SYNOPSIS

The container vessel *Maersk Doha* sailed from Norfolk, Virginia, in the USA shortly after midnight on 2 October 2006. At 0030 an engine room alarm sounded indicating that pressure in the steam system was low. The crew investigated the cause of the alarm and discovered that steam was escaping from the auxiliary boiler air intake. They shut down the burner and opened the furnace door. Steam escaped, and when it had cleared they could see that the furnace tube was severely distorted and cracked.

There was some delay before the chief engineer was informed about the breakdown, and further delay before the problem was reported to the master on the bridge. Although the vessel could have anchored safely to investigate the situation, it was agreed that the main engine could continue to run at low power, and the vessel proceeded to sea.

An Exhaust Gas Economiser (EGE) was fitted in the funnel uptakes to generate steam from the waste heat contained in the main engine exhaust gases, using water circulated from the auxiliary boiler. At about 0200, a rapid rise in the temperature of the EGE was noticed and the chief engineer realised that there was a fire inside the EGE casing. The bridge was alerted at 0230 and the vessel's emergency alarm was activated. Radiant heat from the EGE ignited light fittings, cables and paint on bulkheads in the funnel uptakes, and the crew attempted to fight the fire with a water hose and a fire extinguisher. They were beaten back by the heat and smoke and the engine room was evacuated.

The crew were mustered and firefighters re-entered the funnel uptakes and began to cool the EGE casing using water hoses; they were withdrawn when their team leader grew concerned that the structure might collapse. The main engine room CO_2 gas smothering system was activated, but failed to discharge correctly and, in any case, would have had little effect on the fire. The fire was contained using water hoses to cool its boundaries and was finally extinguished, following advice received from the company head office, by drenching the EGE with water from the top of the funnel and through doors in the EGE casing.

The most likely cause of the fire was a malfunction of the auxiliary boiler control mechanism, which allowed the burner to keep firing with too little water in the boiler. This overheated the furnace, causing the distortion and cracking of the fire tube. As feed water was lost through the crack, the supply of water to the EGE failed, causing it to overheat. Soot deposits, which had accumulated within the EGE, then ignited. It is likely that temperatures in the EGE rose sufficiently high for hydrogen and iron fires to develop.

Inappropriate techniques were used to fight the fire initially, because the crew did not understand enough about the construction of the EGE or how to deal with the fire effectively. The vessel had an extensive Quality and Safety Management System, but it lacked sufficient detail to assist the crew in dealing with either the machinery breakdown, or the subsequent fire. Further problems became evident during the emergency when other equipment did not work correctly. The records of emergency drills and maintenance of machinery made it difficult for the vessel's managers to assess the quality of the work being carried out onboard. Neither these systems, nor the quality and technical audits carried out on the vessel, had been able to detect the underlying condition of equipment which subsequently failed during the emergency.

The crew, with the exception of the chief engineer, were from Eastern European countries. Despite meeting the requirements for gaining UK Certificates of Equivalent Competency and being able to use the working language of the ship, there was a tendency for the majority of the crew to revert to their shared native language. This had the effect of isolating the chief engineer and hindered his ability to understand and control the response to the emergency.

The management company undertook an investigation immediately after the accident and then promulgated to other managed vessels – in the form of safety and technical circulars – the lessons learned. Further measures were instigated to change emergency procedures and improve whole ship response.

In view of the action already taken, and in progress, no further recommendations are made as a result of this investigation.

Maersk Doha