



Life-Saving Appliances - Marine Evacuation Systems and Davit-Launched Liferafts - Single Point of Failure

Notice to all Owners, Masters, Builders, and Crew of UK Passenger Ships

This notice should be read with SOLAS Chapter III, S.I.1999/2721 as amended, S.I.1999/2723 as amended, Directive 2009/45/EC as amended, and S.I.2000/2687 as amended.

Summary

This MGN explains the process to be applied by ship operators to demonstrate the risk mitigation for a single point of failure leading to reduced capacity of Marine Evacuation Systems and Davit-launched Rafts fitted to UK passenger ships.

1. Introduction / Background

1.1 Ships increasingly utilise Marine Evacuation Systems (MES) and Davit-Launched Rafts (DLR) as part of the abandonment technology on board. For certain smaller passenger ships, particularly those on domestic or short international voyages, it is possible during abandonment that a substantial proportion of abandonment may require the chute/slide of an MES or a davit launching system. On some ships there are cases when the entire abandonment capacity could rely on a single MES or DLR on either side of the ship.

1.2 If substantial or sole reliance is placed on MES or DLR for abandonment then it could be possible (if unmitigated) that a failure of one DLR davit or one MES chute/slide system could inhibit or severely hinder abandonment into the associated liferafts. Risk mitigation on ships is managed through on board Safety Management Systems.

2. UK Policy on Transferability of Liferafts Associated with MES or DLR

2.1 There are additional provisions in the applicable passenger ship standards about the need to provide capacity redundancy, which are intended to account for a single point of failure on any one ship side by requiring additional liferafts or the side-to-side transferability of liferafts in certain cases.

2.2 Within SOLAS Chapter III (for passenger ships of less than 500GT carrying less than 200 persons), and in Directive 2009/45/EC, liferafts intended for throw-overboard launching are required to be stowed in a position providing easy side-to-side transfer at a single open deck level. If this stowage arrangement cannot be met, additional liferafts are required. Arrangements for MES and DLR are addressed separately by the applicable requirements but if reliance is



solely or substantially placed on abandonment through MES or DLR then the same principle of either transferability of liferafts or the mitigation of the risk of a single point of failure are equally relevant.

2.3 In order to achieve a similar safety level, in the event of any one MES or DLR abandonment system being rendered inoperable, the remaining liferafts would have to be transferred across the ship (in water if needs be) to achieve the minimum capacity on the undamaged side of the ship.

3. Mitigation of Single Point of Failure – Considerations for Ship Operators and MCA

3.1 Operators of UK passenger ships certificated (or due to be certificated) by the MCA are invited to voluntarily complete a risk assessment of their operation, through Safety Management System (SMS) measures, to determine whether transfer of rafts would be necessary and or possible in the event of a single point of failure of MES or DLR. This is to ensure the MES capacity redundancy is equivalent to the capacity requirements for throw-over liferafts, accounting, where appropriate, for the issue of single point of failure highlighted in this Note.

3.2 The risk assessment completed by the ship operator should consider whether the risks are sufficiently mitigated for the ship or whether remaining liferafts in the event of a single point of failure (damage to or failure of one MES/DLR abandonment system or component) may be transferred across the open deck. If appropriate, moving liferafts through the water to the other (safe) side of the ship in order to provide for the liferafts remaining on the safe side of the ship to be capable of evacuating at least 75% of the total number of persons the ship is certificated to carry may be an option for ships where solely MES or DLR are fitted. Failing these two options, the operator might consider whether additional liferafts are to be provided in order to ensure a minimum 75% redundancy on any one side of the ship in the event that one MES or DLR abandonment system is rendered unserviceable.

3.3 In any case, the ship's Safety Management System should address how the failure of a safety critical system, such as an MES or DLR, is addressed. A single mechanical fault or accidental damage may be foreseeable and the risks of such a failure should be mitigated primarily through appropriate design but also through good on board operational procedures. In developing a risk assessment for determining compliance with the MES or DLR provisions the ship operator is advised to consider mitigation of the following (which are not to be considered an exhaustive list):-

- a) Operating profile of the ship (time of year, proximity to rescue).
- b) Anticipated worst sea state, sea temperature and weather conditions.
- c) Ease with which rafts may be transferred (due to weight or ability to tow).
- d) Suitability of rescue boat and bousing arrangements for raft transfer in-water.
- e) The nature of single point failure likely to occur with the MES system installed.
- f) Number of persons on board, ratio of crew to passengers and crew responsibilities.
- g) The history of operation of the ship, and other vessels in the same operating area.
- h) Integral redundancy of survival craft arrangements (fall-back modes, enhanced maintenance regimes, or layers of redundancy).
- i) Time delay to evacuation that may be incurred by the transfer of rafts, and the availability of suitability trained personnel.

3.4 The suitability of MES liferafts for transfer from one side to the other in the water as part of a risk mitigation strategy will significantly depend on how that liferaft is connected to, and therefore boused-in to the MES. Towing such a liferaft to the other side of the ship is just the beginning of the activity and so any risk mitigation strategy relying on transfer through the water should also account for the practicalities of doing so in order to demonstrate that the end point of a fully boused-in liferaft ready for boarding via the MES is achievable given anticipated limitations such as weather, sea state and number of crew. The easiest method of achieving



such evidence is through a practical trial but the risks of relying on in-water transfer should be adequately considered in the risk assessment.

3.5 Provided the ship operator assures the MCA through demonstrable evidence of reasonable consideration of risks relevant to the proposed arrangements, through at least the points highlighted in this MGN, no actions are required of ship operators besides compliance with the minimum requirements of the Directive.

3.6 Once completed, the risk assessment remains the responsibility of the ship operator but may be reviewed by the MCA at any time. MCA surveyors may assess whether additional measures (such as additional liferafts) should be required to provide an acceptable level of safety in the course of applying the applicable regulations. In all cases, MCA surveyors will look to that the mitigation of risks is applied rather than simply expecting the provision of additional liferafts.

4. Mitigation of Single Point of Failure – Potential Failure Scenarios

4.1 Mitigation against the single failure approach underpins UK policy. This policy requires that sufficient LSA - correctly served by launching appliances, where necessary – is available to ensure dry-shod evacuation in the event of any single failure including loss of any single survival craft, loss of a launching appliance or of any component of an MES system.

4.2 Provision of mitigation against a single point of failure is necessary given the possible reasons for requiring an abandonment and that a single mechanical failure or accidental damage is quite foreseeable, and has been experienced during drills. In the case of MES and DLR, a single point of failure could result in one or more of the following scenarios:-

- a) Failure of control mechanisms leading to the loss of an entire system.
- b) Failure of MES chutes to deploy (or damaged/twisted on deployment), again leading to loss of the entire system, unless each chute of a twin-chute system can be deployed and used completely independently.
- c) Failure of a single chute or davit prior to or after deployment.
- d) Failure of an individual liferaft after deployment.
- e) Inaccessibility due to compromised structural integrity or fire.

4.3 The outcome of a single MES or DLR failure could therefore be much more significant than the simple loss of one survival craft and needs to be fully addressed in the on board safety management procedures as well as on board LSA complement.

More Information

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File Ref: MS/003/086/024

Published: Printers to Insert Month Year
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