

Investigation Report No. 236/20

Date: 25 May 2023

Serious marine casualty

Fire in the main engine scavenge air duct on board the EBBA MAERSK on 29 July 2020

1 Summary

On 29 July 2020, the EBBA MAERSK was en route from Felixstowe (UK) to Hamburg (Germany). After the changeover from a conventional heavy fuel oil to a low-sulphur light fuel oil, a fire broke out in the main engine's scavenge air duct.

The EBBA MAERSK has a common-rail engine as her main engine. The ship sails on the high seas with open-loop scrubbers and has to change to a low-sulphur fuel for voyages in a SECA. The amount of *heavy* low-sulphur fuel on board that day was not sufficient for the voyage segment up the River Elbe to the pier in Hamburg. Accordingly, the main engine was changed over (contrary to usual practice) to a *light* low-sulphur fuel, which was available in sufficient quantity.

Shortly after the changeover was completed, the exhaust gas temperatures of three cylinders successively began to rise above the normal level. One cylinder had to be disengaged electronically. After a brief cooling period, this cylinder's exhaust gas temperature began rising again, even though the cylinder was no longer being actuated.

Shortly afterwards, 'Fire in scavenge air duct' alarms sounded for the forward six of the 14 cylinders. The engine department quickly verified this. It was immediately communicated to the bridge that the engine had to be shut down without delay. They anchored immediately, initially to the east and just outside of the Elbe Approach traffic separation scheme.

The fire in the scavenge air duct was extinguished using the designated system. A thorough inspection of the scavenge air duct was carried out after the engine had cooled down. No damage to the cylinder units was found. However, two of the injection control units (ICUs) were clogged with a tar-like substance. They were overhauled and reinstalled.

During the investigation of this accident, the BSU was especially interested in whether the characteristics of the relatively 'young' low-sulphur heavy fuel oils could have played a role in the development of the fire.

The investigation section of this report begins with two chapters providing fundamental knowledge, one on the subject of limiting sulphur in marine fuels, and one on marine fuels in general. The chapters that follow describe the ship and then the engine, in particular the technical functionality of the ICUs.

Furthermore, the fuel changeover process is considered in greater detail, as are various laboratory analyses. Publications from Wärtsilä (concerning the observed problems, some of them released years before the accident) were also included in the investigation.

A bachelor thesis on the subject of this damage delivered important findings for the investigation report.

2 Safety Recommendations

The following safety recommendations do not constitute a presumption of blame or liability in respect of type, number or sequence.

2.1 Maersk Line

Assessment of ICU wear condition based on leakage rate

The BSU recommends that Maersk Line, as operator of the EBBA MAERSK, assess the condition of an ICU, especially with regard to increased monitoring and complete replacement or overhaul, on the basis of the leakage rates in MGO operation.

When switching from a heavy fuel to a light fuel, the changing leakage rate must be closely monitored, at least until it and the component temperature have stabilised. Based on this leakage rate, a decision must be made as to whether continued operation on light fuel is safe or not.

2.2 WinGD

Re-evaluation of the Letter of No Objection regarding the TBO extension for flex components of the APMM fleet

The BSU recommends that WinGD, as Wärtsilä's legal successor for this type of agreement, re-evaluate the Letter of No Objection with A. P. Møller-Mærsk A/S, taking into account the different deterioration and leakage rates on light fuel operation.