



**Report of the investigation into
the engine room
fire onboard the *M.V. Nariva*
at sea on
14 August 2001**

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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 himself. The Bahamas Maritime Authority makes this report available to any interested parties on the strict understanding that it will not be used as evidence in any court proceedings anywhere in the world.

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Bahamas Maritime Authority
Latham House
16 Minories
LONDON
EC3N 1EH
United Kingdom

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1. SUMMARY

- 1.1 On 14 August 2001 the *MV Nariva* was on a ballast passage from Lavera, France, to Tjelbergodden, Norway. At 1125 (GMT +2) local time in position 49° 36.6' North, 003° 36.5' West, the fire alarm sounded and thick smoke and flames were seen coming from the funnel.
- 1.2 Prior to the fire the vessel's engineers were draining the deck hydraulic pipe line in order to carry out maintenance on the line. The oil drained to a storage tank in the engine room by way of an reservoir/expansion tank which vented above the main engine turbo charger.
- 1.3 Once the fire alarm had been raised the chief engineer attempted to enter the engine room at main deck level. Whilst attempting this he sustained burns to his face and hands.
- 1.4 After accounting for the ship's personnel and sealing the engine room, CO² was released to extinguish the fire after which the vessel was towed to Falmouth.

2. PARTICULARS OF VESSEL

2.1 “*M.V. Nariva*” was a chemical tanker registered at Nassau, Bahamas, of welded steel construction. The accommodation and machinery spaces were situated aft. She had the following principal particulars:

- Official Number - 731008
- IMO Number - 9172715
- Length overall - 175.00metres
- Breadth - 27.70metres
- Depth - 16 metres
- Gross Tonnage - 20 573 tonnes
- Net Tonnage - 7 644 tonnes
- Deadweight - 30 977 tonnes
- Call Sign - C6PW2
- Year of build - 1998
- Type - Chemical tanker
- Owner - Faxdex Shipping Corporation
- Operator - Mitsui O.S.K Lines
- Manager - MOL Tankship Management Ltd.
- Class - Nippon Kaiji Kyokai
- Time and date of incident - 1125, 14 August 2001
- Place of incident - 49° 36.6' North, 003° 36.5' West
- Injuries - Chief Engineer, facial burns
- Damage - Engine room fire damage

2.2. At the time the vessel complied with the all statutory and international requirements and certification.

3. NARRATIVE OF EVENTS

- 3.1 On 14 August 2001 the *MV Nariva* was on a ballast passage from Lavera, France, to Tjelbergodden, Norway. At 1125 (GMT +2) local time in position 49° 36.6' North, 003° 36.5' West, the fire alarm sounded and thick smoke and flames were seen coming from the funnel.
- 3.2 At the time of the fire the vessel's engineers were draining the deck hydraulic pipe line in order to carry out maintenance to the line. In order to drain the line the oil had to pass back through the system into the engine room storage tank. Prior to entering the storage tank the oil had to pass back through a reservoir/expansion tank in the bottom of the engine room.
- 3.3 Once the fire alarm had been raised the chief engineer attempted to enter the engine room by the cross alleyway door at main deck level. Unfortunately whilst attempting this he sustained burns to his face and hands.
- 3.4 At 1130 the crew were mustered and boundary cooling started. At this time all the ship's personnel were not accounted for so CO² was not released into the engine room. A Mayday was transmitted at 1135 and at 1150 the owners and Brixham Coastguard were contacted. At this time all the ship's personnel were accounted for. At 1205 CO² was released into the engine room and at 1215 the Mayday was down graded.
- 3.5 After subsequent re-entry by crew wearing breathing apparatus to determine whether the fire had been extinguished, ventilation fans were started to remove the smoke. At 1553 the atmosphere in the engine room was found to contain 20% oxygen in the lower levels and the tug arrived at 1730.
- 3.6 After working through the night an electrical generator was started and electrical power restored, but attempts to restart the main engine pumps failed. At 1423 the tug connected a line and commenced to tow the vessel to Falmouth arriving at the "Crossroads Buoy" at mid day on 16 August 2001.

4. ANALYSIS

- 4.1 Prior to the fire the vessel's engineers were draining the deck hydraulic pipe line in order to carry out maintenance on the line. The oil drained to a storage tank in the engine room by way of an reservoir/expansion tank. This tank vented at 'A' Deck level just below the base of the funnel, but immediately above the main engine turbo charger.
- 4.2 Whilst draining the deck line the reservoir/expansion tank drain valve was open to the engine room storage tank and oil was also returning through the overflow pipe to the storage tank. The reservoir/expansion tank vent pipe ran from the storage tank at the bottom of the engine room to an open ended pipe with a vent breather at the top of the engine room just below the funnel deck level and above the main engine exhaust in way of the turbo charger.
- 4.3 Both the drain and overflow pipes were 25mm diameter while the vent pipe diameter was 40mm. The deck return line filling the tank was 125mm and with the vessel trimmed by 3metres by the stern the top of the vent pipe was lower than the forward section of the deck line.
- 4.4 Due to the top of the vent pipe being lower than the forward part of the deck line due to the stern trim and the vent pipe being of a larger diameter than both the drain and overflow lines, it would appear that the oil returning from the deck was forced up the vent pipe. The location of the vent, above the main engine exhaust turbo charger, directed any overflow to fall directly on to it where it ignited.
- 4.5 The chief engineer sustained burns to his face and hands whilst opening the engine room door in the cross allyway at main deck level. From the fire damage to the cross alleyway it would appear that he did not manage to completely close the door on his withdrawal.

5.

CONCLUSIONS

- 5.1 The direct cause of the fire was the impingement of hydraulic oil in a substantial quantity onto the main engine exhaust in way of the turbo charger where it ignited. The main engine was operating at full sea speed at the time, therefore the exhaust temperature would have been well in excess of the contact ignition temperature of the hydraulic oil.
- 5.2 Due to the top of the vent pipe being lower than the forward part of the deck line and the vent pipe being of a larger diameter than both the drain and overflow lines it appears that the oil returning from the deck was forced up the vent pipe and onto the main engine exhaust.
- 5.3 The fact that the vent pipe was positioned too low was a design fault which did not take account of the stern trim of the vessel allowing the vent pipe to become lower than the forward sections of the hydraulic pipe.
- 5.4 With reference to 4.5 above, the engine room emergency escape opened out into this cross alleyway. If, as is supposed, the chief engineer did not manage to close the engine room door, exit from the engine room by the emergency exit could have been barred by smoke and fumes.

6. RECOMMENDATIONS

The owners/operators of the vessel are recommended to carry out the following:-

6.1 The position of the vent pipe should be routed up into the starboard side of the funnel and fitted with a collection tank. A drain pipe of greater diameter than the vent pipe should be led from this tank to the engine room oily bilge. In addition a vent from the top of the collection tank should lead straight out through the side of the funnel so in the unlikely event of the collection tank becoming full oil would not flow into the top of the engine room.

6.2 A redundant connection on a section of pipe at the lowest point in the hydraulic system should be modified into a drain. The line should be fitted with a valve and blank to allow draining of contaminated oil into drums rather than the storage tank.

6.3 The engine room emergency escape should be modified to allow safe access to an open deck.

(Recommendations 6.1 to 6.3 have been carried out by the owner of this vessel. There are several vessels of this type, both with the same owners as the *Nariva*, and other owners. They have all been advised of the design defect with the deck hydraulic system and similar modifications have been put in hand.

The Classification Society is recommended to ensure that :-

6.4 Although, in *Nariva* the engine room emergency exits complied with the requirements of SOLAS, in new ships, where provided, additional emergency exits should allow safe access to the open deck.

6.5 In existing vessels in their class and new buildings such oil system venting arrangements comply with SOLAS Chapter II-2, Regulation 15, 'Arrangements for oil fuel, lubricating oil and other flammable oils', to prevent oil coming into contact with hot surfaces.

APPENDIX 1



Photos 1 & 2. Deck hydraulic system reservoir tank vent pipe in upper part of engine room





Photo. 3 New collection tank for deck hydraulic system reservoir tank vent pipe.



Photo. 4 Deck hydraulic system reservoir tank vent pipe extended up into funnel.



Photo.5 Deck hydraulic reservoir tank vent pipe collection tank vent through side of funnel.