



National Transportation Safety Board

Fire and abandonment of Ro/Ro Passenger Vessel
Caribbean Fantasy
Two Miles Northwest of San Juan Harbor
San Juan, Puerto Rico
August 17, 2016



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Accident Overview

Adam Tucker
Investigator-in-Charge



Accident Location

- Approaching San Juan
- 387 passengers and 124 crew: 511 total
- Trailers/containers and personal vehicles



Vessel Details

- 614 feet long, 28,112 gross tons
- Delivered in 1989
- Certified to carry 1,150 persons
- Three garage decks (A, B, and C) plus accommodation/public spaces
- Three lifeboats, two marine evacuation systems and one fast rescue boat
- Owner operator: Baja Ferries
- Charter party: America Cruise Ferries



Weather

- Daytime, good visibility
- Winds: easterly at 13 knots, gusts to 17 knots
- Seas: northeasterly, wave height 4 feet
- Air temperature: 84 degrees F

1 nautical mile



07:23 Fuel leak reported



Ensenada de Boca Vieja

Port of San Juan
Entrance Channel

San Juan

Pier 6

07:23 Fuel leak reported



07:25 Fire started



Ensenada de Boca Vieja

Port of San Juan Entrance Channel

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1 nautical mile



07:37 Carbon dioxide released

Ensenada de Boca Vieja

Port of San Juan
Entrance Channel

San Juan

Pier 6

- 07:23 Fuel leak reported
- 07:25 Fire started
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07:47 Announcement to passengers and crew regarding the fire



- 07:23 Fuel leak reported
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1 nautical mile



07:49 Explosion in Garage B



Ensenada de Boca Vieja

Port of San Juan Entrance Channel

San Juan

Pier 6

- 07:23 Fuel leak reported
- 07:25 Fire started
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- 07:49 Explosion in Garage B



07:54 Deployment of Marine Evacuation System (MES) ordered



- 07:23 Fuel leak reported
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- 07:37 Carbon dioxide released
- 07:47 Announcement to passengers and crew
- 07:49 Explosion in Garage B
- 07:54 Deployment of MES ordered



08:21 Launching of lifeboats commenced



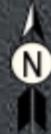
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08:53 First people down starboard Marine Evacuation System



1 nautical mile



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10:21 *Caribbean Fantasy* aground

Ensenada de Boca Vieja

Port of San Juan Entrance Channel

San Juan

Pier 6

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11:30 Last person transferred from lifeboat

Ensenada de Boca Vieja

Port of San Juan Entrance Channel

San Juan

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13:00 Last person reported off vessel



1 nautical mile



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- 13:00 Last person reported off vessel



Ensenada de Boca Vieja

**Port of San Juan
Entrance Channel**

San Juan

Pier 6

Damage and Injuries

- Engine room, garage deck, hull, and accommodation
- Estimated the damages about \$20 million and the ship was sold for scrap
- 50 injuries – 6 serious
- No release of pollutants

Investigation

- On scene investigation
- Materials laboratory examination
- Coast Guard formal marine casualty investigative hearing



Exclusions

- Electrical and steering system
- Crew licensing and certification
- Weather

Safety Issues

- Machinery maintenance practices
- Fuel and lube oil quick closing valves
- Fire protection
- Crew training on and familiarity with emergency systems and procedures
- The implementation of the company's safety management system
- Oversight by the flag state and the flag state's recognized organization

Investigative Team

- Adam Tucker – Investigator-in-charge/operations
- Mike Karr – Survival factors
- Luke Wisniewski – Engineering factors
- Carrie Bell – Human factors
- Larry Bowling – Port state control, SAR, and MRO
- Nancy McAtee – Fire and explosions
- Chris Babcock – Voyage data recorders

Staff that Supported Team

- Joe Panagiotou – Materials laboratory
- Paul Suffern – Meteorologist
- Alice Park – Graphics development
- Andrew Ehlers – Writer/editor
- Monica Mitchell – Writer/editor

Parties to the Investigation

- United States Coast Guard
- Baja Ferries SA de CV
- MAN Diesel and Turbo SE



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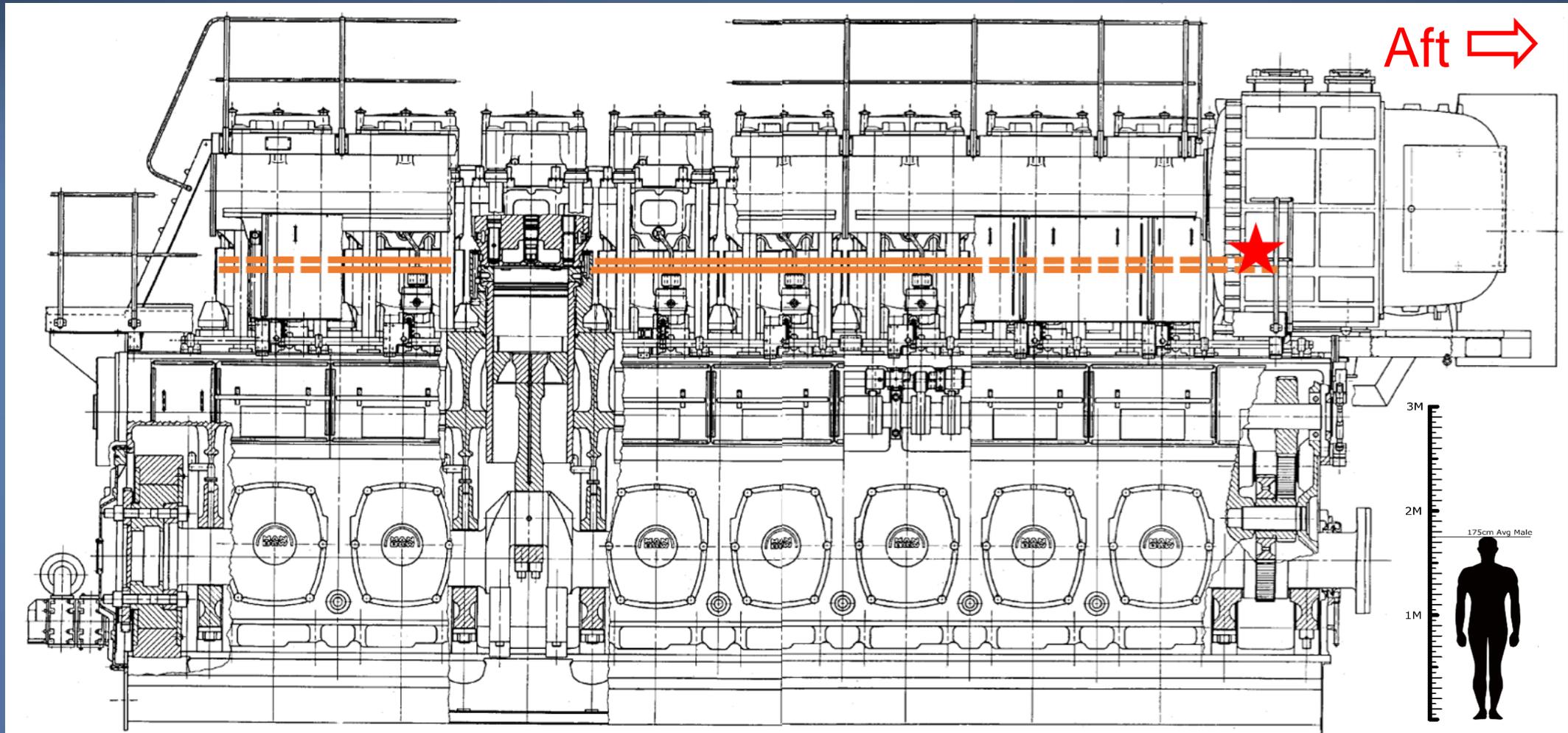
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Engineering Factors

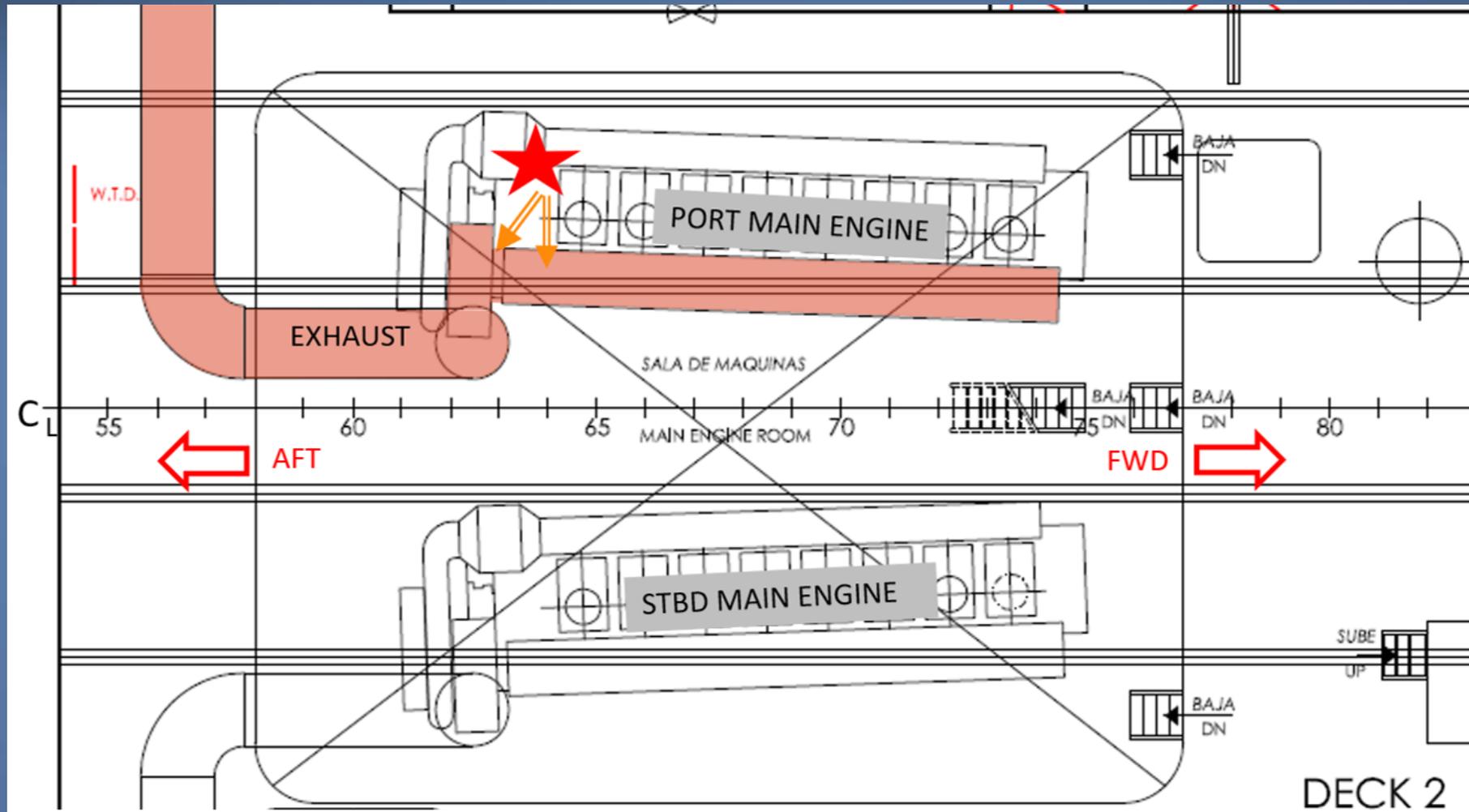
Luke Wisniewski

Engineering Group Chairman

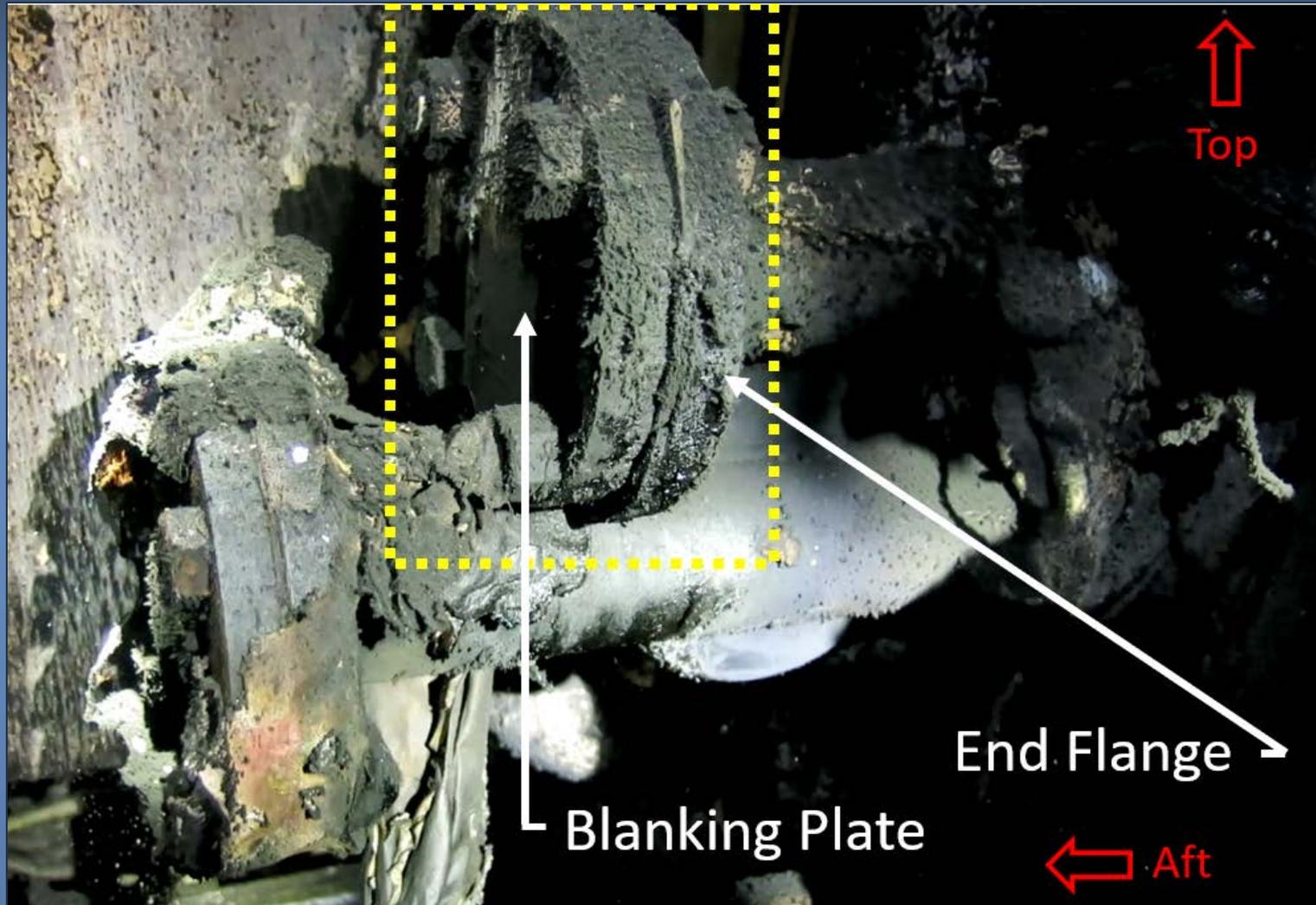
Mitsubishi MAN B&W Diesel Engine (Side Profile)



Mitsubishi MAN B&W Diesel Engine (Top View)

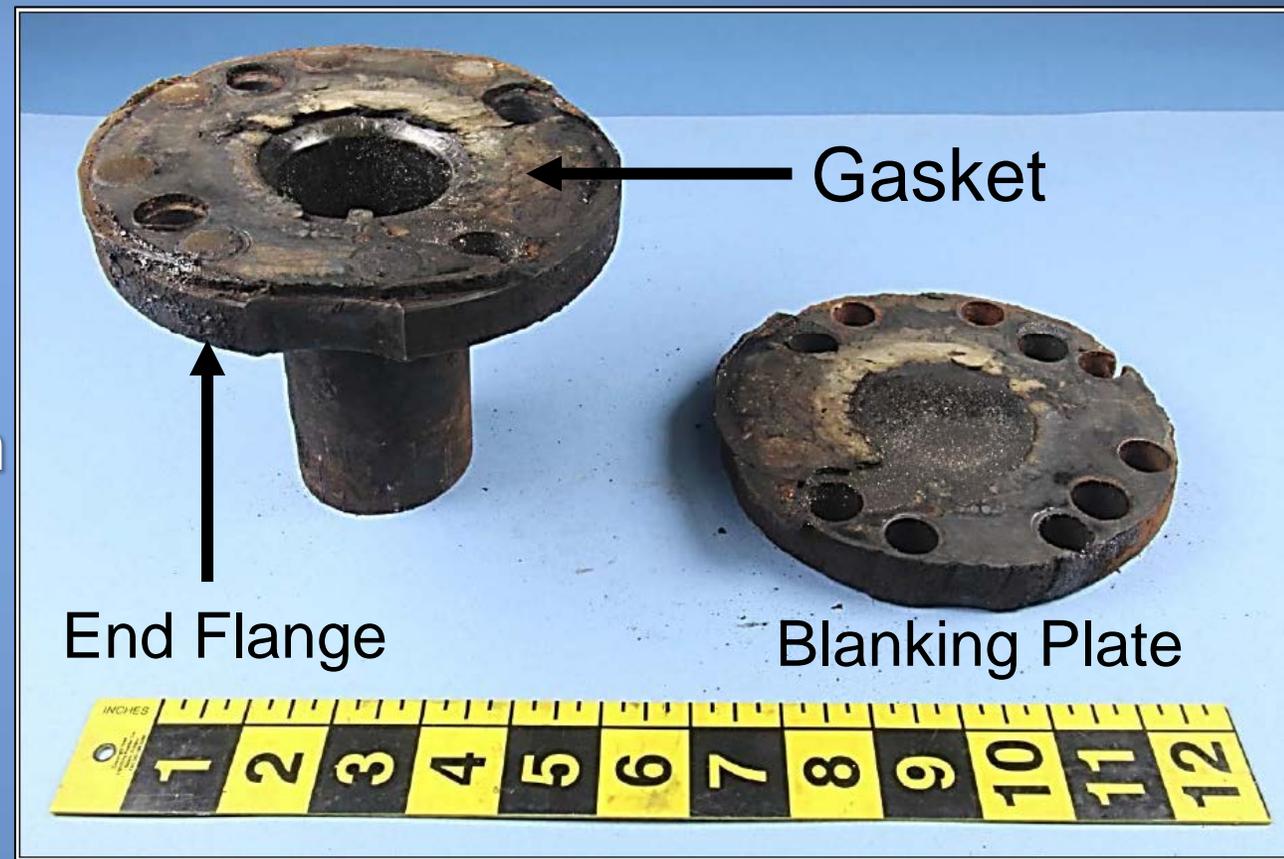


Fuel Supply End Flange Assembly



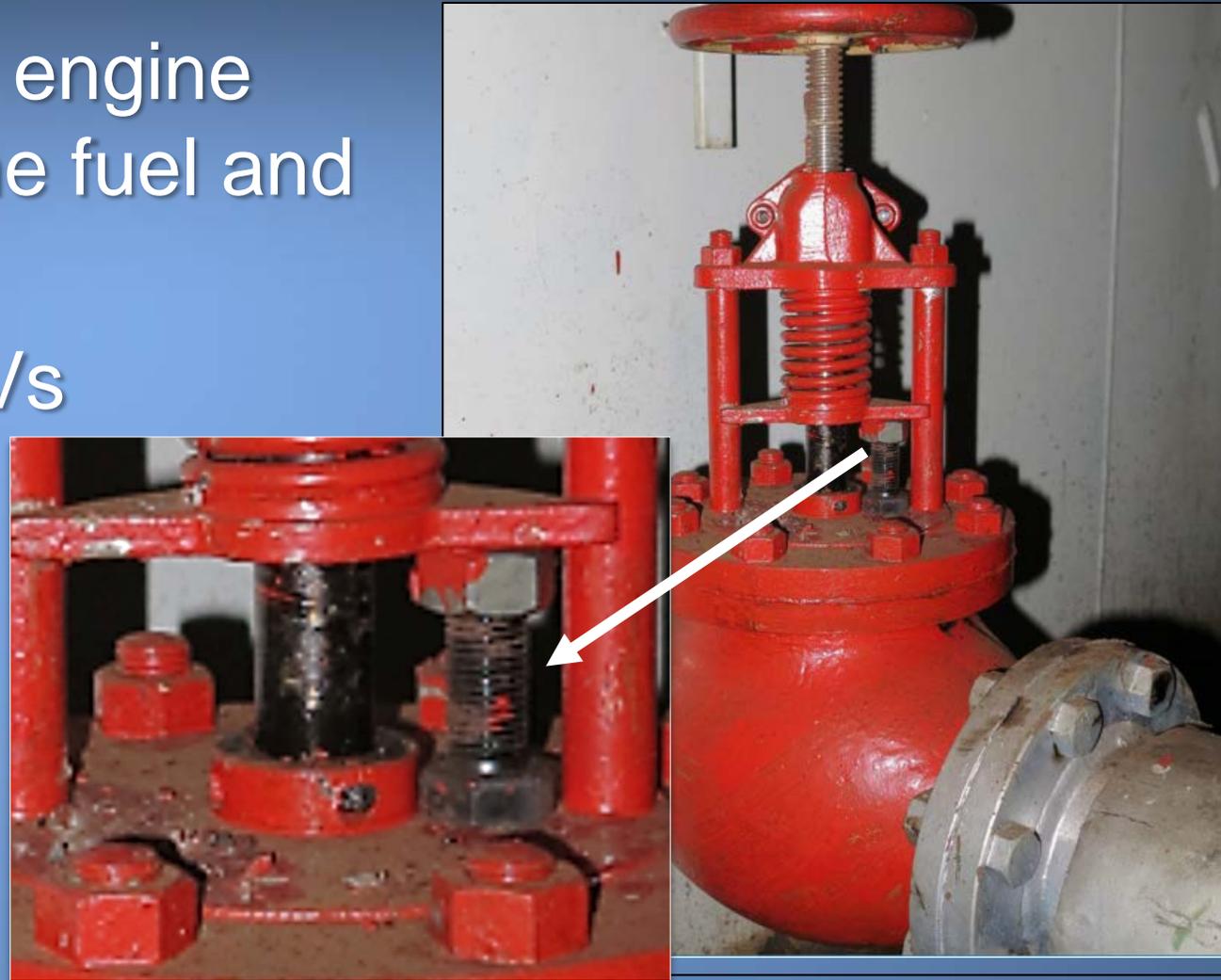
Improper Gasket Material & Nonstandard Blanking Plate

- End flange
 - Four bolt flange
 - OEM design
- Gasket material
 - Silicone rubber composition
 - Not specified composition
- Blanking plate
 - Not OEM design

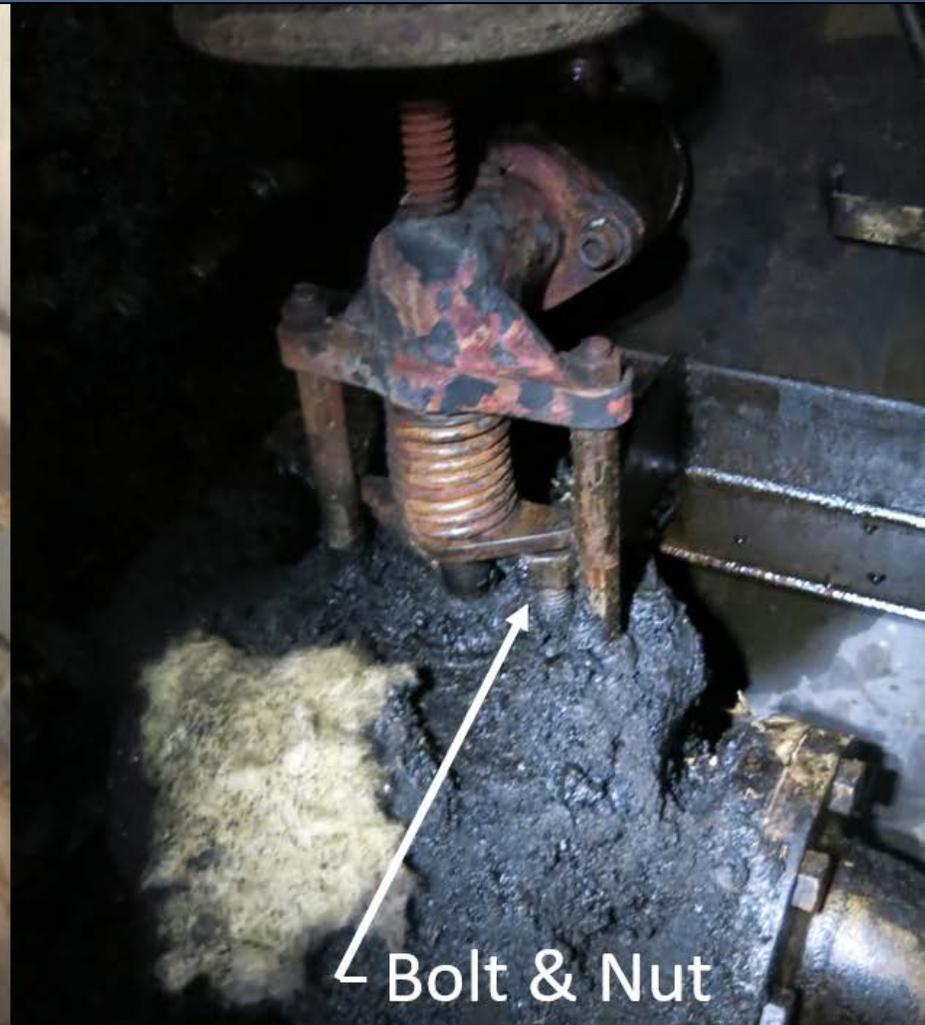
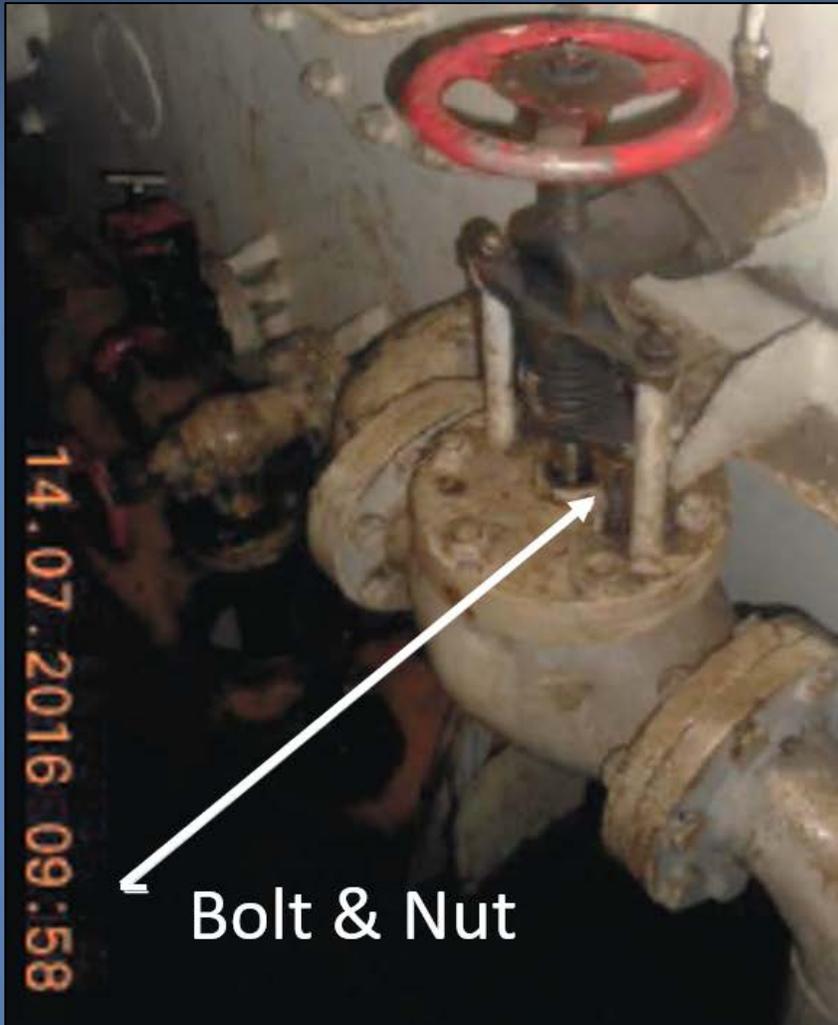


Fuel & Lube Oil Quick Closing Valves (QCVs)

- Designed to seal the main engine room space by securing the fuel and lube oil at the tanks
- Eight fuel and lube oil QCVs blocked open



Port Lube Oil Storage Tank QCV



Anti-Spray Tape

- Prevent fuel spray
- Improper installation



Lack of Adherence to Manufacturer's Guidance

- Customer information letter not followed
- Improper gasket material
- Non-OEM blanking plate

Diesel Customer Information No. 321 MAN | PrimeServ

Action Code:
At first opportunity

Splash Guard
Instruction for correct guarding

DCI / 321 - February 2013

Concerns
MAN Diesel & Turbo four-stroke medium speed engines in marine applications

Summary
Instruction for mounting of splash guard

Filing Advice
Operating instructions, chapter one

General Remark

According to IMO SOLAS Chapter II-2, Part B, Reg. 4, Par. 2.2.5.3 oil fuel lines shall be designed to assure that they are sufficiently separated from hot surfaces, electrical installations or other sources of ignition and shall be screened or otherwise suitably protected to avoid oil spray or oil leakage onto possible ignition sources. Therefore all resolvable connections with flammable media have to be equipped with splash guards.

With this customer information we would like to inform you about this requirement. Resolvable connections with flammable media are located specifically in the fuel oil modules, lube oil equipment and flexible and rubber connecting elements.

Description of the possible risk

Following a leakage of flammable media a fire or explosion may result, which can severely endanger the health and safety of personnel.

Recommended action

All connections need to be equipped with an appropriate splash guard to address this safety issue. Furthermore you should regularly inspect the functionality and correct installation of the splash guards.





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Shipboard Fire Protection

Nancy B. McAtee

Fire & Explosions Group Chairman

Carbon Dioxide (CO₂) Fixed Firefighting System

- Installed in main and auxiliary engine room
- Designed to extinguish fire
- Activated by staff captain when space was clear of personnel



Carbon Dioxide (CO₂) Fixed Firefighting System

- Fire not contained or suppressed by CO₂
 - Heat and smoke spread to adjacent areas
 - Black smoke seen coming from exhaust stacks
- Ventilation dampers not sealed

Water Firefighting Systems

- High-pressure water-mist system
- Drencher system

Water-Mist System

- Installed in various locations
- Suppresses/contains fire
- Activated manually or automatically
- Water supplied by fresh water tanks

Water-Mist System

- Chief engineer activated water-mist system
- VDR indicated automatic activation of additional zones
- System did not suppress or contain fire in engine room



Drencher System

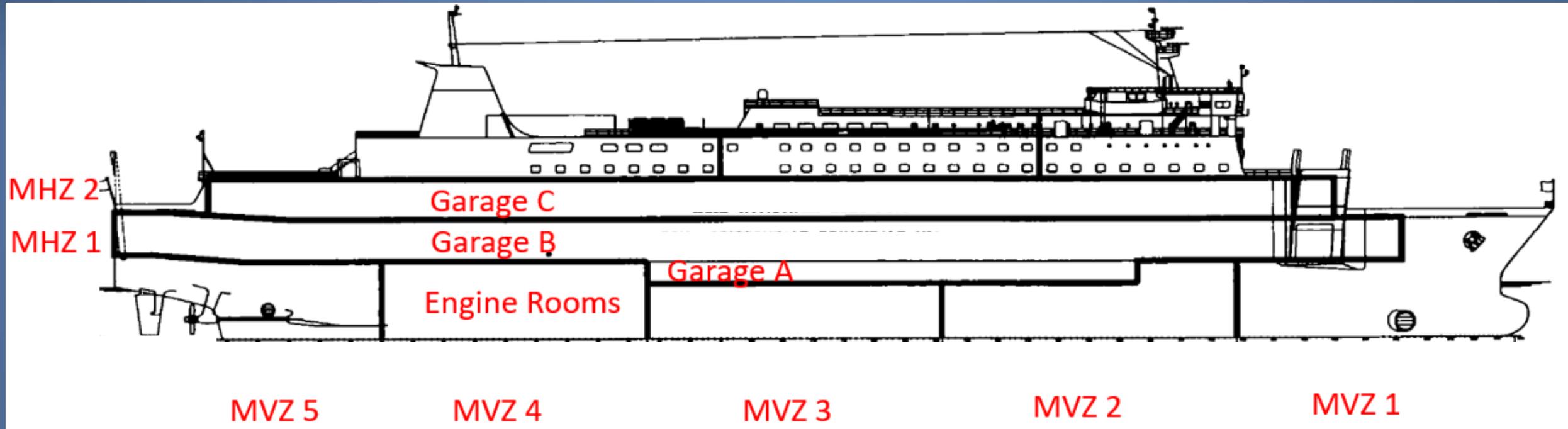
- Installed on the garage decks
- Manually activated
- Water provided by fresh water tanks
- 1st engineer activated drencher system



Water Firefighting Systems

- Same fresh water tanks supplied both systems
 - Last filled in San Juan
 - Found nearly empty postaccident
- Water mist did not suppress fire
 - Multiple activations
 - Reduced water supply

Structural Fire Protection



Structural Fire Protection

- A-60 boundary compromised
 - Heat spread to vehicles and cargo on garage deck B
 - Explosion on garage deck B
- Design criteria based on standardized test fires
 - Fire exceeded design criteria
 - Spread to deck above



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Survival Factors

Michael Karr

Survival Factors Group Chairman

Decision to Abandon the Vessel

- Fire, smoke, and explosions reported
- Smoke in accommodation areas
- CO₂ system deployed
- Water-mist system operation not verified
- Vessel listing 4 degrees
- Vessel only on emergency power



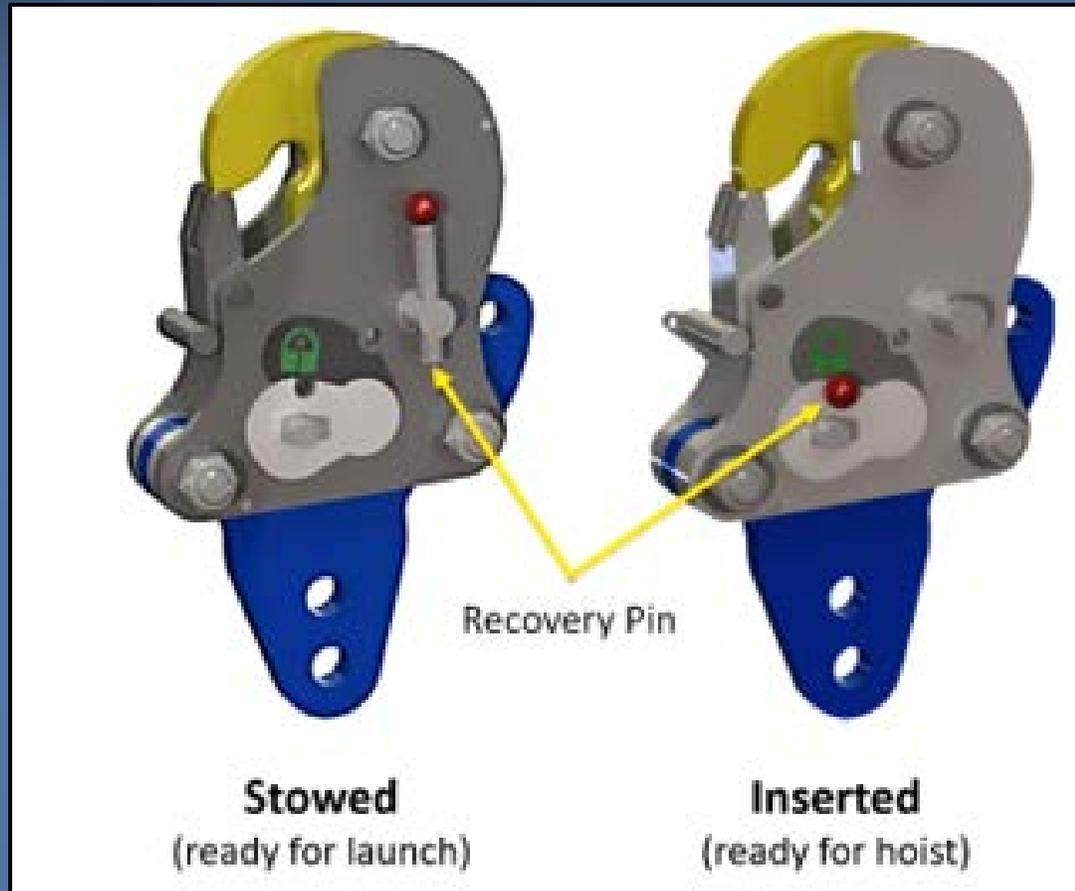
Lifeboats

- Lifeboats No. 1 and 2
 - Partially enclosed
 - 150-person capacity

- Lifeboat No. 3
 - Fully enclosed
 - 70-person capacity



Lifeboat Release Hooks

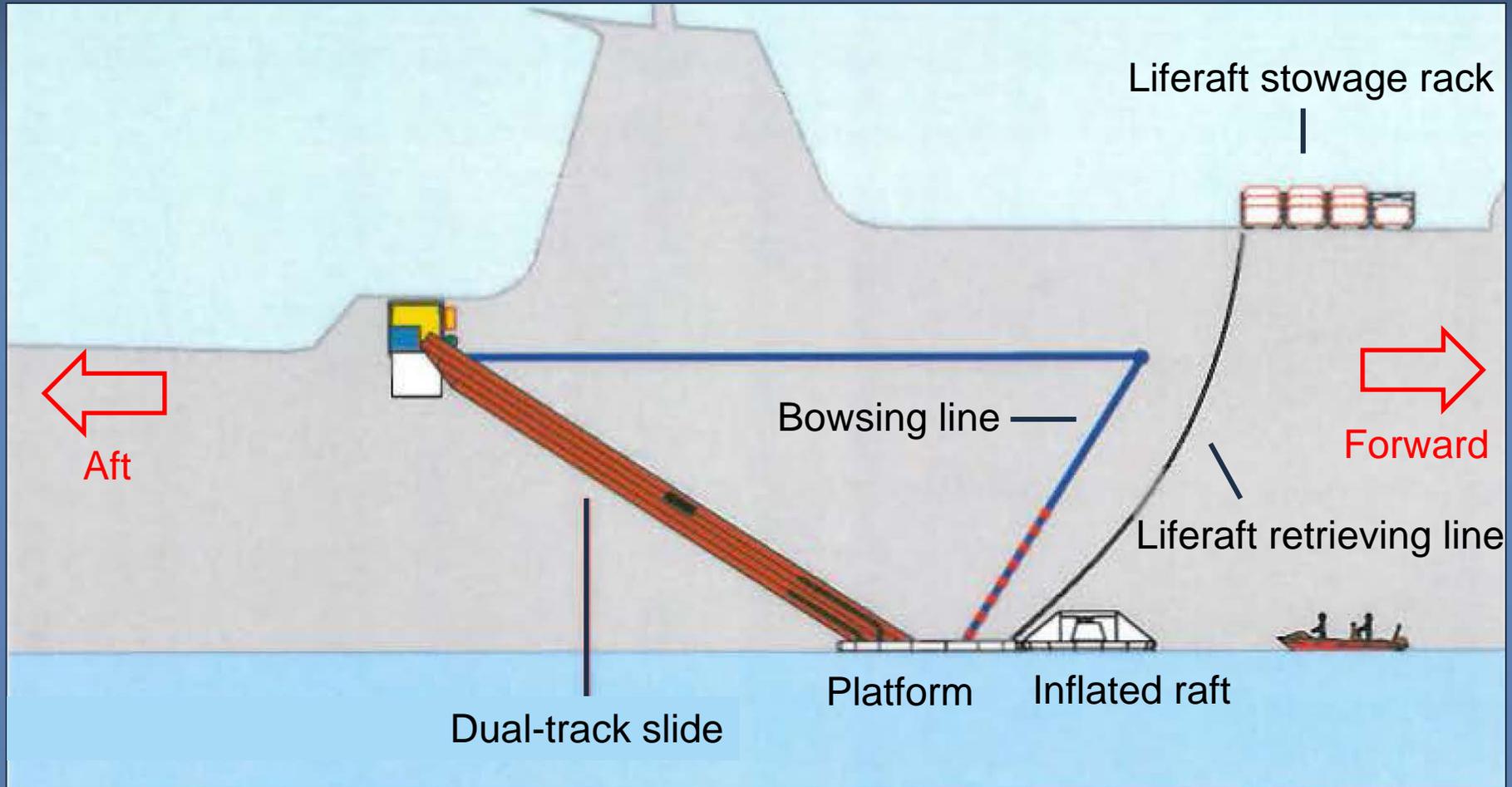


Lifeboats

- Minimal training and familiarization
- Knowledge of lifeboat release hooks lacking
- Increased the risk to crew and passengers



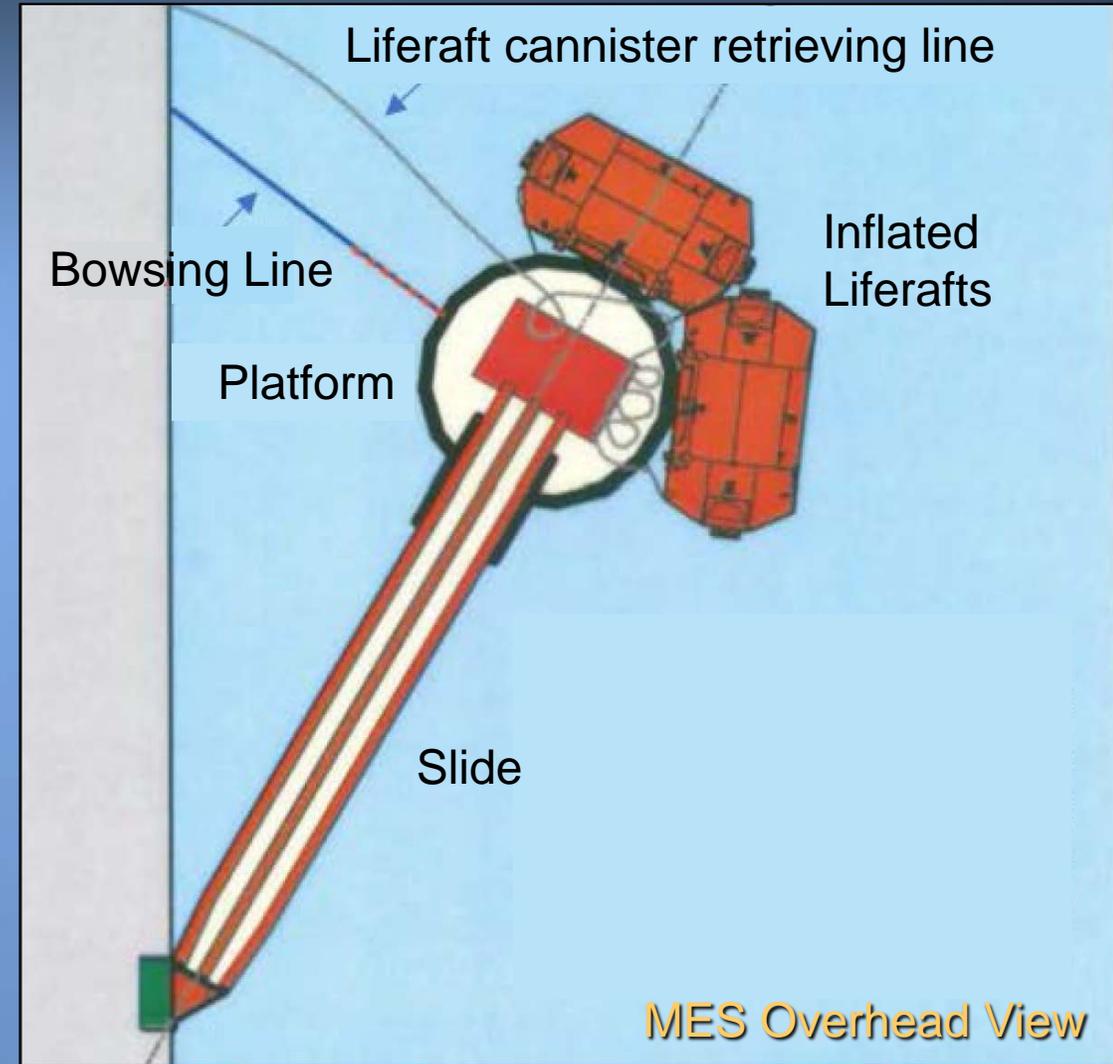
Marine Evacuation System (MES)



Marine Evacuation System (MES)

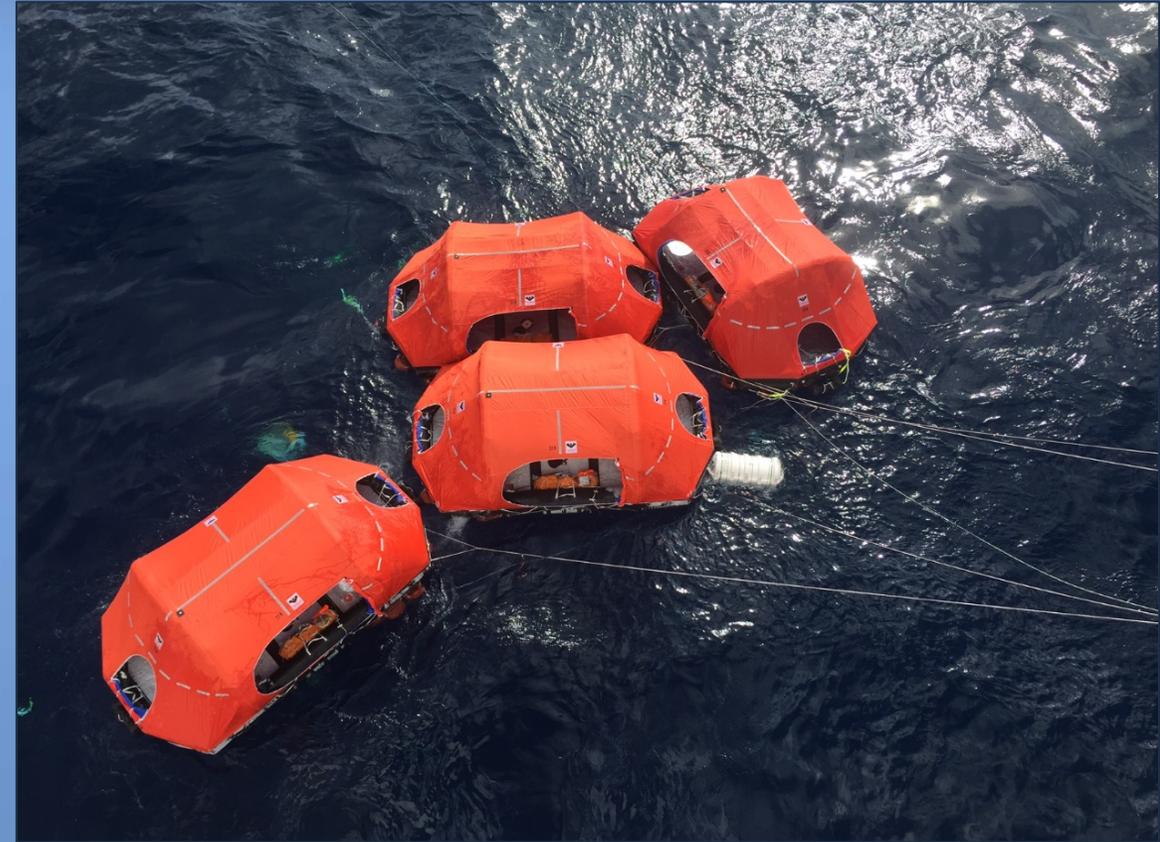


Portside liferaft container stowage rack



Marine Evacuation System (MES)

- MES liferafts prematurely inflated
 - Containers launched nearly the same time
 - Painters remained attached due to manual launch
 - Tension on painters triggered auto-inflation



Marine Evacuation System (MES)

- Training and familiarization inadequate
 - Deficiency in MES deployment participation
 - MES training video not sufficient



Screen capture from MES Training Video

Injuries to Passengers and Crew

- MES deployed at a waterline angle of 54 degrees
- Steep slope, fast speed, abrupt stop
- Five ankle injuries



Passenger Accountability and Vessel Abandonment

- Public address system announcement
 - Two different orders in two different languages
- Crew uncertainty
- Some crew not adequately trained

Passenger Accountability and Vessel Abandonment

- Life saving appliance embarkation order interrupted roll-call process
- Crew searched accommodation and public spaces

Passenger Accountability and Vessel Abandonment

- Last person removed 3 hours and 43 minutes after the abandonment order



Passenger Accountability and Vessel Abandonment

- Lack of training with lifesaving equipment
- Lack of familiarity with evacuation process





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Human Factors

Carrie Bell

Human Performance Group Chairman

Safety Management System

- Company must establish SMS for its vessels
- SMS must be implemented at all levels
- Requires proactive effort by management

Safety Management System

- Training and safety critical roles
- Responsible for training specific to lifesaving appliances and firefighting
- Understanding of emergency duties
- Training opportunities
 - Lifeboats - Not operated in water in 10 months
 - MES – Most crew did not observe deployment

Company Oversight

- Inadequate maintenance practices
- Documentation issues
 - Vital documents obsolete or unusable
 - Two versions of emergency plan onboard
 - Insufficient record-keeping
- Working Language

Safety Culture

- Good safety management requires top-down commitment
- Baja Ferries' safety culture
 - Reactive vice proactive approach
 - Poor overall safety culture
 - Lack of involvement



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Port State Control and Mass Rescue Operation

Larry Bowling

Port State Control and MRO Group Chairman

Maritime Safety and Compliance – Tiered System

- Owner – Baja Ferries
- Flag State/Administration – Panama Maritime Authority
- Classification Society/Recognized Organization – RINA Services
- Port State Administration – Coast Guard

Port State Control Program

- Plan review, initial and subsequent vessel examinations
- Issuance of *Certificate of Compliance* when deemed to be in substantial compliance
- Minor non-compliance matters addressed by issuances of deficiencies
- More severe deficiencies may lead to actions such as operational control or detention

Caribbean Fantasy PSC History

- Plan review– January 2011
 - Multiple control actions issued to compel compliance
 - Structural Fire Protection deemed inadequate
- Initial exam – May 2011
 - 174 Item worklist
 - Placed upon quarterly examination schedule

Caribbean Fantasy PSC History

- Detained in Port of San Juan
 - August 2014
 - October 2015
 - Coast Guard and RINA identified objective evidence which indicated the SMS was not fully implemented on board
- Detained in Port of Gibraltar
 - July 2016

Mass Rescue Operations Program

- Authorized in FY 2002 by Congress
- Preparation for emergency response to large number of persons in distress
- Created Passenger Vessel Safety Specialist (PVSS) positions at each Coast Guard District and Sector San Juan
- Program requires MRO plan development and exercises

Caribbean Fantasy MRO

- All 387 passengers and 124 crew were brought safely ashore
- Principal factors
 - Close proximity to the port of San Juan
 - PVSS assigned to Sector San Juan
 - MRO plan maintained and exercised





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