



United States Coast Guard

Report of Investigation into the Circumstances Surrounding the CARIBBEAN FANTASY Fire, 2 Miles Northwest of San Juan, Puerto Rico; Subsequent Grounding and Evacuation of 511 Persons with 7 Minor Injuries on AUGUST 17, 2016



MISLE Activity Number: 5977513



16732
29 Aug 2016

MEMORANDUM

From: S. A. Buschman, RADM [REDACTED]
CGD SEVEN [REDACTED]

To: M. J. Capelli, CDR [REDACTED]
CGD SEVEN (dpi) [REDACTED]

Subj: FORMAL MARINE CASUALTY INVESTIGATION CONCERNING THE FIRE AND
SUBSEQUENT GROUNDING OF THE CARIBBEAN FANTASY OFFSHORE SAN JUAN,
PUERTO RICO ON 16 AUGUST 2016

Ref: (a) Title 46 United States Code, Chapter 63
(b) Title 46 Code of Federal Regulations, Part 4
(c) Marine Safety Manual, COMDTINST M16000.10, Volume V

1. Pursuant to the authority contained in reference (a) and the regulations promulgated under reference (b), you shall commence, as soon as practicable, a formal marine casualty investigation into the fire and the subsequent grounding of the ferry CARIBBEAN FANTASY while transiting to San Juan, Puerto Rico on 16 August 2016.

2. A representative from the Panamanian government has requested to participate in this investigation, and is authorized to do so. LCDR [REDACTED] is assigned as legal counsel for this investigation. In addition, the following Coast Guard personnel are available to assist you:

- a. Mr. [REDACTED] CG INV NCOE
- b. Mr. [REDACTED] CG MSC
- c. Mr. [REDACTED] CG CS NCOE
- d. LT [REDACTED] CGD SEVEN (dpi)
- e. LTJG [REDACTED] CG Sector San Juan

3. The National Transportation Safety Board (NTSB) is also charged with the responsibility of determining the cause or probable cause of this casualty by the Independent Safety Board Act of 1974 (49 U.S.C. 1901, et. seq.) and may designate representative(s) to participate in this investigation. The NTSB representative(s) may make recommendations regarding the scope of the inquiry, may identify and examine witnesses, and/or submit or request additional evidence.

4. You will thoroughly investigate the matter in accordance with the provisions found in references (a) through (c), and you shall engage technical subject matter experts from the Investigations National Center of Expertise (INCOE), Cruise Ship National Center of Expertise (CSNCOE), Marine Safety Center, NTSB, and other agencies as appropriate. More specifically, you will determine the following:

- a. The cause of the marine casualty and the adequacy of fire fighting and protection systems in place aboard the vessel.
 - b. The adequacy of the safety management system and procedures to ensure full accountability of crew and passengers during the incident.
 - c. The adequacy of the life saving systems and procedures to ensure the crew and passengers were able to safely and swiftly evacuate the vessel.
 - d. Whether there is evidence that any failure of material (either physical or design) was involved or contributed to the casualties, so that proper recommendations for the prevention of the recurrence of similar casualties may be made.
 - e. Whether there is evidence that any act of misconduct, inattention to duty, negligence or willful violation of the law on the part of any person holding a Coast Guard credential contributed to the casualties, so that appropriate proceedings against the credential of such person may be recommended.
 - f. Whether there is evidence that any Coast Guard personnel or any representative or employee of any other government agency or any other person caused or contributed to the cause of the casualty.
 - g. Whether the present regulatory framework, as applied to this and similar vessels, provides an adequate measure of safety.
5. Upon conclusion of the investigation, you will submit your completed investigative report to me with the collected evidence, established facts, conclusions and recommendations. You shall complete your investigation within 12 months of the convening date. You are encouraged to submit interim recommendations intended to prevent similar casualties, if appropriate, during the course of your investigation. Your report will be submitted to Commandant (CG-INV) through the Seventh Coast Guard District Prevention Division (dp) and Commander, Seventh Coast Guard District.
6. District Seven will provide funding, technical assistance, and administrative support, as may be required and within the scope of this investigation. When deemed appropriate for the proper and orderly functioning of this formal investigation, the District Commander is authorized to negotiate for commercial court reporting services pursuant to 10 USC 2304(a)(4). This authorization satisfies the requirements of USCG Procurement Regulations 11-3.204(b)(1) for Commandant (CG-85) approval prior to negotiation of contracts for personal and professional services. If district funds are not available, comply with the Manual of Budgetary Administration, COMDTINST M7100.3.

#

Copy: CG Sector San Juan (S) (Sp)
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LANTAREA (LANT-54)
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U.S. Department of
Homeland Security

United States
Coast Guard



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16732/IIA #5977513
26 February 2024

**THE FIRE AND SUBSEQUENT GROUNDING OF THE PANAMA FLAGGED
PASSENGER FERRY CARIBBEAN FANTASY (IMO 8814263) 0.8 NAUTICAL
MILES NORTH OF PUNTA SALINAS, PUERTO RICO ON AUGUST 17, 2016**

ACTION BY THE COMMANDANT

The record and the report of the investigation convened for the subject casualty have been reviewed. The record and the report, including the findings of fact, analysis, conclusions, and recommendations are approved subject to the following comments. This marine casualty investigation is closed.

ACTION ON RECOMMENDATIONS

Recommendation 1: It is recommended that the Commandant of the Coast Guard reiterate to all Officers in Charge of Marine Inspection to closely evaluate and scrutinize crewmember training records for emergency situations, drills, and training during all Certificate of Compliance exams.

Action: I concur with this recommendation. Foreign Passenger Vessel Annual Exam guidance requires examiners to check both crew competency as well as training records. The Office of Commercial Vessel Compliance (CG-CVC) will work closely with the Cruise Ship National Center of Expertise to ensure the importance of scrutinizing crew training records is emphasized to all Coast Guard personnel who perform foreign passenger vessel examinations.

Recommendation 2: It is recommended that the Commandant of the Coast Guard reiterate to all Officers in Charge of Marine Inspection to closely evaluate and scrutinize shipboard Safety Management System (SMS) practices for critical engineering maintenance procedures to ensure adequate reporting to shoreside management during all Certificate of Compliance (COC) exams.

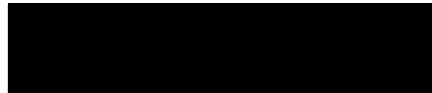
Action: I concur with the intent of the recommendation. While scrutiny of the details of the shipboard SMS is not a part of COC exams in the absence of objective evidence; this recommendation points to the need to scrutinize engineering spaces and equipment that may provide objective evidence of failures in engineering maintenance.

CG-CVC intends to publish a Chief of Inspections Note (CID Note) to provide an overview of lessons learned from this casualty. The CID Note will initiate an

enhanced examination program (EEP) campaign to focus port state examiners on scrutinizing on the types of engineering systems and deficiencies that were identified as contributing factors in this casualty.

Recommendation 3: It is recommended that the Commandant of the Coast Guard support International Maritime Organization (IMO) changes to the Standards of Training Certification and Watchkeeping (STCW) code to increase content and frequency requirements for mariners in fully operating Marine Evacuation Systems.

Action: I do not concur with this recommendation. The investigation does not make a compelling case to pursue changes to the International Convention on the STCW Code to increase content and frequency requirements for mariners in fully operating Marine Evacuation Systems (MES). Specifically, the investigation determined that the crew of the CARIBBEAN FANTASY did not adhere to existing regulatory MES training requirements prior to the incident.



A. M. BEACH
Captain, U.S. Coast Guard
Director of Inspections and Compliance



16732
28 Apr 2022

CARIBBEAN FANTASY (IMO NO. 8814263) FIRE, 2 MILES NORTHWEST OF SAN JUAN, PUERTO RICO; SUBSEQUENT GROUNDING AND EVACUATION OF 511 PERSONS WITH 7 MINOR INJURIES ON AUGUST 17, 2016

ENDORSEMENT BY DISTRICT COMMANDER

The record and the report of the investigation convened for the subject casualty have been reviewed. This casualty highlights the oversight provided by the vessel owner, flag state and RO in ensuring the vessel was operating in compliance with international conventions was significantly inadequate. There is clear evidence that the vessel's SMS was not effectively implemented based on the discovery of unapproved modifications to the fuel system for the main engines, the intentional blocking of the QCVs in the open position, the operational condition of lifesaving equipment and the complete lack of nonconformities reported by the vessel under their SMS.

Additionally, the crew was insufficiently trained to effectively abandon the vessel as evidenced by the inability of the crew to properly deploy the vessel's survival crafts. In particular, the current training/proficiency requirements under SOLAS and STCW for MES may be inadequate as only one crewmember had ever seen an actual deployment of a MES. If this casualty had occurred further offshore with less response resources available to respond in a timely manner the outcome may have been quite different as it would have forced the crew and passengers to use the improperly deployed MES or remain on the burning vessel. The following additional recommendations are made based on the Seventh District's review of the casualty.

It is recommended that Panama:

- Investigate the apparent inadequate oversight by the RO who failed to identify the vessel's modified fuel system, improper operation of QCVs, and ineffective implementation of the vessel's SMS.
- Investigate their failure to ensure the crew was properly trained for emergency situations, in particular, abandon ship procedures and proficiency in operating lifesaving equipment.

It is recommended that RINA:

- Investigate their oversight of this vessel to determine what allowed/enabled the vessel to operate with unapproved modifications to the vessel's main engines fuel system, intentionally block open the fuel and lube oil QCVs and operate with an ineffective SMS.

The record and the report, including the findings of fact, analysis, conclusions, and recommendations are approved. It is recommended that this marine casualty investigation be closed.

ENDORSEMENT ON RECOMMENDATIONS

Safety Recommendation 1: It is recommended that the Commandant of the Coast Guard reiterate to all Officers in Charge of Marine Inspection to closely evaluate and scrutinize crewmember training records for emergency situations, drills, and training during all Certificate of Compliance exams.

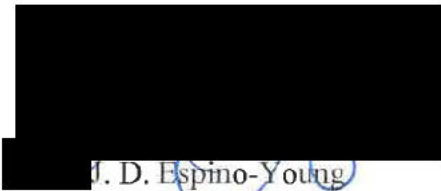
Endorsement: Concur; it may be appropriate to expand in the FPV exam guide, MPS-FM-CSNCOE-01(17), what questions should be asked regarding the MES to adequately judge crew proficiency.

Safety Recommendation 2: It is recommended that the Commandant of the Coast Guard reiterate to all Officers in Charge of Marine Inspection to closely evaluate and scrutinize shipboard Safety Management System practices for critical engineering maintenance procedures to ensure adequate reporting to shoreside management during all Certificate of Compliance exams.

Endorsement: Concur; the lack of maintenance and modifications to critical systems and the failure to report these nonconformities per an effective SMS should have been identified during flag and RO surveys.

Safety Recommendation 3: It is recommended that the Commandant of the Coast Guard support IMO changes to the STCW code to increase content and frequency requirements for mariners in fully operating Marine Evacuation Systems.

Endorsement: Concur; STCW code requires basic proficiency once every five years with no specifics regarding MES. Additionally, SOLAS requires launching a MES every six years and crew participation in deployment no longer than every two years but in no case not more than three years. As identified in this casualty, only one crewmember had ever seen a MES deployment indicating the frequency requirements in STCW and SOLAS may be insufficient to ensure adequate proficiency in launching a MES.



J. D. Espino-Young
Captain, U.S. Coast Guard
Chief of Prevention, Coast Guard District Seven



16732
30 Jun 2021

CARIBBEAN FANTASY (IMO NO. 8814263) FIRE, 2 MILES NORTHWEST OF SAN JUAN, PUERTO RICO; SUBSEQUENT GROUNDING AND EVACUATION OF 511 PERSONS WITH 7 MINOR INJURIES ON AUGUST 17, 2016

EXECUTIVE SUMMARY

The CARIBBEAN FANTASY was a roll-on/roll-off (Ro/Ro) passenger vessel with routine passenger and cargo service between Santo Domingo, Dominican Republic and San Juan, Puerto Rico. On August 17, 2016, while approaching the Port of San Juan Puerto Rico, a fuel leak started on the port side main propulsion engine. The fuel sprayed on the exhaust manifold which ignited the fuel oil causing a main space fire. Neither the vessel's fixed firefighting nor crew fire teams were able to contain and extinguish the fire.

The Master initiated abandon ship but deviated from the vessel's standard procedures based on his proximity to the Port of San Juan and the abundant government, commercial, and recreational resources nearby. All 511 persons onboard were evacuated, 50 passengers and crew were transported to local area hospitals, all released the same day. After medical evaluation, seven passengers had minor injuries for sprained ankles/knees resulting from evacuating the vessel via the Marine Evacuation System (MES).

While attempting to fight the fire and during the abandon ship operations the CARIBBEAN FANTASY drifted southwest and grounded on a sandy bottom. The vessel was anchored in that vicinity for three days before being towed into San Juan where shore-based firefighters extinguished the fire. The CARIBBEAN FANTASY suffered an estimated \$20 million in damage and the vessel was eventually scrapped in lieu of repair.

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List of Acronyms

ATON	Aids To Navigation
CBP	Customs and Border Protection
CFR	Code of Federal Regulations
CG	Coast Guard
CGC	Coast Guard Cutter
COTP	Captain of the Port
ECR	Engine Control Room
F	Fahrenheit
FO	Fuel Oil
FURA	Fuerzas Unidas de Rapida Acción
GPS	Global Positioning System
GRP	Glass Reinforced Plastic
HELO	Helicopter
IMO	International Maritime Organization
ISM	International Safety Management
MES	Marine Evacuation System
MHZ	Main Horizontal Zone
MVZ	Main Vertical Zone
NTSB	National Transportation Safety Board
OSC	On Scene Commander
PME	Port Main Engine
PR	Puerto Rico
PREMA	Puerto Rico Emergency Management Agency
PSCO	Port State Control Officer
QCV	Quick Closing Value
RINA	Registro Italiano Navale
Ro/Ro	Roll on/Roll off
SCBA	Self Contained Breathing Apparatus
SOLAS	International Convention for the Safety of Life at Sea
STRB	Starboard
USC	United States Code
VDR	Voyage Data Recorder
VHF	Very High Frequency



16732
30 Jun 2021

CARIBBEAN FANTASY (IMO NO. 8814263) FIRE, 2 MILES NORTHWEST OF SAN JUAN, PUERTO RICO; SUBSEQUENT GROUNDING AND EVACUATION OF 511 PERSONS WITH 7 MINOR INJURIES ON AUGUST 17, 2016

INVESTIGATING OFFICER'S REPORT

1. Preliminary Statement

1.1. This marine casualty investigation was conducted and this report was submitted in accordance with Title 46, Code of Federal Regulations (CFR), Chapter I, Subchapter A, Part 4, Subpart 4.07, and under the authority of Title 46, United States Code (USC) Chapter 63. Pursuant to 46 USC § 6308, no part of this marine casualty investigation report including the findings of fact, opinions, recommendations, deliberations, or conclusions, shall be admissible as evidence or subject to discovery in any civil or administrative proceeding, other than an administrative proceeding initiated by the US.

1.1.1. The US is not signatory to the Casualty Investigation Code. However, the guidance in the Casualty Investigation Code is used as a common framework and was utilized in this marine casualty investigation.

1.1.2. In incidents such as this, the Casualty Investigation Code states that a vessel's flag State and an affected coastal State, should agree as to which will serve as the Marine Safety Investigating State (MSIS). On August 17, 2016, after being notified of the incident, the USCG Investigation and Casualty Analysis Program Office (CG-INV) and representatives of Panama agreed that the USCG would serve as the MSIS, with Panama designated as a Substantially Interested State (SIS). The US National Transportation Safety Board (NTSB) also conducted its own investigation under its authorities, but participated in conjunction with the USCG investigation.

1.1.3. On August 18, 2016, the USCG Seventh District Commander convened a formal marine casualty investigation, designating the Lead Investigation Officer and supporting personnel.

1.1.4. On August 18, 2016, Five Investigators from the USCG and Six Investigators from the NTSB arrived in San Juan and began conducting interviews with crewmembers and CG personnel. On August 19, 2016, a team boarded the CARIBBEAN FANTASY

and retrieved the voyage data recorder (VDR) capsule. After the vessel was towed into port, the fire extinguished, and the atmospheric conditions determined to be safe, the investigation team boarded the vessel on August 23, 2016, to examine spaces and equipment and collect documentation. The investigation team departed San Juan on August 26, 2016, returned to San Juan September 14-16, 2016, for the post casualty examination and surveys of the lifesaving systems. The team reconvened in Fort Lauderdale October 24-28 and December 5-9, 2016, to conduct interviews with passengers, CG personnel, first responders, and RINA representatives. On March 20-29, 2017, a nine-day district formal hearing was held in San Juan, PR.

1.2. The following organization were designed as Party in interest, in accordance with 46 United States Code Section 6303 and 46 Code of Federal Regulations Section 4.03-10: Baja Ferries, Sociedad Anonima de Capital Variable (S.A. de C.V.), as owner of the CARIBBEAN FANTASY, American Cruise Ferries as charterer of the CARIBBEAN FANTASY, and Registro Italiano Navale, (RINA) as classification society of the CARIBBEAN FANTASY.

1.3. Unless otherwise noted, all times listed in this report are in local time to the incident (Atlantic Standard Time, Coordinated Universal Time offset minus four hours) using a 24-hour format and are approximate.

2. Vessel Involved in the Incident



Figure 1; Stock photo of CARIBBEAN FANTASY from MarineTraffic

Official Name:	CARIBBEAN FANTASY
Identification Number:	8814263
Flag:	Panama
Vessel Class/Type/Sub-Type	Ro-Ro Passenger
Build Year:	1989
Gross Tonnage:	28,112 GT
Length:	613.9 ft
Beam/Width:	88.7 ft
Draft/Depth:	22.3 feet
Main/Primary Propulsion: (Configuration/System Type, Ahead Horse Power)	Mitsubishi MAN B&W 8L58/64 diesel engines, two 14,400 hp
Owner:	Baja Ferries, SA DE CV La Paz, Baja California Sur, Mexico
Operator:	Baja Ferries, SA DE CV La Paz, Baja California Sur, Mexico

3. Injured Persons

Person/Relationship to Vessel	Sex	YOB	Status
██████████ - Passenger	Male	██████	Injured Knee & Ankle
██████████ - Passenger	Female	██████	Injured Ankle
██████████ - Passenger	Male	██████	Injured Knee
██████████ - Passenger	Male	██████	Injured Ankle
██████████ - Passenger	Male	██████	Injured Ankle
██████████ - Passenger	Female	██████	Injured Knee
██████████ - Passenger	Female	██████	Injured Ankle

4. Findings of Fact

4.1. The Incident:

4.1.1. On 16 August 2016, at approximately 1913, the CARIBBEAN FANTASY departed Santo Domingo for a short international voyage overnight to San Juan, PR. The vessel carried 387 passengers, 124 crew, 7 dogs, 58 containers, and 36 vehicles. There were originally 512 total persons onboard, but one passenger disembarked before departure due to medical reasons, reducing the final count to 511.

4.1.2. More than 24 hours of bridge audio, radar, and parametric data were recovered from the VDR capsule. The recorded duration was from 1314 August 16, 2016, to 1350 August 17, 2016. Four VDR microphones were installed in the overhead ceiling of the navigation bridge that provided coverage across the entire width of the bridge, and also recorded VHF radio communication on the bridge. Timeline information obtained is extremely accurate as most of the audio was clear and matched recorded vessel alarms, and sensors, however, simultaneous conversation, use of languages other than English, noise from alarms and overflying helicopters did limit the some of the use of audio recorded by the VDR.

4.1.3. On the morning of August 17, the CARIBBEAN FANTASY was approaching the pilot boarding area near the entrance of the port of San Juan for a scheduled 0730 local time pick up of the harbor pilot. In the main engine room, the watch included the third engineer, motorman, and wiper. The motorman and wiper were carrying out normal rounds and tasks in the engine room, and the third engineer was in the Engine Control Room (ECR) preparing for the vessel's arrival into San Juan. The Chief Engineer arrived in the ECR just before 0700.

4.1.4. On August 17, at 0715, the vessel was inbound, approximately 3 miles from San Juan Harbor entrance, propulsion in bridge control, heading of 100 degrees, with a speed of 17.4 knots. A weather buoy located 1.7 miles from San Juan Harbor recorded the following weather: winds from 083 degrees true at 13 knots with gusts up to 17 knots, air temperate 83.7 degrees F, wave height 4 feet from 054 degrees true.

4.1.5. At 0720, the officer of the watch notified San Juan port control that CARIBBEAN FANTASY was approaching the entrance. Meanwhile, the motorman and wiper discovered a fuel leak coming from the port main engine near cylinder no. 8 and the engine's turbo charger. The motorman returned to the ECR and informed the Chief Engineer of the leak. The Chief Engineer accompanied the motorman, verified the leak, then returned to the ECR.

4.1.6. At 0723 the Chief Engineer reported the fuel leak to the bridge and took local control of the engine and reduced the pitch on the port main engine. He then left the ECR to return to the fuel leak which he discovered was now a fuel spray. The Chief Engineer observed the fuel spray ignite from contact with the exhaust manifold starting a fire. Both the Chief Engineer and Motorman, who were on the port side of the engine, returned to the ECR. When they returned to the ECR the Chief Engineer manually

activated the water-mist firefighting system, while the wiper, who was on the starboard side of the engine, evacuated the space via watertight door number 4 and 5 along the centerline of the vessel. This led through the auxiliary engine room immediately aft of the main engine room. He continued to evacuate via the stairs to garage B.

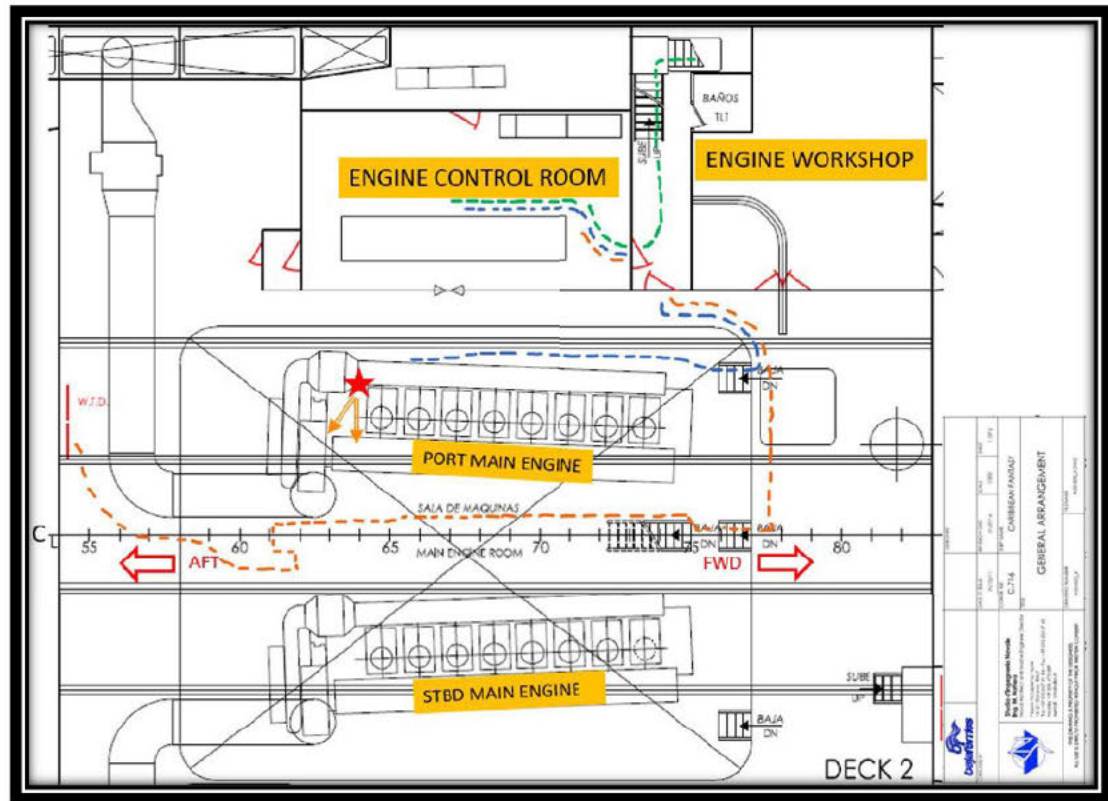


Figure 2; Engine room General Arrangement with fire location=*star* and egress routes of engine watch personnel. *Orange*=Wiper egress route; *Blue*=Motorman & Chief Engineer fuel spray investigation; *Green*=Motorman, Chief Engineer, and Third Engineer egress

4.1.7. While the Chief Engineer was activating the water mist system the Third Engineer pulled both propulsion levers to zero pitch and deenergized the fuel oil supply and boost pumps.

4.1.8. At 0725, the Chief Engineer reported the fire in the Engine Room to the Bridge. Almost simultaneously, numerous audible alarms sounded on the bridge. The Master sent the Staff Captain to check on the casualty, while the Safety Officer proceeded to Garage B for staging.

4.1.9. At 0726, CARIBBEAN FANTASY notified the pilot boat of the fire, requested tug assistance, and warned of a potential evacuation.

4.1.10. At 0727, the bridge announced “Mr. Skylight” over the public address system, this is the vessel’s code to the crew that they have a fire. The crew immediately reported to their fire stations. The Master ordered rudder hard to port for a heading of 120 degrees and a speed of 10 knots.

4.1.11. At 0729, the Chief Engineer phoned the bridge that engine room personnel were evacuating to Garage B. Simultaneously, the Staff Captain arrived in the ECR and conversations started between the Master, Chief Engineer, Staff Captain, and Safety Officer on preparing to activated the fixed CO2 system. The Chief Engineer couldn't account for the wiper. He donned an emergency escape breathing device and tried to enter the engine room from the ECR, but couldn't proceed due to the heat and smoke. On their way out of the ECR the Chief Engineer activated the emergency shutdown for ventilation and the 8 quick closing valves for fuel and lube oil supply. The Staff Captain proceeded to the CO2 room in Garage B aft in preparation for releasing the system. The Chief Engineer, 3rd Engineer, and Motorman proceeded to Garage C.

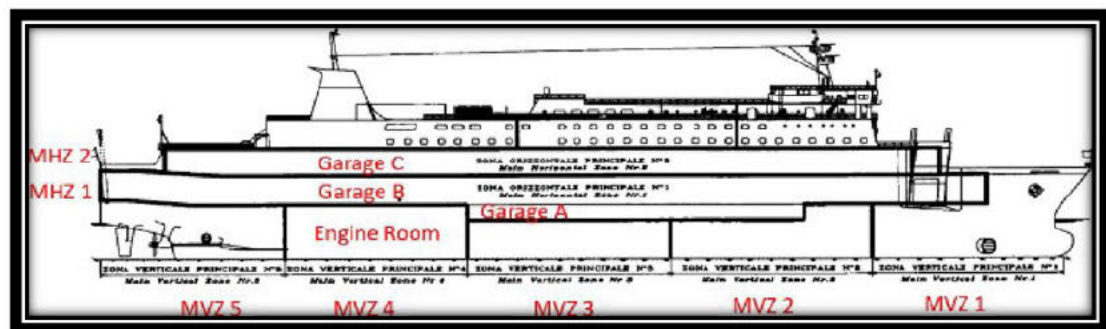


Figure 3; Profile view of main vertical and horizontal zones.

4.1.12. At 0733, the Staff Captain reported he was standing by to release the CO2 system. At this time Fire response team members attempted to attack the Engine room fire from Garage A; they were unsuccessful, closed the door, and moved to Garage B; they reported Garage B beginning to fill with smoke. They started boundary cooling in Garage B.

4.1.13. At 0734, the Safety Officer requested all fire doors for main vertical zones 4 and 5 be closed and the bridge confirmed them closed. Simultaneously, the Master spoke to the reception desk to inform the Senior Receptionist of the fire in the engine room and to gather all passengers to their muster stations and prepare for evacuation. The Evacuation leaders confirmed the order, however, the Hotel Director stated that he would relocate passengers from Muster Station C to the Helo Deck due to the smoke. All the while, communications continued for confirming the location of the Wiper on VHF; so they could release the fixed CO2 system.

4.1.14. At 0736, the Fire team confirmed to the Chief Engineer who relayed to the Bridge that the Wiper evacuated the Engine room. The Master gave the order to release the CO2. The Chief Engineer proceeded to the CO2 room to assist the Staff Captain.

4.1.15. At 0737, the Staff Captain reported the CO2 was released. He and the Chief Engineer remained in the CO2 room, verified that they heard the CO2 bottles discharge, and witnessed frost on the valves and piping. Both departed for the drencher system.

4.1.16. At 0742, the Master requested activation of the drencher in Garage B, the Staff Captain reported the fresh water drencher was almost finished. A subsequent fire in Garage B was reported.

4.1.17. At 0745, the Deck Cadet announced over the public address system in English that there is a fire onboard and to follow the directions of the crew. Immediately, following in Spanish he announced that the Master has decided to abandon the vessel. The investigation later confirmed that the second message was a mistake by the Deck Cadet. The CARIBBEAN FANTASY sounded one long blast on the ship's whistle. According to the vessel's emergency plan this signal was to prepare for abandon ship, all crew should transition from fire fighting duties to abandon ship duties.

4.1.18. At 0749, the Safety Officer reports an explosion in Garage B. The investigation later confirmed that the sounds of explosion were the tires from the container trailers directly over the engine room busting and igniting. The Master requested the Drencher for Garage B, the Chief Engineer confirmed the Drencher was already running.



Figure 4; Post Casualty photo of container trailer wheels in Garage B directly over engine room (Secondary fire and source of explosions heard and reported by crew)

4.1.19. At 0754, the Master asked the Safety Officer if the fire was under control. She replied that the fire was not under control and heard three explosions in Garage B. The Master order preparation of the Marine Evacuation System (MES), and all passengers and crew to don lifejackets.

4.1.20. At 0756, the Second Officer reported to the Bridge that all internal spaces were evacuated.

4.1.21. At 0758, the Bridge sounded one long blast again on the ship's whistle, the ship's signal for abandon ship.

4.1.22. At 0759, The Master informed the pilot boat that the vessel is launching the MES on the port side. At the same time, the Second Officer reported the CG 45751 on scene.

4.1.23. At 0801, The Master ordered the Drencher stopped because the vessel was listing to port. The vessel started drifting in a southwest direction with the starboard bow into the wind.

4.1.24. At 0802, the port MES was inflated and on the water. The Second Officer asked the Master to launch the fast rescue boat, the Master declined and said to use the Coast Guard vessels.

4.1.25. At 0803, Master requested Coast Guard to help gathering rafts and bring them to the port side MES platform. The Staff Captain reported smoke on the port side that was blowing onto the port MES, and the slide angle was too steep, near vertical, for people to slide down. The Coast Guard rescue boat also recommended the CARIBBEAN FANTASY use the starboard MES.



Figure 5; Photo of empty inflated liferafts not at the end of MES slide during the evacuation.

4.1.26. AT 0804, the Second Officer requested the Safety Officer prepare the starboard MES, and to release rafts on both sides. The Staff Captain activated the remote releases for the liferafts on port side of the ship then starboard side. On the port side, only 1 of 12 liferafts dropped from the rack on Helo Deck to the water it was recovered uninflated and still attached by the painter line.

4.1.27. At 0806, the Second Officer reported the first raft in the water.

4.1.28. At 0807, the Master ordered to send someone to the MES platform to open the liferafts. The Staff Captain replied that the port MES wasn't good, and was sending everyone to the starboard side.

4.1.29. At 0808, Master ordered embarkation of Lifeboat #2 and preparation of Lifeboat #1.

4.1.30. At 0809, the Second Officer reported to the Coast Guard that the vessel is starting with evacuation of 512 passengers and crew. The total persons onboard were later confirmed at 511.

- 4.1.31. At 0810, the vessel again sounded one long blast on ship's whistle, the vessel's signal for abandon ship.
- 4.1.32. At 0812, The Deck Cadet ordered starboard MES crew to release starboard liferafts.
- 4.1.33. At 0814, the Chief Engineer arrived on the bridge and briefed the master that everything in the engine room was secured, but could not verify that the fire was out.
- 4.1.34. At 0815, the Master ordered the crew to prepare Lifeboat #3 and sent the Third Officer to command the Lifeboat because the Second Officer was staying on the bridge for command and control.
- 4.1.35. At 0817, there was a power interruption as the ship transitioned from electrical generators to the emergency diesel generator.
- 4.1.36. At 0818, the Staff Captain reported that starboard MES bowing line was broken and that the port MES was not able to be used.



Figure 6; Post Casualty photo of Marine Evacuation System bowing line in two pieces.

- 4.1.37. At 0819, Lifeboat #1 reported they were ready to be lowered with 100 people onboard. The Master gave order to launch Lifeboat #1.
- 4.1.38. At 0823, Master reported to Coast Guard that he is evacuating passengers now because he could not control the fire.

- 4.1.39. At 0825, Lifeboat #1 Commander reported he could not release the hooks.
- 4.1.40. At 0827, The Second Officer instructed the Lifeboat #1 Commander to release the hooks manually.
- 4.1.41. At 0829, Lifeboat #1 reported one passenger in water and requested the Coast Guard to help recover that person. Also, a report was received that a second person jumped into the water.
- 4.1.42. At 0836, Lifeboat #1 Commander reported that the engine was not working, and requested assistance from surrounding small boats. The lifeboat was also taking on water. Tugboat DIANE MORAN transferred the passengers from Lifeboat #1 to the tugboat's deck and sailed to Pier 6. A Coast Guard response boat towed Lifeboat #1 in port.
- 4.1.43. At 0837, the Master ordered Lifeboat #2 to be lowered. The Lifeboat #2 Commander was unable to release hooks using the release handle, so the crew manually removed the hooks. Lifeboat #2 motored under its own power to Pier 6 in San Juan, escorted by a Coast Guard response boat.
- 4.1.44. At 0842, other response vessels and aviation assets arrived on scene. These included a boat from Customs and Border Protection (CBP), two police boats, five tugboats, a boat from the fire department, a Marine Spill Response Corporation (MSRC) boat, a second pilot boat, and a number of recreational vessels. In addition to the Coast Guard response boats, a 55-foot aids to navigation (ATON) boat (CG 55115) arrived on scene. Two Coast Guard MH-65 Dolphin helicopters from Air Station Borinquen, Puerto Rico, and a Fuerzas Unidas de Rapida Acción (United Forces of Rapid Action—FURA) Bell 429 from Isla Grande airport in San Juan also arrived on scene. Between 0840 to 0925, a total 14 persons boarded the CARIBBEAN FANTASY with SCBAs and personnel protective equipment including shore-based firefighters, a Puerto Rico police rescue unit, and Puerto Rico Emergency Management Agency (PREMA) personnel. The Master of the CARIBBEAN FANTASY did not authorize these extra personnel and was unaware they arrived on his vessel.



Figure 7; Photo during evacuation of CARIBBEAN FANTASY with Government, Commercial, and Recreational assistance.

4.1.45. At 0843, the Master noticed there was no Lifeboat #3 Commander, so he sent the designed person, Second Officer from bridge. The Master requested assistance via VHF with bringing liferafts alongside the MES platform. The Master also ordered people sent down the MES slide but the Staff Captain responded that it was not safe.

4.1.46. At 0847, the Master ordered Lifeboat #3 to launch, and again requested to send crew down the MES slide. The Staff Captain responded that he would send people down but it was not safe because of the steep angle.



Figure 8; Photo of the STBD Marine Evacuation System orientation during the evacuation.

4.1.47. At 0850, the CGC JOSEPH TEZANOS arrived on scene and announced they assumed the duty of On Scene Commander.

4.1.48. At 0851, the Master requested again that crew are needed on starboard MES platform to collect the liferafts.

4.1.49. At 0853, first crew went down starboard MES slide.

4.1.50. At 0854, Lifeboat #3 Commander reported he could not release the hooks.

4.1.51. At 0855, the Deck Cadet hailed via VHF radio for all vessels to take any liferafts and bring them to the ship, and also requested help to release the hooks on Lifeboat #3. The request from CARIBBEAN FANTASY for help to release the hooks on Lifeboat #3 continued on VHF for approximately 20 minutes, spoken in English and Spanish.



Figure 9; Post Casualty photo of Lifeboat 3 hanging above water.

4.1.52. At 0906, the Master ordered the Staff Captain not to send any passengers down the MES slide because it was dangerous and to only send the crew down to help bring the life rafts alongside the platform.

4.1.53. At 0912, Master hailed via VHF to the CGC JOSEPH TEZANOS and requested assistance with pulling the MES platform to create a better angle so the passengers and crew could evacuate.

4.1.54. At 0913, the Safety Officer also requested assistance over VHF for Lifeboat #2, which was taking on water.

4.1.55. At 0916, After failing to release the hooks on Lifeboat #3 for 29 minutes the CARIBBEAN FANTASY attempted to hoist the lifeboat back up, the winch tripped, leaving Lifeboat #3 suspended 10 feet above the water, with approximately 100 passengers inside. The CARIBBEAN FANTASY requested assistance to remove the passengers and crew suspended in Lifeboat #3.

4.1.56. At 0918, the Deck Cadet requested via VHF radio to “close more liferafts” to the MES platform so they could board more passengers and crew as soon as possible.

4.1.57. At 0923, the Master requested the Coast Guard recover one liferaft on starboard side that was filled with people and drifting away. The Master directed the Staff Captain to not release any liferafts from the MES platform without a boat to tow it. Liferafts were subsequently filled one at a time. Passengers and crew were then transferred from the liferafts to a support vessel and sailed to Pier 6.

4.1.58. At 0949, the Master announced on VHF that there were about seventy people remaining onboard, including the crew. He requested assistance moving liferafts to the MES platform and to pull on the MES slide to make a better angle for the slide.

4.1.59. At 0953, the Master again requested the Coast Guard move the MES platform forward for a better angle.

4.1.60. At 0954, the pilot boat reported that the tugboat DIANE MORAN had a mooring line on the bow of CARIBBEAN FANTASY.

4.1.61. At 1000, CG 55115, with a higher freeboard, began removing passengers from Lifboat #3.

4.1.62. At 1001, the DIANE MORAN, reported to be on CARIBBEAN FANTASY’s bow and requested CARIBBEAN FANTASY to prepare additional lines for a tow.

4.1.63. At 1009, a Coast Guard rescue boat attached a line to the starboard MES platform and pulled it forward to create a better slide angle. At 1010, the Master ordered the Staff Captain to proceed with sending the remaining passengers and crew down the slide.



Figure 10; Photo of CG response vessels assisting with moving liferafts and orienting the MES correctly during the evacuation.

- 4.1.64. At 1012, the DIANE MORAN requested the CARIBBEAN FANTASY drop anchor.
- 4.1.65. At 1015, the Master ordered the anchor dropped and held six shackles in the water.
- 4.1.66. At 1021, the CARIBBEAN FANTASY grounded on sandy bottom.

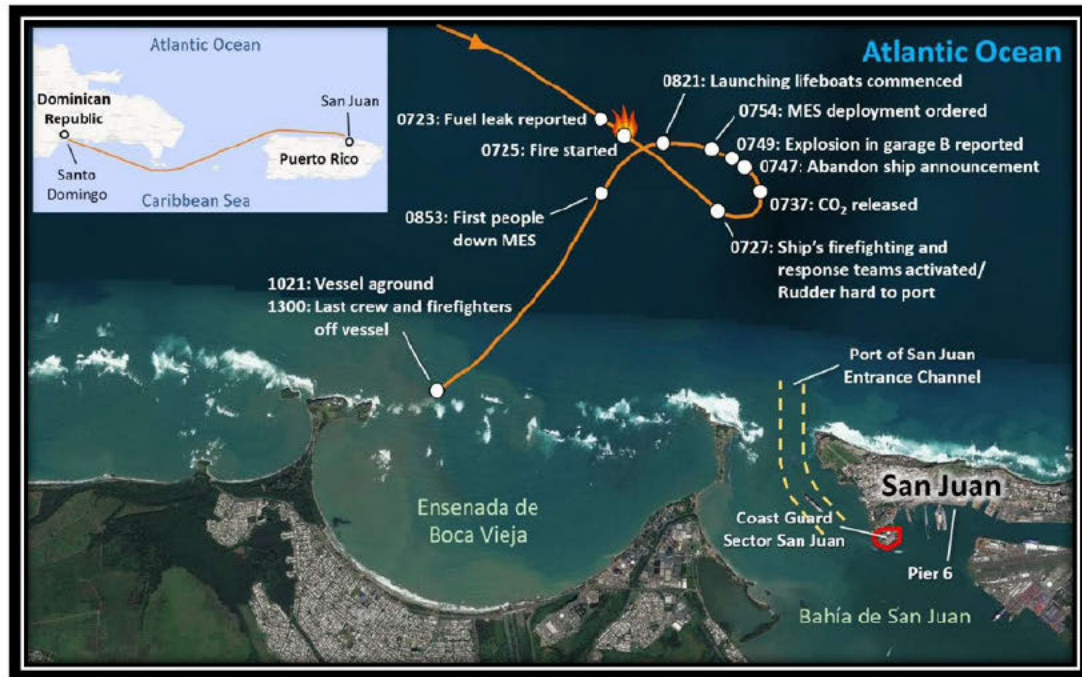


Figure 11; GPS route and major events timeline.

- 4.1.67. Around 1021, the CG MH-65 helicopter hovered above Deck 8 and recovered elderly and disabled passengers via basket hoist. Two trips were conducted, each evacuating four passengers, for a total of eight persons and one dog. All were transferred to Isla Grande airport, 4 miles away.
- 4.1.68. At 1030, the Master reported all passengers off the CARIBBEAN FANTASY.
- 4.1.69. At 1104, the last crewmember not remaining onboard went down the slide.
- 4.1.70. At 1119, the Master reported five persons remained onboard.
- 4.1.71. At 1130, the last crewmember was transferred from Lifeboat #3 to the CG 55115.
- 4.1.72. The CARIBBEAN FANTASY had 7 dogs onboard, which were kept in air-conditioned kennels on Deck 7 aft. In preparation for arriving into port, two dogs were moved to Deck 3, Garage B. After the recovery of passengers, the five dogs on Deck 7 were rescued by the Coast Guard and FURA helicopters. The 02 dogs on Deck 3 were recovered, deceased from smoke inhalation, by firefighters on August 20, 2018.

4.1.73. After all passengers, crew, and dogs evacuated, 5 crewmembers remained on board: the Master, the Staff Captain, the Safety Officer, the Chief Engineer, and the Chief Electrician. CGC JOSEPH TEZANOS ordered the Master that everybody needed to be off the ship, despite the Master's request to remain onboard.

4.1.74. At 1224, a FURA helicopter landed on the Helo Deck and recovered the five crewmembers, and transferred them to the Airport. The FURA helicopter returned on two trips to remove the remaining shore-based firefighters. All persons were off the vessel by 1300.

4.1.75. At 1320, the JOSEPH TEZANOS established a 1000-foot security zone around the perimeter of the CARIBBEAN FANTASY to prevent unauthorized vessels or aircraft from approaching the vessel.

4.1.76. At 1422, the Coast Guard cutter RICHARD DIXON arrived on scene and assumed the role of OSC from the JOSEPH TEZANOS.

4.1.77. The CARIBBEAN FANTASY remained aground, on fire, until August 20 when it was towed into port and moored alongside pier 15 in San Juan Harbor. At 1600, the Coast Guard Captain of the Port (COTP) granted permission for the salvage company fire team to enter the main engine room to extinguish the fire. At 1800 the fire was reported extinguished.



Figure 12; Post Casualty photo of CARRIBEAN FANTASY post evacuation, grounded and anchored.

4.2. Additional/Supporting Information:

4.2.1. On August 9, 2016, Coast Guard Sector San Juan Port State Control Officers (PSCO) performed a Certificate of Compliance renewal examination of the vessel. The PSCOs reported seven deficiencies, three of which remained outstanding at the time of the incident. Two of those deficiencies were firefighting

related; (1) dampers in two ventilation ducts in the vehicle spaces were not shutting properly and (2) a section of the overhead on cargo deck B was missing insulation that was required to stop increase the time for heat transfer. The third was an electrical deficiency.

4.2.2. The CARIBBEAN FANTASY was divided into five main vertical zones (MVZs) that provided both watertight integrity and thermal/fire containment. The ship also had two main horizontal zones (MHZs) subdividing the garage decks with A-60 boundaries.

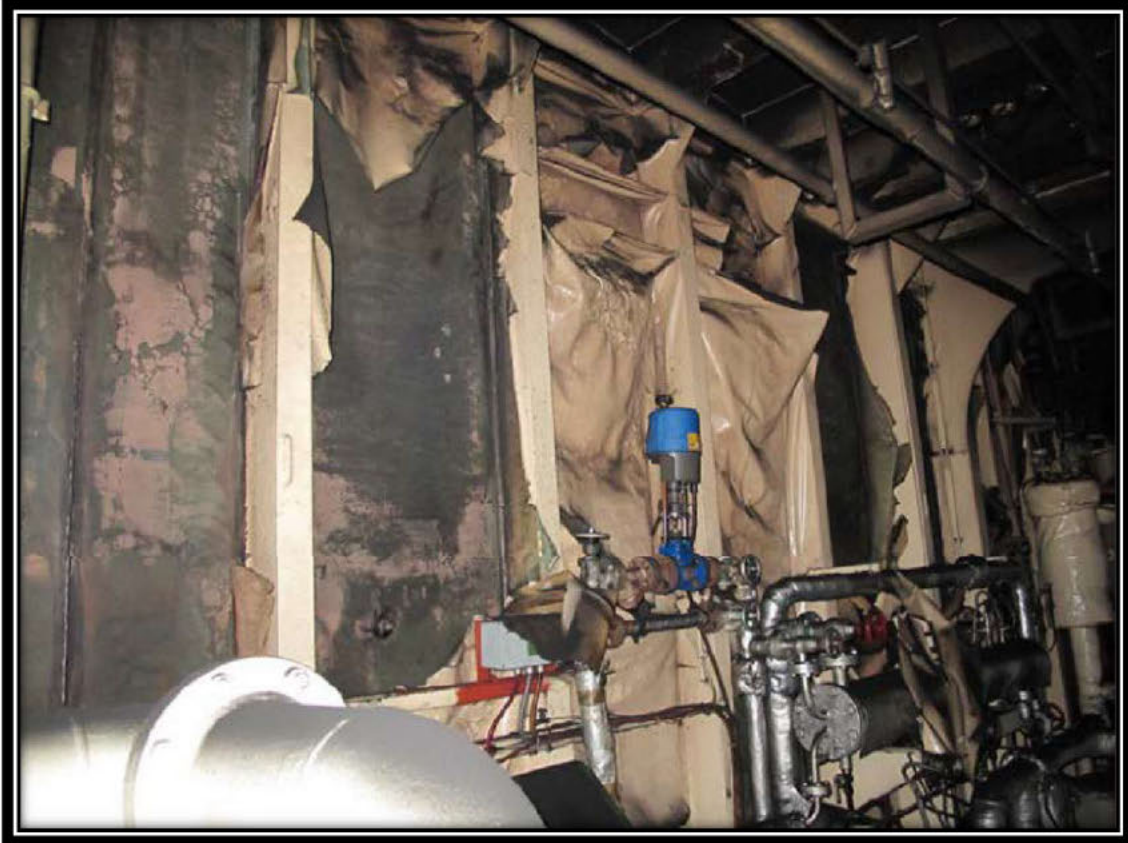


Figure 13; Post casualty Photo of bulkhead between main engine room & auxiliary engine room (auxiliary engine room side)

4.2.3. The port engine fuel supply line blanking plate was found to be fabricated from a piece of steel previously used in a different application. It appeared to be torch cut and not a symmetrical circle. It contained 12 holes, however, only 4 holes were used to secure the blank end to the flange.

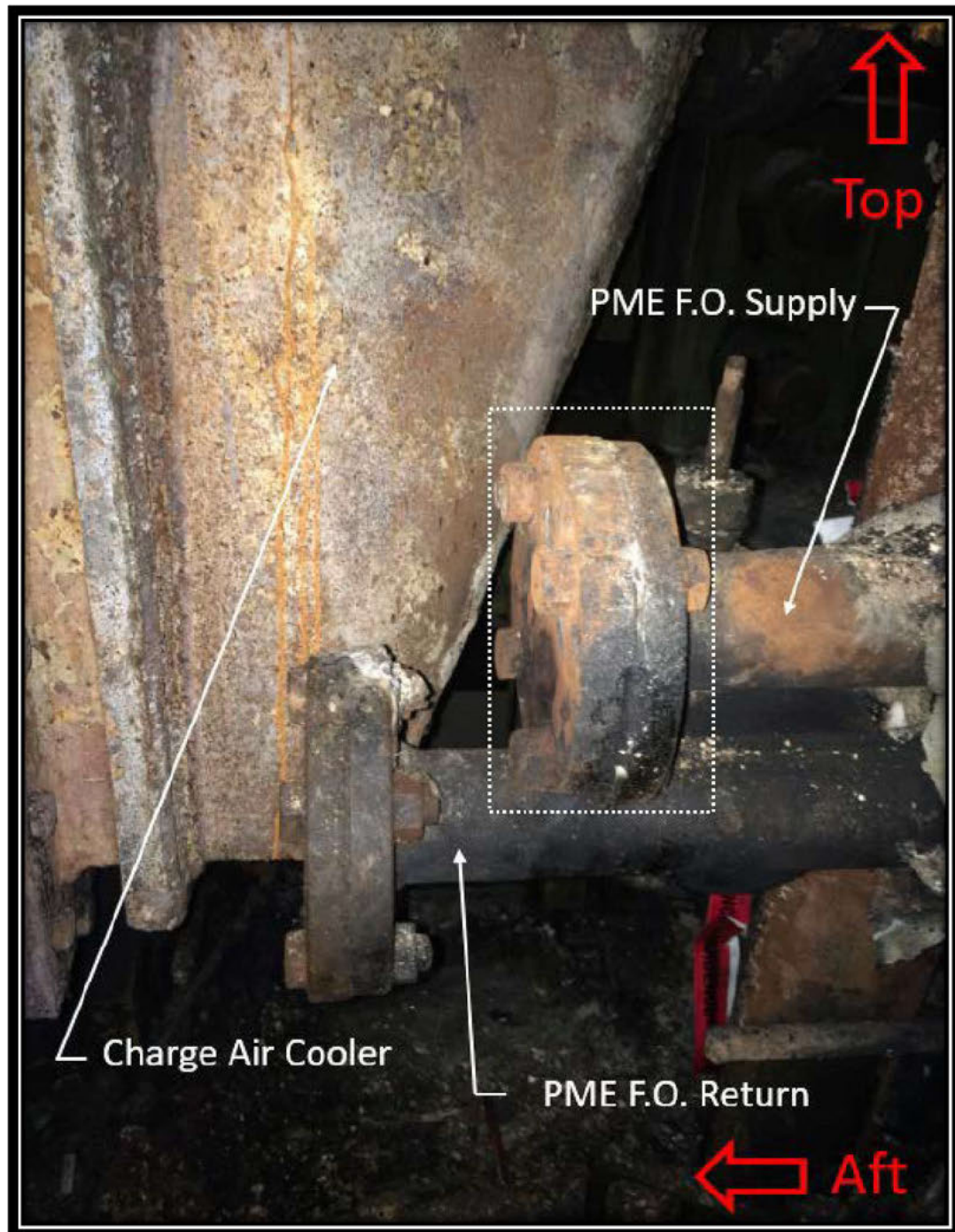


Figure 14; Photo post casualty of Port Main Engine Fuel Oil Supply blank end (source of fuel leak).

4.2.4. The port engine fuel supply line gasket used at the site of the fuel leak was tested by the NTSB materials laboratory and found to be silicone rubber. Silicone rubber is considered an unsuitable gasket material for use in fuel systems because exposure to fuel degrades the silicone rubber. The engine manufacture recommended that the gasket material be nitrile rubber filled with aramid yarn, mineral wool, and other inorganic fillers.



Figure 15; Post Casualty photo of Fuel supply line blank end examined in NTSB materials lab. (blank end view)



Figure 16; Post Casualty photo of Fuel supply line flange and blank end in NTSB materials lab. (profile)



Figure 17; Post Casualty photo of Fuel supply line gasket in NTSB materials lab. (Between flange & blank end)

4.2.5. During the post-casualty inspection of the engine room, investigators discovered several areas of inadequate installation of anti-splash/anti spray tape on the Port and Starboard Main Engine fuel oil piping flanges and connections per the manufactures recommendations. Only one layer of tape was fitted around the fuel oil flanges and connections. Several areas had exhaust pipe insulation that was degraded, exposing the hot exhaust pipe manifold. During normal operation the exhaust pipe manifold is between 750-850 degrees F. The fuel oil at the time of the casualty had an ignition temperature of 495 degrees F.



Figure 18; Post Casualty photo of STRB Main Engine with damaged thermal protection.

4.2.6. During the post casualty investigation, all of the CO2 bottles were weighed and determined to be empty.

4.2.7. During the casualty not all ventilation dampers were fully closed. It was difficult to determine how many and which ones were partially or fully closed because shore side fire fighters reported closing some they found ajar and could not remember where and when they were manually closed.

4.2.8. Post casualty it appeared the Garage drencher systems were activated. The fresh water tanks were found empty, standing water was found in Garage A and B, and the system was found in a configuration to draw water via the saltwater pumps.

4.2.9. After the accident, investigators found all eight fuel and lube oil quick closing valves were intentionally blocked open with inserted bolts. It was impossible to isolate

the fuel oil and lube oil supply to the main engine room via remote activation. The port lube oil supply valve was tested by removing the bolt holding the valve open and the valve closed properly.



Figure 19; Post Casualty photo of Lube Oil Storage tank quick cut-off valve blocked open with bolt



Figure 20; Post Casualty photo of Fuel Oil Service tank blocked open with bolt.

4.2.10. The vessel could carry up to 1150 passengers and crew on a short international voyage. The vessel had twenty-three 50-person liferafts, one fully enclosed

lifeboat holding 70 people, two partially closed lifeboats holding 150 each and a Fast rescue boat.

4.2.11. Schat-Harding AS designed and manufactured the Lifeboats and davits supplied to the CARIBBEAN FANTASY. Lifeboats #1 and #2, were a partially-enclosed Lifeboat design, model number MPC 36 SV, constructed of glass-fiber-reinforced plastic (GRP). They were built in 1998, had a capacity of 150 persons, an overall length of 35.1 feet, and a beam of 14.1 feet. Lifeboat #3, was a fully-enclosed Lifeboat design, model number KISS800C, constructed of GRP. It was built in 2003, had a capacity of 70 persons, an overall length of 27.9 feet, and a beam of 9.0 feet.

4.2.12. Procedures used by the Lifeboat preparation team found in the Shipboard Emergency Organization manual and in the vessel's SOLAS Training Manual did not contain procedures to ensure the recovery pins for the Lifeboat hooks were in their stored position prior to launching. However, the hook manual provided by the manufacturer to the ship included guidance to visually check that the recovery pins were in their stored position when preparing to lower the Lifeboats.

4.2.13. When lowered, Lifeboats #1 and #2 did not release from their falls upon contact with the water. Each hook operator released the hooks by lifting the gate on the hook when the falls became slack and manually removed the link attached to the block. Lifeboat #1 engine had been under repair at the time of incident. Bolts surrounding the engine compartment had been removed, brackets holding cables and tubes were unfastened, the end cover was missing, and the coolant tank was empty. Also, Lifeboat #1 drain plug was missing and could not be located.

4.2.14. Lifeboat #3 hooks also did not release from their falls upon contact with the water. Lifeboat #3 could not manually release their hooks. While they struggled to release the hooks, waves smashed the Lifeboat into the CARIBBEAN FANTASY's side shell creating cracks in the Lifeboat hull. The Schat-Harding winch was only designed to lift a Lifeboat back to the embarkation deck with 6 people, the Lifeboat had nearly 70 people onboard. When the CARIBBEAN FANTASY attempted to lift the nearly full lifeboat, the winch failed. A successful release test was conducted dockside, post casualty.

4.2.15. Neither the drill schedule nor the official logbook recorded the lowering and/or launching of Lifeboats in accordance with the requirements of a vessel on a short international voyage. Based on configuration the CARIBBEAN FANTASY always moored starboard side to the pier. Records indicated that the starboard side Lifeboats were last lowered in October 2015.

4.2.16. Viking Life-saving Equipment A/S designed and manufactured the liferafts supplied to the CARIBBEAN FANTASY. All were enclosed rafts, model number 50 DKS, with a capacity of 51 persons. The liferafts were integrated with VIKING Marine Evacuation Systems (MES) model # VES DD 25.5m 83.7ft. Evacuation Systems (MESs; model number VES DD 25.5m 83.7-ft). The rafts, were installed on the port and starboard sides of the vessel in sloping racks one deck above the MES, with

12 liferafts on the port side and 11 on the starboard side. The MES installed on the CARIBBEAN FANTASY was designed to have at least two inflated liferafts alongside the platform at a time for simultaneous boarding; two slides for two liferaft entrances.

4.2.17. The port side MES did not adequately deploy, the Staff Captain added additional nitrogen to the slide and platform using the spare refill valve. This did not fix the orientation of the port MES slide and platform. The slide was too steep at the top and flat at the bottom. The bowsing line was not used to position the MES slide and platform. Even if functional, the Master decided that using the port side MES was a risk to passengers from smoke blowing toward the platform of the Port MES.

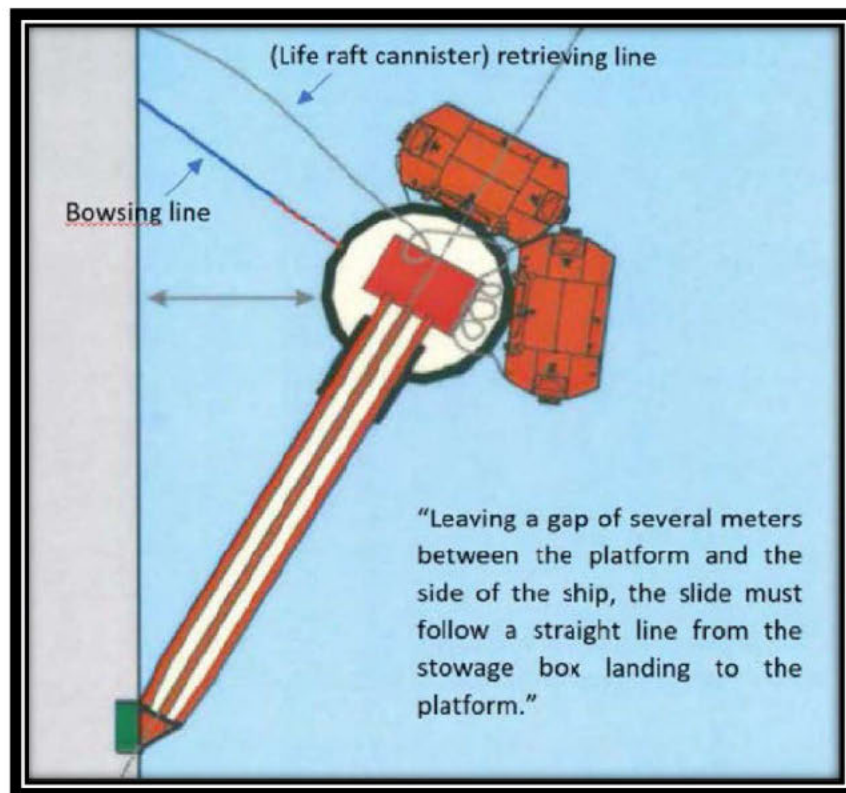


Figure 21; Viking Marine Evacuation System manual showing ideal orientation.

4.2.18. The starboard side MES inflated properly, however, the crew could not use the bowsing line because it was no longer attached. The liferafts were designed to be inflated by crewmembers once they were pulled alongside the MES platform, however, some of the liferafts inflated prior to being pulled to the platform. The crew reported that pulling the inflated liferafts to the platform was significantly more difficult.

4.2.19. SOLAS Chapter III/Part B/Section I Regulation 19.3.4.8 requires crew involved in deploying the MES to have participated in the actual deployment of the MES every two years; however, none of the CARIBBEAN FANTASY crew had ever deployed the MES. The Staff Captain's training record included a document signed by a VIKING service manager attesting to receiving instruction in handling and deployment of a VIKING Evacuation Slide with rafts on June 5, 2014. The safety

officer, who deployed the port MES, and was responsible for training the crew on the system, said she had never seen one deploy live until the day of the accident. Her only MES training was an instructional video shown to members of the CARIBBEAN FANTASY crew during routine MES training.

4.2.20. The CARIBBEAN FANTASY had one rescue boat, designed and manufactured by WaterCraft Hellas S.A. it was stowed on the port side of the ship. The boat, model number HELLAS FRB 6.50, was constructed of GRP and had a capacity of six persons, an overall length 20.8 feet and a beam of 8.0 feet. The emergency plan and station bill approved by RINA on July 3, 2016, and used by the crew during the evacuation called for the crew assigned to Lifeboat #3 to marshal the MES liferafts. The plan did not assign anyone to the rescue boat for abandon ship detail.

5. Analysis

5.1. The Port Main Engine fuel oil supply end flange, blanking plate, fasteners, and gasket material were not properly installed or torqued in accordance with the engine manufacturer's specifications. The flange blanking plate was not provided by the original equipment manufacturer, did not have a raised face and it was not fabricated to a design or quality standard. The blanking plate was not dimensionally accurate to match the flange. There was no inspection or lifecycle management of the gasket material for any of the main engine fuel supply and return lines. The gaskets were only being replaced after failure. Ships force was using generic gasket materials designed for non-petroleum systems which were found in their ships stores to use on all systems with gaskets.

5.1.1. The company did not have a schedule for maintenance or repair of the fuel supply and return line gasket. The ship never reported maintenance or repair concerns on the fuel supply and return lines. If the ship was frequently changing the gaskets or blank ends there was no record to determine the frequency.

5.2. The Port Main Engine fuel oil supply end flange including the blanking plate did not have adequate spray prevention tape and spray shielding installed. There was no inspection or lifecycle management of the spray prevention tape or spray shielding repair and replacement. The same condition for the spray prevention tape and spray shielding installation was found on the Starboard Main Engine fuel oil supply end flange.

5.2.1. The company did not have an inspection schedule for verifying the installation of spray prevention tape or spray shielding. The ship never reported maintenance or repair concerns on for spray prevention tape or spray shielding.

5.2.2. Company did not have a written checklist for verifying spray prevention tape or spray shielding for routine oversight.

5.2.3. The Classification Society on behalf of the Flag administration did not document any non-conformities for missing or inadequate spray prevention tape or spray shielding. They were last onboard the vessel July 14, 2016, for a "Port State Control Preventive Assessment".

5.3. It was highly likely that the vessel used bolts to hold open the quick closing valves (QCV) because the valves did not stay open during normal operations. Based on the condition of the bolts and paint on some of the bolts these were in place almost permanently. With the bolts installed on the QCV it was not possible to secure the engine room from an abundant fuel source.

5.3.1. There was no documentation that the company had an established critical equipment procedure for identifying QCVs as critical equipment to meet the requirements of section 10.3 and 10.4 of the ISM Code. Additionally, the management company nor the classification society on behalf of the Flag state identified the system failures during certification inspections.

5.3.2. Under the provisions of International Conventions - SOLAS - International Convention for the Safety of Life at Sea - Chapter II-2 - Construction - Fire protection, fire detection and fire extinction (SOLAS II-2 regulation 14 2.2.3.6), there is a requirement to have a maintenance plan in place for emergency shutdown of fuel supply. Regulation 14.2.1 also states, such a system should be kept in good order to ensure their required performance if a fire occurs. The Classification Society on behalf of the flag administration did not verify compliance with this requirement.

6. Conclusions

6.1. Determination of Cause:

6.1.1. The Initiating Event (or first unwanted outcome) of this casualty was the failure of the gasket on the end of the fuel oil supply line to the port main propulsion engine. The gasket failure resulted in pressurized fuel oil spraying onto a poorly shielded hot exhaust manifold which ignited the fuel oil.

6.1.1.1. A causal factor for the initiating event was the maintenance on the fuel supply system not in accordance with the engine manufacturer's specifications. The blank flange on the end of the fuel oil supply line and the gasket material used between the flange and the blank end was an inappropriate repair. This causal factor was determined through material analysis of the blank flange and gasket material post casualty. This causal factor was further determined from a similar condition found on the starboard main propulsion engine post casualty.

6.1.1.2. A subsequent causal factor was the inadequate spray prevention tape and spray shielding over the repaired flange and gasket on the port main propulsion engine. This causal factor was determined through post casualty investigation of the fire. This causal factor was further determined from similar conditions found on the starboard main propulsion engine post casualty.

6.1.1.3. A subsequent causal factor was the inadequate hot spot protection (thermal shielding) on the exhaust manifold. This causal factor was determined through post casualty investigation of the fire. This causal factor was further determined from similar conditions found on the starboard main propulsion exhaust manifold post casualty.

6.1.1.4. A contributing factor for these events were the inadequate safety management system on the vessel. This contributing factor was determined through the lack of records found documenting any repairs being conducted on a critical engineering system. In addition, there were no records found that the repairs were inspected by any supervisors on the vessel. No non conformities were issued and the 3rd Engineer completed the repairs without any verification that the repair was completed properly.

6.1.1.5. A subsequent contributing factor for these events were the inadequate oversight by the Classification society on behalf of the Flag administration. This contributing factor was determined through the lack of any documented conditions of class regarding the condition of the main propulsion engines.

6.1.2. A subsequent event was the uncontrollable fire in the Main propulsion space.

6.1.2.1. A causal factor for this event was that the fixed high mist system failed to extinguish the fire. This causal factor was determined through the post casualty investigation that found the high mist system was activated quickly after the fire was detected. In addition, post casualty investigation found the system aligned to the fresh water tanks and those tanks were drained empty.

6.1.2.2. A potential contributing factor to this causal event was that the drencher system was also activated in the cargo holds and that system used water from the same fresh water tanks as the high mist system. It could not be determined by the investigators if, or by how much, this potential contributing factor's effect contributed to the high mist fixed firefighting system.

6.1.2.3. A subsequent causal factor for this event was that the fixed CO₂ extinguishing system failed to extinguish the fire. This subsequent causal factor was determined through post casualty investigation that found the fixed CO₂ extinguishing system was activated and all of the CO₂ storage for the engineering space was found used.

6.1.2.4. A contributing factor to this subsequent event was the inadequate closing of the ventilation fire dampers necessary to keep the CO₂ in the space and oxygen out. This contributing factor was determined through post casualty investigation that found fire dampers not closed properly and testimony from shoreside fire fighters that they found fire dampers open and closed some but not all.

6.1.2.5. A contributing factor to this subsequent event was that the fuel oil and lubricating oil supply lines continually supplied flammable liquids to the main engine space. This contributing factor was determined by investigators finding all the quick closing valves for the fuel oil and lubricating oil systems blocked in the open position by bolts.

6.1.2.6. A contributing factor for these events were the inadequate safety management system on the vessel. This contributing factor was determined

through the lack of records found documenting when or why the quick closing valves for these fuel systems were installed. In addition, there were no records found that the quick closing valves were inspected by any supervisors on the vessel.

6.1.2.7. A subsequent contributing factor for these events were the inadequate oversight by the Classification society on behalf of the Flag administration. This contributing factor was determined through the lack of any documented conditions of class regarding the condition of the quick closing valves being blocked in the open position.

6.1.3. A subsequent event was the fire spread to Garage B.

6.1.3.1. A causal factor for the fire spreading to Garage B was the continuous supply of uncontrolled fire in the space below, the intense heat, and amount of time the fire remained out of control. This causal factor was determined post casualty by investigators finding the insulating material between the main engine space and Garage B deck fully consumed. In addition, investigators found combustible cargo fully and partially consumed in Garage B directly over the main engine space.



Figure 22; Post Casualty photo of main engine room upper.

6.1.4. A Subsequent event was damage to the cargo.

6.1.4.1. The causal factor for the damage to the cargo was the fire and smoke in Garage B. This causal factor was determined post casualty by investigators finding combustible cargo fully and partially consumed in Garage B directly over the main engine space and smoke and water damage to the rest of the cargo.

6.1.5. A Subsequent event was loss of propulsion and steering.

6.1.5.1. The causal factor for the loss of propulsion and steering was the deliberate securing of the main engines in response to the main space fire. This causal factor was determined through post casualty investigation of the VDR and testimony by personnel in the engine control room and on the bridge.

6.1.6. A Subsequent event was abandonment.

6.1.6.1. The causal factor for abandonment was the uncontrollable fire in the main engine room and the Master's decision that passengers and crew could be safely evacuated and assisted by numerous response vessels nearby. This causal factor was determined through video and testimony post casualty.

6.1.7. A Subsequent event was injury.

6.1.7.1. The causal factor for injury was the inadequate deployment of the Marine Evacuation System. This causal factor was determined through video and testimony and hospital records post casualty.

6.1.8. A Subsequent event was persons entering the water.

6.1.8.1. The causal factor for person's entering the water was the decision made by the individuals entering the water. This causal factor was determined through video and testimony post casualty.

6.1.9. A Subsequent event was grounding.

6.1.9.1. The causal factor for grounding was the deliberate loss of propulsion, steering, and loss of situational awareness by the Master while managing the fire and abandonment. This causal factor was determined through analysis of when and where the anchor was deployed as the vessel drifted towards shoal water and testimony post casualty.

6.2. Evidence of Act(s) or Violation(s) of Law by any Coast Guard Credential Mariner Subject to Suspension or Revocation:

6.2.1. No Coast Guard Credentialed mariners were involved in the incident.

6.3. Evidence of Act(s) or Violation(s) of Law by U.S. Coast Guard Personnel, or any other person:

6.3.1. No acts were found meeting these criteria.

6.4. Evidence of Act(s) Subject to Civil Penalty:

6.4.1. No acts were found meeting these criteria.

6.5. Evidence of Criminal Act(s):

6.5.1. No acts were found meeting these criteria.

6.6. Need for New or Amended U.S. Law/Regulation:

6.6.1. No changes were determined to be needed.

6.7. Unsafe Actions or Conditions that Were Not Causal Factors:

6.7.1. An unsafe action during the launching of all three of the Lifeboats was found during the abandonment of the vessel.

6.7.1.1. A causal factor for this unsafe action was inadequate training of crewmembers in their assigned safety sensitive position. This causal factor was determined by investigators through post casualty analysis and testimony that the crewmembers in charge and responsible for the safe launching of the lifeboats could not release the lifeboats from the falls as designed. In addition, one lifeboat after launching could not operate under its own power and started taking on water due to improper maintenance.

6.7.1.2. A contributing factor for this unsafe action was the lack of fully operational drills on the starboard lifeboats. This contributing factor was determined by investigators through post casualty analysis of logged drills only being conducted on the port lifeboats while in port due to always mooring starboard side to the pier because of the vessel's configuration.

6.7.1.3. A contributing factor for this unsafe action was the inadequate safety management system on the vessel. This contributing factor was determined through the lack of records found documenting operational drills not being conducted on the starboard side lifeboats being reported shoreside.

6.7.1.4. A subsequent contributing factor for this unsafe action were the inadequate oversight by the Classification society on behalf of the Flag administration. This contributing factor was determined through the lack of any documented conditions of class regarding fully operation drills not being conducted on the starboard side lifeboats.

6.7.2. An unsafe action during the launching of MES was found during the abandonment of the vessel.

6.7.2.1. A causal factor for this unsafe action was inadequate training of crewmembers in their assigned safety sensitive position. This causal factor was determined by investigators through post casualty analysis of the inadequate ramp angle and testimony that only one of the crewmembers participated in a live MES deployment ever. In addition, no crewmembers participated in a live MES deployment on this vessel.

6.7.2.2. A contributing factor for this unsafe action was the inadequate safety management system on the vessel. This contributing factor was determined

through records found documenting crew were only familiar with MES deployment through watching stock video of its deployment not specific to this vessel.

6.7.2.3. A subsequent contributing factor for this unsafe action were the inadequate oversight by the Classification society on behalf of the Flag administration. This contributing factor was determined through the lack of any documented conditions of class regarding fully operation drills not being conducted on the MES.

7. Actions Taken Since the Incident

7.1. The CARIBBEAN FANTASY suffered an estimated \$20 million in damage and the vessel was scrapped in lieu of repair.

8. Recommendations

8.1. Safety Recommendation:

8.1.1. It is recommended that the Commandant of the Coast Guard reiterate to all Officers in Charge of Marine Inspection to closely evaluate and scrutinize crewmember training records for emergency situations, drills, and training during all Certificate of Compliance exams.

8.1.2. It is recommended that the Commandant of the Coast Guard reiterate to all Officers in Charge of Marine Inspection to closely evaluate and scrutinize shipboard Safety Management System practices for critical engineering maintenance procedures to ensure adequate reporting to shoreside management during all Certificate of Compliance exams.

8.1.3. It is recommended that the Commandant of the Coast Guard support IMO changes to the STCW code to increase content and frequency requirements for mariners in fully operating Marine Evacuation Systems.

8.2. Administrative Recommendations:

8.2.1. It is recommended that this investigation be closed.



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Investigating Officer