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SUMMARY OF EVENTS

The offshore supply vessel M.V. Maersk Handler suffered a serious fire in the engine room on 7th April 1984, whilst on passage from the rig Maersk Valiant to Port Hedland, WA.

The fire occurred whilst the vessel was underway in approximate position 20°25'South and 116°18'East, at about 2108 W.A.S.T on 7th April.

The fire was extinguished by the ship's crew.

No persons were injured and there was no loss of life in the incident, but extensive damage was caused to the engine room and surrounds.

The vessel was disabled as a result of the fire and was towed into Port Hedland, where she was subsequently repaired and returned to service.

AUTHORITY TO CONDUCT INVESTIGATION

On 19th April 1984, Mr F.H.S. Scriven, the Senior Marine Surveyor of the Department of Transport Western Australia, was appointed under sub-section 377A(1) of the Navigation Act 1912, to make a Preliminary Investigation into the circumstances of the fire in the engine room on the M.V. Maersk Handler on 7th April 1984.

In particular the investigation was to establish:

(i) whether any wrongful act or default by any person was a contributory factor to the cause of the fire: and

(ii) whether the Master and Crew took all necessary steps to protect life and property after the fire was detected.

This report is based on interviews conducted by Mr Scriven and documentary material such as the Deck Log Book and the Official Log Book of the Maersk Handler.

PERSONS INTERVIEWED

The following crew members of the Maersk Handler were interviewed on board the vessel at Port Hedland on 26th April 1984

Lane Michael WHITE.....Master
Kelvin Michael TURNBULL.....Chief Engineer
Robert Noel JOHNSON.....Second Engineer
Ernest Henry BEHNK.....Able Seaman
William Kenneth THOMAS.....Greaser

All five were interviewed in the presence of John Farquharson, their Counsel, who is employed by Stone James Stephen Jaques solicitors of Perth.

On 27th April 1984, the Department of Transport's Marine Surveyor based at Port Hedland, John Kyle Cook, was interviewed.

The remaining four crew members who were on board at the time of the fire were:

M. Butler.....Chief Officer
M. Cousens.....Able Seaman
J. Kelly.....Able Seaman
P. Eskildsen.....Able Seaman

VESSEL DATA

Name:	Maersk Handler
Official Number:	381805
Port of Registry:	Nassau, Bahamas
Nationality:	British
Classification:	Det Norske Veritas
Owners:	The Maersk Co. Ltd., Upper Thames Street, LONDON EC4V-3ET, England
Operator:	Australian Offshore Services 356 Collins Street Melbourne VIC
Tonnages:	Gross - 1179.39 Net 517.46, DWT 1939.49
Dimensions:	LOA 64.59m Beam 13.80m, Depth 6.90m to shelter deck.
Propulsion:	Twin (2) 16 cylinder Nohab Polar F216 Vee engines, each 3520 BHP, each driving a KaMeWa controllable pitch propeller through a reduction gear box. Diesel driven transverse bow thruster.
Type of Ship:	Offshore supply vessel.
Built:	1980 at Samsung Ship Building co., Koje, Korea

SHIP'S CERTIFICATE

Cargo Ship Safety Equipment:	Issued 25.10.82 by Det Norske Veritas at Oslo. Valid until 29.7.84. Intermediate inspection 28.7.83.

Cargo Ship Safety Radiotelephony:	Issued 1.10.83 by Det Norske Veritas at Oslo. Valid until 27.7.84
Cargo Ship Safety Construction:	Issued 31.10.81 by Det Norske Veritas at Oslo. Valid until 28.7.84. last intermediate inspection 28.7.83.
International Loadline:	Issued 8.6.82 by Det Norske Veritas at Oslo. Valid until 3.8.85. Annual inspection 28.7.83

QUALIFICATIONS OF OFFICERS

L.M. White	Master	Master (Foreign-Going) Certificate of Competency issued Sydney 1976
M. Butler	Mate	1st Mate (Foreign-Going) Certificate of Competency issued Sydney 1981
K.M. Turnbull	Chief Engineer	1st Class Motor Certificate of Competency issued Newcastle NSW 1977
R.N. Johnson	2nd Engineer	Engineer Watchkeeper (Motorship) Certificate of Satisfactory Service issued Melbourne 1983.

SEQUENCE OF EVENTS

At 1715 W.A.S.T 7th April 1984, the Maersk Handler departed from the offshore drilling rig Maersk Valiant, which was on location at Harriet No. 3 well (20°36'S 115°37'E), bound for Port Hedland. The weather was cloudy, but fine and clear with an ENE wind of 12-15 knots and a slight sea and swell. There was a total complement of 9 persons on board at the time, with no passengers.

At 2108, the Master was on the bridge carrying out the 6-12 watch, when the automatic fire detection alarm sounded, indicating a fire in the engine room. The vessel's position at the time was 20°25'S 116°18'E.

The Chief and Second Engineers stated that they immediately left their respective cabins and entered the engine room by the entrance on the port side. The smoke in the engine room was reported to be very dense and acrid. The engineers then entered the airconditioned control room, some 2 to 3 minutes after the alarm had sounded, and confirmed the fire by telephone to the Master on the bridge. They could see the fire by the starboard engine through the control room windows. The Chief Engineer stated that as the fire was so fierce, it was decided that the best action was to seal and isolate the engine room and to use the fixed Halon gas fire smothering system.

The two engineers then left the engine room and the Chief Engineer instructed the Second Engineer to close down the engine room prior to releasing the gas. He then reported the situation to the Master on the bridge.

On receiving confirmation of the fire from the engineers, the Master broadcast a radiotelephone distress message (MAYDAY) on frequency 4125 kHz. This was acknowledged immediately by Adelaide Radio (VIA), followed shortly after by Broome Radio (VIO). The oil rig supply vessels Lady Cynthia, Lady Elizabeth, and Lady Kathleen also acknowledged the Mayday call. Lady Cynthia and Lady Elizabeth advised that they were proceeding to assist Maersk Handler, while the other vessel stated that she would remain standing by the drill rig Glomar Main Pass III, unless further assistance was required.

The Chief Engineer rejoined the Second Engineer who, with the Greaser, was engaged in closing all engine room external doors, funnel flaps and the open internal watertight door by remote control. The Chief Engineer activated the remote controls shutting down fuel tank valves, oil fuel pumps and engine room vent fans. During this time thick smoke was being emitted from the engine room doors and funnels.

The emergency stops on the bridge for the main engines had been activated, but it was noted in the deck log book that the starboard engine continued to run on for approximately 7 minutes.

When all had been secured, the starboard engine stopped and a head count carried out, the Halon gas was released into the engine room. The available evidence indicates that this action was completed about 10 minutes after the fire alarm had sounded at 2108 hours.

Shortly after the alarm had sounded, the Chief Officer, assisted by Able Seamen Behnk, Cousens and Eskildsen, took the self-contained breathing apparatus and the smoke helmet out of the deck store, laid out hoses and assembled fire extinguishers on the deck. The vessel's inflatable liferafts and float-free lifejacket locker were also freed from their hydrostatic releases.

The wooden deck sheathing on the starboard side above the site of the fire was buckled and smouldering. The emergency fire pump had not been started at this stage, so it was not possible to play a hose on the deck as all other fire pumps were located in the now inaccessible engine room.

The diesel-driven emergency fire pump was located down in the bow thruster compartment, where there was no mechanical ventilation available due to the loss of electrical power. It would have therefore been necessary to leave all doors and hatches open when descending through the cement room to start the pump, there being no provision or requirement for remote control.

The indicator lights for the watertight door between the engine room and the cement room showed both 'open' and 'closed', consequently there was some doubt about its status, and it was considered unwise by the Master and the Chief Engineer to risk a breach of the integrity of the vessel at this stage. This was the only internal watertight door that required closing at the start of the fire. There were five of these sliding watertight doors fitted in the machinery spaces operated hydraulically either by local control or by the centralised control position on deck, four of which were normally kept closed.

There was no cargo on the deck immediately above the area of the fire, which soon appeared to be under control, so the Master considered that the need to start the pump was secondary to the risk of creating a draught and possibly re-igniting the fire by the opening of a door.

By approximately 2130, the Master had all the crew assemble on the bridge in case of problems with the fuel tanks, and

they waited for the fire to die and bulkheads to cool. At this stage, the lighting to the vessel was being provided by the emergency batteries, as there was no emergency generator aboard.

At approximately 2305, the crew cleared the anchor away ready for dropping if necessary. At about 2350 it was considered that the fire had sufficiently eased to risk checking the suspect watertight door. It was found to be securely closed, so the engineers went down to the bow thruster compartment and started the emergency fire pump.

At 2400, as the situation appeared stable, the Chief Officer put on the self-contained breathing apparatus and the 'Telleborg' fire suit and descended through the deck hatch access into the workshop, which was situated on the starboard side aft of the engine room. For a few moments, he opened the watertight door leading from the aft cement room into the engine room aft of the starboard engine. The fire was reported to be out but the heat was intense.

However, the Chief Officer could hear water running into the bilge. The Chief Engineer stated that as it was possible that the water was leaking from the fire main, and there was no power to run the bilge pump, it was decided to stop the emergency fire pump which fed the main. There was no means of isolating the engine room section of the fire main.

Also in case the water running into the engine room was from the salt water injection lines, the Chief Officer immediately visited the engine room again, and at the request of the Chief Engineer closed two isolating sea valves on these lines. However, as the water was no longer running, it was assumed that shutting down the emergency fire pump had solved the problem. This pump was therefore not restarted and it was held in reserve for any further problems. Later, the Chief Engineer discovered that the water was leaking from the main engine cooling system which was breached in the fire.

Following the Chief Officer's closing of the two sea valves, the Chief Engineer put on the breathing apparatus and the fire suit that the Chief Officer had been wearing and went into the engine room to check various valves. Unfortunately, the suit heated up very rapidly due to being previously worn, and he had to curtail his inspection. However, he was satisfied as to the watertight integrity of the space.

The Master and Chief Engineer then decided to keep the engine room sealed until daylight to allow the space to cool further. By 0035 8th April, the Lady Cynthia and the Lady Elizabeth had arrived, and were standing off the disabled vessel. The MAYDAY was cancelled at 0050. All hands went forward and the

tow line from the Lady Elizabeth was manhandled on board. At 0200 the Ladv Elizabeth commenced towing the Maersk Handler to Port Hedland.

At 0700 the Master and Chief Engineer entered the engine room to make a further inspection. No hot spots were found, the engine room flaps were opened and the engine room ventilated naturally. At approximately 0830 the engineers attempted to start the harbour generator, which was sited in the engine room just forward of the starboard main engine. The generator was started but, due to burnt electric cable insulation, power could not be supplied to the distibutor board, and the vessel remained without electrical power.

The engine room was resealed again at 1130, and was only opened at 1830, when the Chief and Second Engineers confirmed the watertight integrity of the space.

The remainder of the tow passed without further incident and the Maersk Handler berthed at Port Hedland at 1005 on Monday 9 April. The classification society, Det Norske Veritas, sent their surveyor on board to examine the damage, and Department of Transport and underwriter surveyors also attended. The surveyors determined that the fire had originated on the forward starboard side of the starboard main engine, but could not find the exact cause.

The surveyors also discovered that the failure of the bridge emergency control to stop the starboard engine immediately, was due to the activating solenoid being damaged in the fire. The backup for closing the fuel valves and stopping the fuel pumps, including the low pressure booster pump, by remote control during the shutdown operations, ensured that the engine stopped before the Halon was released.

The reason for the fire was only discovered on completion of repairs, when the fuel booster pump was started prior to starting the starboard main engine.

Each engine was served by two identical fuel rails, one down each side, a pressure gauge being fitted on a tapping on the port rail of each engine and the tapping on the starboard side being blanked off. The cause of the fire was discovered to be the failure of the blanked tapping on the starboard side of the starboard engine, which then released fuel onto the engine where it ignited. There was one of these blanks on each engine and they were only shown in the engine spare parts book, not in the operation manual. They were not provided with any locking devices.

The blank was only a piece of solid round rod fitted into a conventional screwed pipe fitting which consisted of a

nipple on the rail, a shaped olive of non-ferrous alloy, and a cap. This fitting was the same, but of smaller size than the other fuel pipe connections, except in this case a solid rod piece was inserted instead of a pipe. When a conventional pipe is inserted in this type of fitting, although the olive is of a softer metal than the pipe, the compression effect of the cap on the olive causes the pipe wall to distort slightly. This has the effect of locking the pipe into the olive. However, by using a piece of solid rod, instead of a pipe, this distortion could not occur and the rod would only be held in place against the pressure of the fuel in the pipe by friction. A sketch of the engine showing the blanked fuel line nipple is attached.

A modified blank was manufactured and fitted. This dispensed with the olive and piece of rod, and the modified blank was fitted under the screwed cap. Its overall diameter was such that it would be impossible for it to pass through the hole in the cap.

Repairs were completed to the satisfaction of the Det Norske Veritas surveyors and the vessel sailed to resume her duties on 3 May 1984.

CONCLUSIONS

The cause of the fire was the loss of the blank on the superfluous nipple on the starboard engine starboard fuel rail. The diesel fuel which escaped as a result of this loss, forced out under pressure by the low pressure booster pump, ignited when it came into contact with the hot areas of the cylinder head and exhaust manifold.

The engineers stated that they were unaware of the existence of this blank. When the rod piece blank was discovered to be missing the tightness of the compression cap nut was checked and discovered to be quite firm. The missing piece of rod, which is 20mm long and 6mm diameter, was not recovered but the olive was intact. It appears that for some reason the friction bond between the rod and the olive failed.

The fact that the cap was found to be still hard up after the loss of the blank, showed up a deficiency in the design of the blank. The adoption of such a blank is considered to have been very poor design practice.

The new blanks, which were manufactured for the Maersk Handler, are a much more reliable fixture. However, on an engine running continuously at between 400 and 800 rpm it can be expected that any unlocked screwed coupling could loosen in time due vibration. Accordingly new blanks should be secured mechanically in some way to prevent the fuel leak which would occur if they became slack.

It is of some concern that the starboard engine continued to run after the bridge emergency stop was activated. This was due to the electro-pneumatic solenoid valve in the shut down control failing as a result of the fire.

However, as the leak feeding the fire was located between the fuel tank and the control which stops the engine, the failure of the bridge control to stop the starboard engine did not contribute to the fire.

The starboard engine was subsequently stopped, before the fire smothering gas was admitted, by the correct operation of the statutory emergency controls.

The decision by the Master not to start the emergency fire pump soon after the fire was discovered was a considered risk, and was reasonable in the circumstances, in that the release of the Halon gas appeared to quickly and effectively control the fire.

The emergency fire pump was shut down shortly after it was started at 2350, because it was thought possible that the water leaking into the bilge was from the fire main. This was also justified at the time, because the engine room section of the fire main could not be isolated from other sections of the main. Also there was no power to run the bilge pump and no alternative pump available.

After the fire the vessel was immobilised due to the controls for both engines, which passed down the starboard side, being damaged in the fire so that the undamaged port engine could not be used.

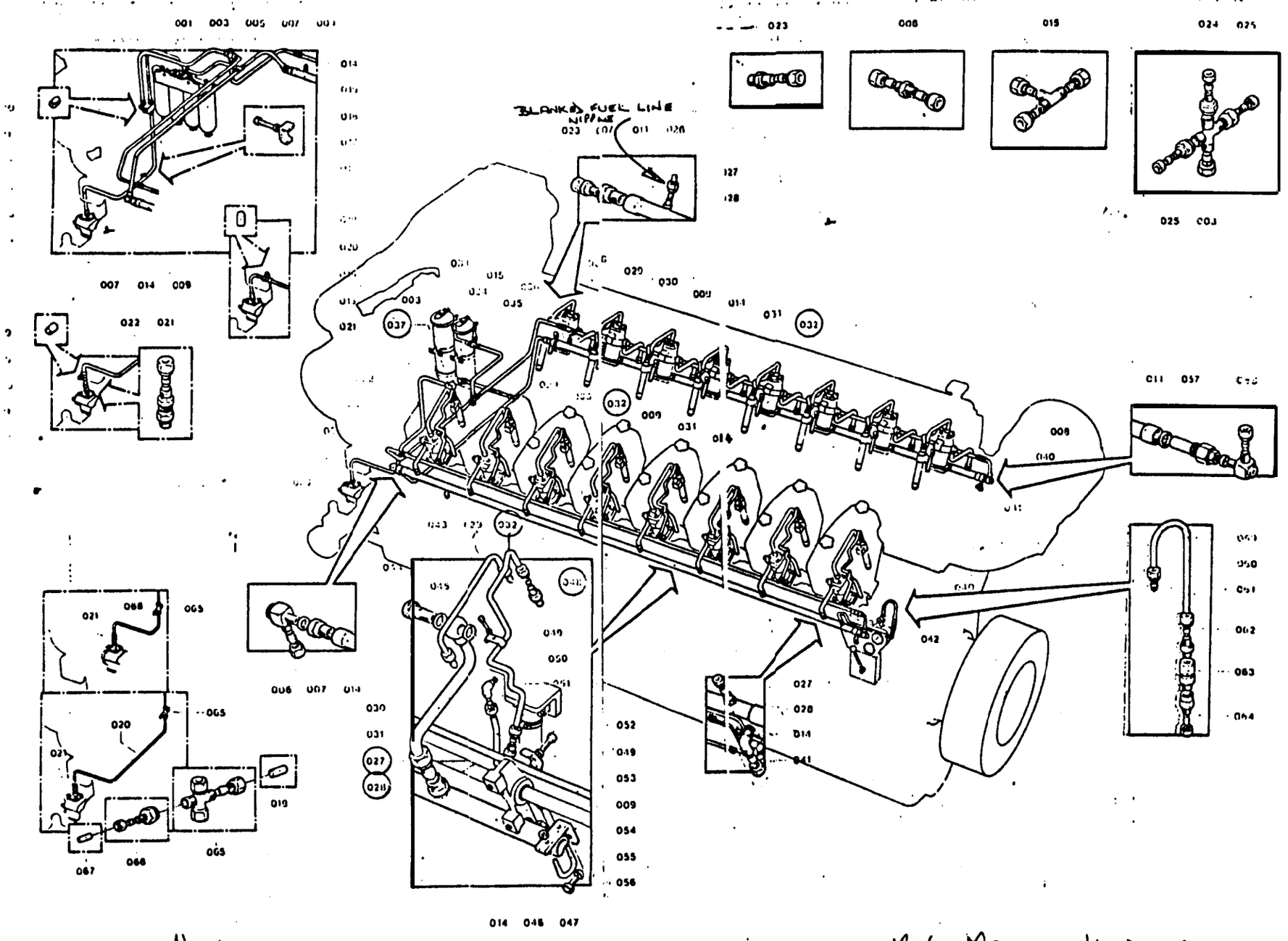
In this vessel, failure of the controls for the watertight door between the engine room and the forward cement room, with the door open, would mean that access to the emergency pump could become impossible in the event of an engine room fire.

The Master had not held a fire drill in the month prior to the incident. Had he done so, the malfunction of the indicator lights on the watertight door may have been discovered and rectified. However, in general the action to fight the fire, once it was detected, was prompt and effective.

Despite the condition of the engine room after the fire, it was apparent that it was normally clean and well maintained. Although the engine room is approved as an Unattended Machinery Space, the engineers make regular visits and on the evening in question the Second Engineer made a visit at 1930 and the Chief Engineer at 2030. On both occasions everything was normal The fire was confined solely to the area of ignition as a result of the normal cleanliness of the engineroom.

Having examined all the facts, it is considered that there was no wrongful act or default by any person directly involved in the operation of the ship which was a contributory factor to the cause of the fire.

It is also considered that the Master and Crew took all the proper and necessary steps to protect life and property after the fire was detected. Assistance rendered by the other two vessels as a result of the 'MAYDAY' radio telephone distress call was prompt and effective.



M.V. Maersk Handler.

Diagram of fuel lines.

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M.V. MAERSK HANDLER