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## Auxiliary Boilers on Board United Kingdom Registered Ships

Notice to Shipowners, Ship Operators, Masters and Engineer Officers

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1. Recently three serious auxiliary boiler explosions have been reported to the Department and in two cases there was loss of life.

The three boilers were of different types and make.

- (a) Vertical smoke tube boiler—combined exhaust and oil fired.
- (b) Vertical combined water tube/smoke tube oil fired boiler.
- (c) Double evaporation boiler (steam heated low pressure drum exploded).

These boilers contained large amounts of water and at the time of the incident were 10 to 15 years old.

2. On investigation it was noted that all had been suffering from general corrosion and pitting on the waterside for sometime. In two cases large cracks developed from small crevices next to welding seams in the shell plating due to high oxygen content in the boiler water over a period.

3. Special examination of such boilers has been carried out since. In a number of cases cracks/fractures have been found in the lower section of the water space in way of main circumferential seam and downcomers, in way of nozzle connections and burner throats. It appears that the cracks/fractures are a result of a corrosion fatigue mechanism, where a corrosive environment has had a significant effect in conjunction with fatigue stress. Probable causes could be due to boiler water not being properly treated, open feed system and low feed temperature.

4. Shipowners are advised that in case of oil fired, exhaust gas or steam heated type boilers the following items need special attention as they contribute to corrosion fatigue, development of cracks leading to boiler drum leakage and possible rupture.

- (a) Internal condition of drum with regard to corrosion.
- (b) Feed water (hotwell) temperature.
- (c) Boiler feed treatment.

5. Shipowners should advise their ship's staff as follows:

5.1 *When the boilers are in service*

- (a) Proper feed treatment should be administered at all times.
- (b) The boiler water to be kept alkaline at all times.
- (c) It is recommended that the feed water temperature should be kept above 90°C (it is worth noting that O<sub>2</sub> content in feed water may be four times higher at 50°C than it is at 90°C).
- (d) Maker's instructions should be followed.

5.2 *During maintenance, routine cleaning and out of service periods*

- (a) Boilers when not in use should either be kept full of water which is alkaline or completely empty and dry.
- (b) When cleaning: all sludge should be removed, areas mentioned in paragraph 3 above should be thoroughly cleaned by wire brush and scraping and inspected for pitting and cracks. If any cracks are suspected they must be further investigated by magnetic crack detection procedure, dye penetrants or any other suitable methods available.
- (c) If any cracking or severe pitting is observed the Department's local Marine Survey Office should be informed when a passenger ship is concerned. If a cargo ship is involved the Classification Society should be informed. The repairs must be effected to the satisfaction of either the Department or the Classification Society.

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