-2359
WTD 0.12	C	Crew Cabins	Must be closed	Open only for Passage
WTD 0.13	C	Crew Cabins	Must be closed	Open only for Passage
WTD 0.14	C	Crew Cabins	Must be closed	Open only for Passage
WTD 0.15	C	Crew Cabins	Must be closed	Open only for Passage
WTD 0.16	C	Crew Cabins	Must be closed	Open only for Passage
WTD 0.17	C	Crew Cabins	Must be closed	Open only for Passage
WTD 0.18	A	Engine Space	Must be closed	May be Open from 0700-1900
WTD 0.19	A	Engine Space	Must be closed	May be Open from 0700-1900

PROVISION AREAS DECKS 1				
DOOR#	CLASS	LOCATION		
WTD 1.20	C	Crew Cabins	Must be Closed	Open only for Passage
WTD 1.21	C	Crew Cabins	Must be Closed	Open only for Passage
WTD 1.22	C	Crew Cabins	Must be Closed	Open only for Passage
WTD 1.23	B	Provisions	Must be Closed	May be Open from 0500-2300
WTD 1.24	B	Provisions	Must be Closed	May be Open from 0500-2300
WTD 1.25	B	Provisions	Must be Closed	May be Open from 0500-2300
WTD 1.26	A	I-95	Must be Closed	May remain open
WTD 1.27	A	I-95	Must be Closed	May remain open
WTD 1.28	B	Engine Control	Must be Closed	May be Open from 0700-1900

<b>A</b>	A door that may be kept open.
<b>B</b>	A door that shall be closed, but may be left opened for the length of time that personnel
<b>C</b>	A door that shall be closed, but may be opened to permit passage only.

APPENDIX II – Watertight Door Policy

Safety & Injury Prevention - RCL - TUIC - SkySea - 2.01 (Revision 43 - 03/31/2017)



RCL Cruises Ltd.



(manual section is applicable for above companies)

**SAFETY & INJURY PREVENTION -** **Revision 43 : March/31/2017**  
**RCL - TUIC - SKYSEA**  
**Chapter 2 - Maritime Safety & Compliance**  
**2.01 Water Tight Door (WTD) Policy**

 **Policy**

**WATERTIGHT DOORS OPERATION AND STANDARDS**

**Defined Terms**

“At Sea” means when the vessel is not at anchor or made fast to the shore.

“Watertight Door” or “WTD” is a door that is located at or below the bulkhead deck and maintains the watertight integrity of the subdivision in which it is located.

“Light Watertight Door” or “LWTD” is a door designed to perform same function as a WTD, however due to its location, the door is not designed to withstand the same head of pressure as a WTD

“Semi Watertight/Splash Door” or “SWTD / Semi-WTD” is a door located at or above the bulkhead deck They are designed to prevent progressive flooding along the bulkhead deck. They are typically linked to the WTD remote closing button on the bridge.

“Vulnerability” is a term associated with the likelihood of vessel survivability following a breach in watertight integrity. Expressed as a percentage, it has the potential to demonstrate the impact that certain variables (design, WTDs, loading, sea height, etc...) have on ship survivability.

“Optimized (Internal) WTD Exemption or Acceptance” is the result of an internal assessment of the flag state exemptions/authorizations using single door vulnerability studies in conjunction with identifying operational efficiencies in areas with WTDs.

“Damage Control Plan” or “DCP” is a printed plan, profile and in some cases transverse drawing that clearly shows information on the ship’s watertight subdivision and the equipment related to

# Majesty of the Seas -Marine Safety Investigation Report

Safety & Injury Prevention - RCL - TUIC - SkySea - 2.01 (Revision 43 - 03/31/2017)

maintaining the watertight integrity of the watertight boundaries.

“Damage Control Manual” or “DCM” is printed booklet that repeats, in greater detail, the information contained in the DCP. In addition, the DCM includes general instructions for controlling the effects of damage. In certain cases, the DCM may contain several one, two and three compartment damage scenarios used to calculate the damage consequence diagram (green, yellow and red chart on the DCP) – these scenarios are only intended to assist the officers in estimating the ship’s relative survivability as the criteria used in the calculations may not reflect the actual situation being faced.

## **Training and Awareness**

All crew members are to be trained on the operation of watertight doors as outlined in the Company training manual. Crew members are to be made aware that passing through a WTD represents an emergency exit and not the primary exit from a space. Ship teams should also use vulnerability related data to raise awareness onboard regarding the importance of WTDs and their direct relationship to ship survivability.

## **Importance of Watertight Doors**

Watertight doors are critical to the watertight integrity and survivability of the ship in a damage condition. Watertight doors must be maintained and tested according to the rules set forth in SOLAS. At any time when a watertight door becomes out of compliance, the master must be notified immediately. The ships respective manager must be notified who in turn will notify class.

Single door vulnerability studies demonstrate the impact individual WTDs have on ship survivability. The insight gained from these studies has been incorporated in to the Optimized (Internal) WTD Exemptions or Acceptances and should be shared onboard for vessels with this information. Regardless, shipboard officers must be familiar with the concept that the WTDs are one of the single most important operational influences on ship survivability in the event of flooding.

The single door vulnerability studies include the impact of the semi-WTDs (SWTDs) on ship survivability. Based on these studies and damage stability calculations, it is imperative that bridge teams recognize the importance of the semi-WTDs in damage conditions. In certain damage conditions, these doors play an equally critical role as WTDs to ship survivability.

## **Emergency Operation**

The officer in charge of the navigational watch must never hesitate to close all watertight doors and semi-WTDs should he/she determine there is an imminent risk of damage to the ships hull or other flooding scenario. This is to be done at any time or circumstance where the officer of the watch determines there is a significant risk of damage to the hull either At Sea, in port, at anchor or utilizing DP.

## **Operational Requirements**

The following safety rules shall be strictly complied with:

- Watertight doors may not be kept in the "Remote" or "Closed" mode - except for

Printed 04/17/2017. Printed copies are uncontrolled, and must be identical to the electronic version. 2

# Majesty of the Seas -Marine Safety Investigation Report

Safety & Injury Prevention - RCL - TUIC - SkySea - 2.01 (Revision 43 - 03/31/2017)

emergencies. The master switch, or the switch for single doors may only be put to Remote/Closed after an appropriate announcement has been made on the PA system, and only during:

## EMERGENCIES

- WTDs are designed to alarm before moving in an effort to protect human life when operated remotely. This feature should be checked but cannot be solely counted on for preventing injuries. Enforcing proper WTD operating procedure is the most effective form of prevention

## TESTING/DRILLS

- Ship survivability from a flooding incident is drastically reduced when all WTDs are opened in preparation for the general closing. The scheduling of this drill should take in to account risks within the port (ie traffic, weather, etc).
- In normal operation, the closing of watertight doors shall be done locally - at the door.
- Doors are to be kept in the "local" mode after they have been closed.
- Due to the possibility of an unforeseen emergency closing, leaving WTDs partially open shall be prohibited as it increases the risk of closing on a person.
- The doors should be tested as per SOLAS and logged appropriately
- WTD's that are greater than 1.2 m wide shall only be opened to the limit/proximity switch while at sea.
- WTD categorization and associated opening times/rules does not apply to a vessel that is safely berthed (ie not At Sea). In this event, the master or his/her delegate on the bridge must still authorize the opening of the WTDs keeping in mind that the opening of WTDs reduces ship survivability. A mental risk analysis must be conducted prior to authorizing the opening. The risk analysis, at a minimum, should include: Quantity and proximity of port traffic, weather and amount of doors already open.
- Operating a WTD in any situation without permission from the master or his/her delegate on the bridge is subject to disciplinary action.

In addition to the visual and audible markings required by SOLAS, all ships shall mark watertight doors as follows:

- Alternating Yellow and Black stripes/squares either vertically, horizontally or diagonally
- Each door shall be marked with the category of door and an explanation of that category as per the vessel's approved DCP, DCM or class/flag documentation.

The WTD categorization of each door shall be indicated on or directly beside the bridge watertight door panel(s) to assist the nautical officer in determining WTD compliance with the vessel's approved DCP, DCM or class/flag documentation. All WTD openings and closings shall be logged in the appropriate logbook. (Not applicable when transiting through a category A, B or C door and immediately closing it after passage).

## **WTD Exemptions & Acceptances**

As a general requirement, all watertight doors are to be kept closed while the ship is At Sea except when personnel are to physically pass through a watertight door, closing it immediately after passage. Exceptions to this general requirement are specified in the vessel's approved DCP,

Printed 04/17/2017. Printed copies are uncontrolled, and must be identical to the electronic version. 3

# Majesty of the Seas -Marine Safety Investigation Report

Safety & Injury Prevention - RCL - TUIC - SkySea - 2.01 (Revision 43 - 03/31/2017)

DCM or class/flag documentation.

Permission must be obtained from the Master or his/her delegate on the bridge prior to opening any WTD. This is primarily to ensure that a mental external risk assessment is conducted prior to granting/denying permission.

All DCP and DCM change requests shall be done by the respective Marine Operation Department in agreement with Maritime Safety. The request shall be in accordance with the following:

1. WTD's between main engine compartments will remain closed at all times except to permit passage.
2. WTD's between engine/technical spaces and crew accommodation spaces shall be closed at all times.
3. In engine spaces, except for the doors already closed under points 1 & 2, an effort should be made so that every second WTD should be kept closed except to permit passage

All exempted doors that are categorized as "A" or "B" doors as per the vessel's approved DCP DCM or class/flag documentation shall always be ready for immediate closure.

## **Optimized (Internal) WTD Exemption/Acceptances**

The Optimized (internal) WTD Exemptions or Acceptances represent an above and beyond compliance initiative. The objective is to reduce flag state exemptions or acceptance letter open times with a special focus on reducing or eliminating opening times for doors that adversely impact ship vulnerability\*. There is no change to the door categorization assigned by the flag state.

The flag state exemptions or acceptances remain wholly intact and at no time will the vessel operate outside of any stated times or categorization issued by class on behalf of the flag state. The internal exemptions/acceptances must work within the confines set by the approved DCP, DCM or class/flag documentation.

Each vessel is responsible for completing their class specific Optimized (Internal) Exemption or Acceptance template. The vessel will operate within the hours stated on the template attached below. The vessel may change the open hours as it best suits their operation based on the following:

1. The door categorization with associated instructions remain the same as stated by the flag state and any credit hours must fall within the times set previously by flag on the approved documentation (if applicable – as these times are not always dictated)
2. All doors must be closed in potentially hazardous conditions as stated later in this section
3. The total scheduled open hours for each door may fall short but will not exceed the hours stated in the template – Door hours apply specifically to one particular door, excess open

Printed 04/17/2017. Printed copies are uncontrolled, and must be identical to the electronic version. 4

# Majesty of the Seas -Marine Safety Investigation Report

Safety & Injury Prevention - RCL - TUIC - SkySea - 2.01 (Revision 43 - 03/31/2017)

hours cannot be credited to other doors.

A request may be submitted to the respective AVP/Fleet Captain in order to receive additional hour credits – See guidance for additional information.

\*Vessels that do not have vulnerability studies will still comply with this policy, however greater emphasis will be placed on operational efficiencies.

Class / Ship Specific Optimized (Internal) Exemption or Acceptance Templates. See guidance for further details:

	
AZ Class - WTD Internal Acceptance - Credit Template.xls	CN - Internal WTD Acceptance - Credit Template.xls
	
EN - WTD Internal Exemption - Credit Template.xls	FR Class - WTD Internal Exemption - Credit Template.xls
	
GR - WTD Internal Exemption - Credit Template.xls	MEGA Class - WTD Internal Exemption - Credit Template.xls
	
ML Class - Internal WTD Acceptance - Credit Template.xls	OA Class - WTD Internal Exemption - Credit Template.xls
	
RD Class - WTD Internal Exemption - Credit Template.xls	RH & VI - WTD Internal Exemption - Credit Template.xls
	
SL Class - Internal WTD Exemption - Credit Template.xls	SP & LG - WTD Internal Exemption - Credit Template.xls
	
TUI - Internal WTD Acceptance - Credit Template.xls	VY Class - WTD Internal Exemption - Credit Template.xls

All doors status MUST be closed<sup>1</sup> in potentially hazardous conditions/areas such as:

- The vessel is navigating in or near areas of restricted visibility
- There is high density of shipping traffic
- Transit in areas close to grounding line or within port limits (as defined in the Navigation Policy and Procedures)
- During Red condition
- Any time when navigating in or near ice
- In areas where soundings are unreliable
- During hazardous weather conditions (i.e. storms, high seas)
- Any time the OOW or Master deems it necessary for the safety of the vessel.
- As per DCP, DCM or class/flag documentation

<sup>1</sup> A WTD may be opened under these conditions to permit passage; it must be closed immediately after passage has been affected. It is at the Master's discretion to invoke this provision, under hazardous conditions, in an effort to reduce permission requests to the bridge.

# Majesty of the Seas -Marine Safety Investigation Report

Safety & Injury Prevention - RCL - TUIC - SkySea - 2.01 (Revision 43 - 03/31/2017)



## Guidance

### **Importance of Watertight Doors**

The risk of progressive flooding is increased if WTDs are open during a flooding situation. Damage to the structure following a collision or grounding could lead to bulkhead and deck deformation, potentially rendering affected doors unable to close.

Large amounts of water can very quickly flood a compartment(s) following extensive damage. This is directly related to the size of the damage and the depth at which it occurs below the waterline, amongst other factors. By potentially having many compartments in communication with each other, sufficient water can quickly enter across these compartments and establish large free surfaces that could upset the righting moment. It is imperative to recognize the speed at which this can happen, keeping in mind that WTDs have up to 60 seconds to close per SOLAS.

Debris, false indications of closure (faulty sensor) or simply delaying the closing of WTDs are other factors that could significantly increase the risk of progressive flooding through open WTDs.

### **WTD Exemptions**

#### **Operational Guidance**

The following are examples of painting of WTD and signage to be placed at each watertight door.

Yellow/Black paint scheme:



The below WTD Category sign should be posted on or near each door.

#### **Category A**

This door may be kept open except when closed by the bridge during potentially hazardous situations

When closed, permission must be received from the bridge to open this door

#### **Category B**

# Majesty of the Seas -Marine Safety Investigation Report

Safety & Injury Prevention - RCL - TUIC - SkySea - 2.01 (Revision 43 - 03/31/2017)

This door must remain closed at sea, but may be opened while crew are working in the adjacent spaces

OR

This door must remain closed at sea, except for the following times while crew are working in the adjacent space:  
(for example)  
0700-1100  
1300-1700  
1800-2000

## Category C

This door must be kept closed at all times when the ship is at sea unless permission is granted by the bridge to pass through.

The door must be closed again after passage.

OR

This door must be kept closed at all times when the ship is at sea except while passing through

The door must be closed again after passage.

## Optimized (Internal) WTD Exemption or Acceptance

An Optimized (Internal) WTD Exemption or Acceptance is comprised of four components:

- 1) Identifying operational efficiencies in areas with WTDs to reduce the amount of time doors are required to be open
- 2) Reducing or eliminating the opening hours of doors that have been identified through single door studies as having an adverse impact on ship vulnerability
- 3) Optimization procedure
- 4) Open door credit system

### 1) Operational Efficiencies

Operational efficiencies in regards to WTDs refer to a collection of management processes implemented in the area of WTDs that looks to reduce open hours. The processes can include,

Printed 04/17/2017. Printed copies are uncontrolled, and must be identical to the electronic version. 7

# Majesty of the Seas -Marine Safety Investigation Report

Safety & Injury Prevention - RCL - TUIC - SkySea - 2.01 (Revision 43 - 03/31/2017)

but are not limited to; increased man power during open hours, more effective scheduling of operations around open hours, enhanced management techniques to increase productivity during open hours, identifying alternative routes to move items, etc.

## 2) Single Door Vulnerability Studies

Single door vulnerability studies utilize a calculation technique that provides the ability to measure the impact of open WTDs, LWTDs and Semi-WTDs on ship vulnerability. A ranking system has been developed to numerically identify doors with the greatest impact to ship vulnerability. A door with the ranking of 1 (one) has the most impact on ship vulnerability while every subsequent door has less of an impact relative to the first door.

## 3) Optimization Procedure

The optimization procedure results in a proposal made by each vessel to marine operations regarding the potential reduction in WTD opening hours. The onboard teams used a combination of operational efficiencies and the knowledge gained through single door vulnerability studies to reduce overall opening hours with a special focus on reducing or eliminating opening times for doors that adversely impact ship vulnerability. The reduction of open hours for each vessel is within the current flag state rules governing the WTDs, thus representing an above and beyond compliance situation. These proposals were consolidated to produce class specific Optimized (internal) WTD Exemption or Acceptance templates.

## 4) Open Door Credit System

The open door credit system provides flexibility while retaining the overall results of the optimization procedure. The templates state the maximum amount of open hours that each door may have, this number must not be surpassed.

Example:

TT.01 has a credit of 12 open hours, approved documentation pertaining to this vessel states that this B category door can only be opened between 05:00 and 23:00.

The vessel sets their Internal Exemption or Acceptance to have the door open from 06:00 until 12:00 and again from 17:00 until 23:00.

WATERTIGHT DOORS - INTERNAL EXEMPTION							
Door No	Frame	Category	Vulnerability Rank Out Of 25	Open Hours as per Flag Exemption	Scheduled Internal Exemption Opening Times	Scheduled Internal Exemption Opening Hours	Internal Exemption Opening Hours CREDIT LIMIT
----- TANK TOP DECK -----							
TT.01	167	B	24	14	06:00 - 12:00 17:00 - 23:00	12	12

Results - The open hours meet the total of 12 open credit hours and fall within the approved

# Majesty of the Seas -Marine Safety Investigation Report

Safety & Injury Prevention - RCL - TUIC - SkySea - 2.01 (Revision 43 - 03/31/2017)

documentation parameters.

## **Exemption Requests**

The requests must include a detailed risk assessment taking in to account the doors impact on vulnerability, a robust justification for operational needs as well as the length of time the vessel has currently operated with the standard class appropriate template. The request must remain in line with criteria 1, 2 & 3 mentioned in the policy. If granted, these requests will be valid for a set period of time (season) where it will then expire, reverting to the original hour thresholds stated in the class appropriate template.

**Related Entries:**

**Related Chapters:**

**END OF SECTION**

Printed 04/17/2017. Printed copies are uncontrolled, and must be identical to the electronic version. 9

## Majesty of the Seas -Marine Safety Investigation Report

### APPENDIX III: Merchant Shipping (Official Logbooks) regulations 1981 extract:

PART IV			
<i>Entries relating to passenger ships</i>			
	Column 1 Particulars of Entry	Column 2 Signatory	Column 3 Witness
45.	<p><i>(All such ships)</i></p> <p>A record of—</p> <p style="margin-left: 20px;">(a) the times of the last closing, before the ship proceeds to sea, of the watertight doors and other appliances referred to in regulation 2 of the Closing and Openings in Hull Regulations <sup>278</sup>, and of the next subsequent opening of such doors and appliances;</p> <p style="margin-left: 20px;">(b) the times of the opening and closing, while the ship is at sea,</p>	<p><i>(note: An officer rather than a member of the crew must sign these entries, in addition to the master)<sup>279</sup></i></p>	

<sup>278</sup> see Appendix VIII for excerpt

<sup>279</sup> see section 143(5) of the Act and the original paragraph

# Majesty of the Seas -Marine Safety Investigation Report

## Merchant Shipping (Official Log Books) Regulations

	Column 1 Particulars of Entry	Column 2 Signatory	Column 3 Witness
	<p>of any watertight door pursuant to [SOLAS 74/88 and previously] regulation 3(1)(c) of those Regulations;</p> <p>(c) whether the portable plates referred to in regulation 4 of those Regulations are in place when the ship proceeds to sea, and the times, if any, of the removal and replacement of such plates when the ship is at sea; and</p> <p>(d) the occasions on which drills are practised and inspections made in compliance with [SOLAS 74/88 and previously] the provisions of those Regulations, and whether the appliances to which such drills and inspections relate are in good working order.</p>		
46.	<p><i>(All such ships)</i> A record of—</p> <p>(a) the times of the last closing, in accordance with [SOLAS 74/88]<sup>280</sup>, of the watertight and weathertight doors referred to in those Regulations and of the next opening of such doors;</p> <p>(b) the times of the openings and closing of any watertight or weather door pursuant to [SOLAS 74/88]<sup>282</sup>.</p>	<p><i>(note: An officer rather than a member of the crew must sign these entries, in addition to the master<sup>281</sup>)</i></p>	
47.	<p>(a) <i>(All ships of Class I, II, IIA and IV<sup>283</sup> as specified in the Passenger Ships Regulations 1980 or 1984 as the case may be)</i> A record of draughts, trim and vertical</p>	<p><i>(note: An officer rather than a member of the crew must sign these entries, in</i></p>	

\*\*\*