Maritime & Coastguard Agency

MARINE GUIDANCE NOTE

MGN 464 (M+F)

Life Saving Appliances:- Lifeboats & Rescue boats - Weight Increase from Water Ingress

Notice to all Ship owners; Masters; Deck Officers; Manufacturers of lifeboats and launching appliances and Service Providers

Summary

This MGN applies to ships' lifeboats and rescue boats, excluding inflatable rescue boats and inflatable fast rescue boats.

The MCA is aware of cases where both lifeboats and rescue boats are being found to be overweight. The use of an overweight lifeboat or rescue boat impairs the ability of the equipment to function as designed and approved, and could lead to serious safety implications such as dangerous overloading of the launching appliances beyond their safe working load.

There is widespread use of inherently buoyant material filled compartments and airtight voids in the construction of many lifeboats and rescue boats. Over time, these voids or inherently buoyant material spaces have been shown to experience problems of water ingress and retention which leaves the lifeboat or rescue boat overweight.

Weighing of a vessel's lifeboat or rescue boat is encouraged in order to track weight increase, and halt it at the earliest opportunity. This notice provides guidance on the identification of overweight lifeboats and rescue boats, potential problems associated with them, and the actions to be taken if found on board.

Background

1. All lifeboats and rescue boats have inherent buoyancy created with air tight chambers or are fitted with inherently buoyant material which must not be adversely affected by water, oil or oil products.

2. Inherently buoyant materials, by their nature, should not have water in them owing to the lack of space for water to accumulate and the spaces should be air tight.

3. Expanding foam is often used as inherently buoyant material and in some cases, has been found to shrink in volume or degrade over time. Inevitably small air pockets will also be created during manufacture, depending on the quality control procedures.

4. Once spaces have been created or left for the accumulation of water, there exists the potential for further buoyant material degradation through prolonged exposure to the trapped water. Water absorption of the lifeboat or rescue boat's laminate structure can also lead to a gradual weight increase of the lifeboat or rescue boat.

5. Due to the requirement for the void spaces to provide buoyancy and the further requirement that foam filled voids should not be able to accommodate water, most designs do not have the facility to drain all of the areas within a hull that may have collected water over time.

6. The continued use of lifeboats or rescue boats that are heavier than when built is more likely to result in damage to boat, davits or foundation arrangements, which might not be immediately obvious.

Water Ingress

7. There are many ways in which water can penetrate into the sealed areas of a lifeboat or rescue boat:

a. Cracks or damage in the hull or deck
b. Poorly sealed deck fittings or deck-hull join
c. Standing water in any area which may lead to water absorption and the laminate taking on water over time.

8. If a lifeboat or rescue boat is over its design weight (the lifeboat or rescue boats design weight should be marked on the Declaration of Conformity (DoC)) then the following requirements of an approved lifeboat or rescue boat system could be adversely affected:-

- Hook or release mechanisms Safe Working Load (SWL)
- Davit SWL
- Stability
- Buoyancy
- Self-righting or ability to right after capsize
- Acceleration forces
- Towing capability
- Fuel consumption and range
- Manoeuvrability
- Maximum person capacity
- Davit foundation arrangements

Maintenance

9. Detailed hull and superstructure inspection should be made for cracks, damage, deterioration of gel coat or defective seals and any defects recorded in the planned maintenance system with position, description and date. This is to track spread of cracks or gel coat deterioration. This information should be recorded as part of the Preventative Maintenance Schedule.

10. This task should be in addition to any inspection by the original Equipment Manufacturer (OEM) or approved Service Provider. Checking of the hull and superstructure condition should be incorporated into the mandatory weekly and monthly inspections and where applicable, documented in the vessel's Safety Management System (SMS).

11. Small cracks, gel coat or laminate damage may seem insignificant but when exposed to the high water pressure when a lifeboat or rescue boat is manoeuvring at speed, or prolonged exposure, they could lead to water ingress.

12. During routine maintenance, crew should ensure that drain plugs fitted to the hull are regularly opened and that no standing water is allowed to gather on the stowed lifeboat or rescue boat. Crew should be aware that the removal of the drain plug(s) may only allow the draining of water from a single compartment, if the compartments are not interconnected, resulting in the water in other compartments remaining trapped.

13. Maintenance checks of the lifeboat or rescue boat should identify any damage or poorly sealed fittings, and arrangements for repair should be made.

14. During drills the crew should be aware of the problems highlighted in this guidance notice and monitor boat performance for unusual characteristics that could be attributed to an increase in weight, eg that it feels 'heavy' or 'sluggish' when manoeuvring.

15. Another sign that the boat has experienced a large increase in weight due to water ingress may be difficulty in lifting. The minimum recovery speed for a rescue boat is 0.3m/s, and for a fast rescue boat it is 0.8m/s. This speed may be affected due to the increase in weight.

Weighing a lifeboat or rescue boat

16, Weighing should be done in line with developed procedures which should include a risk assessment before being conducted.

17. Weighing of a vessel's lifeboat or rescue boat at any convenient point is encouraged in order to track weight increase and halt it at the earliest opportunity. The weighing operation could be harmonised with the annual thorough examination conducted by the OEM or approved Service Provider.

18. On board new vessels, it is recommended that newly installed equipment is weighed in order to record the initial weight to be used as a baseline for monitoring increasing weight.

19. At the 5 year load testing of the launching appliances, the OEM or Service Provider may have load cells on board the vessel to measure the 110% overload test weights. The presence of load cells should be utilized in order to weigh the lifeboat or rescue boat prior to 110% overload testing being conducted.

20. The following items should be noted during the weighing in order to conduct the Increase in Lifeboat or rescue boat Weight calculation:

a. The amount of fuel on board
b. The normal equipment as per the lifeboat or rescue boat's inventory and whether it is on board
c. Any excess equipment and its weight

21. It should be ensured that the lifeboat or rescue boat is free from all accessible water ingress by opening any drain valves in the hull and that the bilges are dry on inspection.

Calculating the Increase in Lifeboat or rescue boat Weight

22. The IMO's Life-Saving Appliance Code (LS Code) requires that the equipment Declaration of Conformity (DoC) contain the total Mass fully equipped and fully manned. The DoC should be carried onboard at all times and be presented to the attending Surveyor particularly before any testing including overload testing.

23. The lifeboat or rescue boat Approval Plate should contain the maximum number of persons allowed on board and the assumed person weight (for older lifeboats or rescue boats installed before 1 July 2010 it may be 75kg and for newer lifeboats or rescue boats it may be 82.5kg, depending on the vessel type).

24. The amount of fuel on board needs to be established. The equipment user manual will be able to clarify the fuel tank sizes and required minimum amount to be retained on board at all times to meet the SOLAS requirements. If the tanks are not full then this should be allowed for in the calculation.

25. The normal equipment required to be carried on board, as per the lifeboat or rescue boats inventory, according to the OEM instructions, needs to be on board and accounted for when the boat is weighed.

26. Excess equipment, if carried on board over and above the SOLAS requirements (LSA Code) or OEM inventory, needs to be allowed for in the calculation.

27. If strops or slings are used the weight of these needs to be deducted.

28. A tabular calculation aid, taking all of the above into consideration, is contained in Annex 1.

Actions

29. Annex 2 contains an Action Diagram in order to help the decision making process outlined below.

30. If there is no weight increase in the lifeboat or rescue boat, the operator should continue to monitor the weight of the lifeboat or rescue boat periodically.

31. If a weight increase is found, the operator, in conjunction with the manufacturer of the boat, davit and winches should decide the safe limits of weight increase for the vessel and equipment, having conducted a thorough risk assessment of all of the component parts of the system.

32. If there is a weight increase, the *"Actual Weight of Lifeboat or rescue boat"* (see Annex 1 for calculation) must be checked against the safe working load (SWL) of the system. This could include items such as launching appliance, lifeboat or rescue boat hook and structural connections or lifting points and strops. If any of the SWLs are exceeded by the *"Actual Weight of Lifeboat or rescue boat"*, then the lifeboat or rescue boat must not be used. The manufacturer should be contacted immediately and the MCA notified.

33. If excess equipment is carried, over and above what is required by the LSA Code and the OEMs lifeboat or rescue boat inventory, this may be removed from the lifeboat or rescue boat in order to reduce weight. None of the LSA Code required equipment should be removed from the lifeboat or rescue boat (this is included in the weight found on the DoC). The approved lifeboat or rescue boat cannot be modified in any way to achieve weight savings by any person without the approval of the manufacturer or MCA.

34. In order to ensure that the launching appliances are being tested to the actual weight of the lifeboat or rescue boat that they serve, the weight used for the 5 year load test is the *"Actual Lifeboat or rescue boat Weight"* and not its *"Declaration of Conformity weight".*

35. Before using the *"Actual Lifeboat or rescue boat Weight"* for any testing, the following must be ensured:

a. A risk assessment has been conducted;
b. The "*Actual Lifeboat or rescue boat Weight"* is within the launching appliance or any other parts of the system's SWL;
c. The OEM has confirmed that overloading of the boat past 110% of the *"Declaration of Conformity weight"* will not cause any damage.

36. Records of the periodic weighing of lifeboat or rescue boat should be kept on board. The weight used for load testing and the determination of this weight should also be documented and retained on board. Where weight gain affects the boat performance or exceeds the system SWL, the MCA must be informed.

More Information

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ANNEX 1 to MGN 464

Table for Calculating the Increase in Lifeboat or rescue boat Weight

Fuel Load (% of fuel tank full)		*%*
Fuel Capacity (in litres)		*l*
$\left(\frac{100 - Fuel\ Load\ (\%)}{100}\right) \times Fuel\ Capacity\ (L) \times 0.8 = M_f$		
M_f	*Missing Fuel Correction Factor (from above)*	*kg*
M_{DoC}	*Declaration of Conformity (DoC) Weight*	*kg*
C_{prs}	*Weight of Maximum Persons Allowed (Number of people x weight of people) (See Approval Plate)*	*kg*
C_e	*Extra Equipment Correction Factor (weight of all excess equipment & fuel carried)*	*kg*
C_s	*Weighing Strops Correction Factor (weight of weighing slings or strops)*	*kg*
$M_{weighed}$	*Weighed Weight of Lifeboat or rescue boat*	*kg*
$(M_{weighed} + M_f - C_e - C_s) - (M_{DoC} - C_{prs}) = \Delta M_{DoC}$		
ΔM_{DoC}	*Increase in Lifeboat or rescue boat Weight (from above)*	*kg*
$M_{DoC} + \Delta M_{DoC} + C_e = Actual\ Weight\ of\ Lifeboat\ or\ rescue\ boat$		
Actual Weight of Lifeboat or rescue boat (from above)		*kg*
$Actual\ Weight\ of\ Lifeboat\ or\ rescue\ boat \leq SWL$		
SWL	*Safe Working Load Lifeboat or rescue boat Hook*	*kg*
SWL	*Safe Working Load Davit*	*kg*
SWL	*Safe Working Load Lifting Strops or points*	*kg*

ANNEX 2

Action Diagram