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## **Safety Preparations Prior to Machinery Maintenance**

Notice to: Ship owners, Masters & Officers of merchant vessels

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*Summary*

- Deaths have occurred as a result of machinery and systems being inadequately isolated prior to maintenance.
- Procedures for the isolation of machinery prior to maintenance shall be included in the company's planned maintenance system

### **INTRODUCTION**

The port exhaust gas economiser of a UK flagged vessel ruptured during sea trials killing two people and injuring three more.

The pressure vessel, heated by main engine exhaust gas, was not in use at the time of the accident but had not been drained of water. It was isolated from the steam plant but not vented to atmosphere. The safety valves of both port and starboard economisers had been lifted by means of the easing gear in order to prevent them becoming pressurised whilst the main engines were running at sea. The precaution proved to be inadequate as the port economiser safety valve spindles were seized shut in their guides by an accumulation of corrosion products and boiler sludge deposits etc. The valve position indicators at the easing gear hand-wheels indicated that the valves were fully open.

Over a period of time the port economiser became over-pressurised and ultimately failed. It ruptured in way of corrosion fatigue cracks around the lower circumferential seam discharging hot water and steam over people working in the vicinity.

The MAIB accident report highlighted, amongst other things, inadequate safety precautions in preparation for maintenance and inadequate maintenance / inspection procedures between surveys.

It was recommended that the MCA ensure that the ISM Code audit function 'take account of the lessons learned from this accident'.

### **PREPARATIONS FOR MAINTENANCE**

Section 10 of the ISM Code covers Maintenance of the Ship and Equipment and specifically mentions 'equipment and technical systems the sudden operational failure of which may result in hazardous situations'. The scope of assessment of this section of the Code shall be expanded to encompass those procedures and work instructions that govern the maintenance preparations of machinery that may present a hazard to personnel and the environment during overhaul and inspection periods.

In addition to the manufacturer's planned maintenance instructions the company Safety Management System (SMS) should provide detailed procedures for the isolation and preparation of machinery and systems in readiness for maintenance. The primary consideration of such procedures and instructions being the safety of personnel and the protection of the environment.

Such procedures should include instructions for all machinery and systems that may present a hazard to personnel or the environment when disturbed. Typically, the SMS shall include those systems that remain pressurised and /or at elevated temperatures when shut down and isolated and which may discharge their contents, under pressure, when disturbed. In addition provision shall be made for those systems, such as exhaust gas economisers and composite boilers, that may become pressurised or otherwise rendered hazardous by some supplementary means even when inoperative. The inspection, testing and maintenance of all safety and relief devices included in the specification of such systems should also be included in the planned maintenance procedures.

The company shall develop a means of providing auditable proof of compliance with all such procedures and instructions which may be in the form of check-lists or any other means the company may consider appropriate

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