Loading of Lifeboats during Drills

Guidance

STEP CHANGE IN SAFETY
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1 Introduction and Acknowledgements

Introduction

The guidance contained in this document was produced by the combined efforts of a cross-industry working group set up in late 2001. The group facilitated an analysis of current practices in loading lifeboats for the purposes of drills, reviewed current legislation & guidance, carried out a full risk assessment and concluded with the production of this guidance on best practice.

This publication is not intended to be a mandate on industry. It is intended to guide dutyholders in adopting best practice when loading lifeboats for the purpose of drills. Where alternative methods can, through risk assessment, or the provision of particular safety systems, be shown to offer an equally effective solution, there is no reason why they should not be adopted.

Whilst every effort has been made to ensure the accuracy of the information contained in this publication, neither Step Change in Safety, nor any of its members will assume liability for any use made thereof.

Acknowledgements

Step Change in Safety would like to thank several individuals from a wide range of companies and organisations who gave resources and time to developing these guidelines. Particular acknowledgement for valuable contribution to the members of the companies and organisations listed below:

Aker Kvaerner
Amerada Hess
Bluewater
BP
Britannia Operators Limited
Chevron Texaco
Conoco Phillips
Exxon Mobil
Halliburton
Health & Safety Executive
KCA Deutag
Maersk Contractors
Marathon
Shell
Smith Rea Energy Ltd
Sparrows Offshore Services
Statoil
Step Change OIMs Network
Step Change Elected Safety Rep’s Network
Step Change Safety Professionals and Advisers Network
Survival Craft Inspectorate Ltd
Talisman
Transocean
Total E&P UK
UKOOA
Universal Sodexho
Purpose and Deliverables

The purpose of the Step Change Lifeboat Loading & Launching Work Group*, and the expected deliverables/outcomes from the group, were agreed at the outset as follows:-

• Produce guidance/proposals on cross industry "best practice" for the loading of lifeboats during drills.
• Understand current legislation and guidance documentation.
• Review technical integrity issues around lifeboats, davits and associated maintenance pennants.
• Gain understanding of current cross industry "drivers" for loading lifeboats.
• Create Risk model to demonstrate factors affecting loading lifeboats with personnel during emergency drills.

*Note: The original workgroup was set up following concerns raised by the workforce in regard to the frequency and the risk associated with the loading of lifeboats for the purpose of drills. In addition, to understand the reasons behind the launching of boats for the purpose of maintenance. After analysis of lifeboat user survey questionnaire it was agreed the focus of the workgroup be on producing guidance on loading lifeboats for the purpose of drills. This document makes reference to maintenance but the guidance contained only relates to the loading of lifeboats during drills.

Overview

This Step Change publication is the final deliverable from the Lifeboat Loading & Launching Work Group. It represents what the Group have agreed as best practice in relation to the loading & launching of lifeboats during drills.

The Group consisted of representatives from installation operators, contracting companies, Step Change networks, the Regulator, UKOOA and other specialists.

This guidance commences with a review of current legislation and technical guidance as it relates to lifeboat drills. It then describes the group’s review of technical integrity issues around lifeboats, davits and the use of maintenance pennants. This is then followed by a discussion of cross-industry "drivers" for the loading of lifeboats during drills.

A key component of this guidance (and a foundation stone for the recommendations) was a cross-industry risk assessment undertaken during September 2002. This risk assessment is summarised herein.

Finally, this guidance includes a copy of SADIE Alert 436, which was published on the SADIE database on 24th April 2003.
**Introduction**

The present situation on lifeboat legislation is complicated by the interaction between offshore installation legislation (under the Health and Safety at Work etc Act 1974) and maritime legislation (under IMD and SOLAS), since some offshore installations can be subject to both regimes depending on what they are doing at any given time. However, as far as possible, the Regulators try to avoid a situation where duty holders have to comply with two different sets of parallel requirements.

Also new legislation has appeared in recent years which has a bearing, such as the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER), and the need for a verification scheme under the Offshore Installations and Wells (Design and Construction etc) Regulations 1996 (DCR), since duty holders normally designate the lifeboat system as a safety critical element. As well as maritime legislation, further health and safety legislation which has a bearing on lifeboats includes the Provision and Use of Work Equipment Regulations (PUWER).

This guide concentrates mainly on legislation as it applies to offshore installations but, as some installations are also classed as ships under certain circumstances, a brief mention is made of this, in particular requirements under IMO SOLAS (The International Convention for the Safety of Life at Sea).

**Lifeboat legislation (offshore installations)**

Equipment and its use on UK offshore installations is subject to the Health and Safety at Work etc Act 1974 (HSWA), and, where an installation is also classed as a ship, to IMO and Merchant Shipping requirements.

Sources of specific legislation and guidance applying to the lifeboat system (lifeboat and davit) on an offshore installation include:

- The Offshore Installations (Prevention of Fire and Explosion and Emergency Response) Regulations 1996 (PFEER) and the associated ACoP (Approved Code of Practice) and guidance (HSE Books L65 1997).
- The Management of Health & Safety at Work Regulations 1999 (MHSWR) and its associated ACoP and guidance (HSE Books L21 2000).

The above legislation applies to fixed installations, and to mobile installations on station.

PFEER and the associated ACoP include the following requirements:

- A “PFEER” assessment has to be carried out.
- The assessment should include the selection of appropriate means of evacuation [eg lifeboat system] including type, capacity and location.
- There has to be a sufficient number of people on the installation competent to undertake emergency duties and operate relevant equipment.
- Everyone on the installation has to be provided with adequate instruction and training in the appropriate action to take in an emergency.
- Everyone on the installation has to be provided with notification of its contents as are sufficient for them.
- Arrangements have to be made to ensure, so far as is reasonably practicable, the safe evacuation of all persons.
- The lifeboat and associated plant has to be so constructed as to be suitable for the purpose for which it is provided.
- The lifeboat and associated plant has to be maintained in an efficient state, in efficient working order and in good repair.
- A suitable written scheme has to be prepared and operated to ensure that relevant plant on the installation [eg the lifeboat system] is subject to systematic examination by a competent and independent person. Work done to comply with this requirement may contribute to the SCR verification scheme.

The lifeboat system is normally classified as a safety critical element. SCR requires a verification scheme to ensure that a safety critical element is suitable and remains in good repair and condition. The verification scheme will contribute to ensuring compliance with PFEER.
MHSWR includes a requirement that employers undertake risk assessments for work activities [such as a lifeboat drill] for the purpose of identifying the measures which need to be put in place to prevent accidents and to protect people against accidents.

**Lifeboat legislation (offshore installations operating as a ship)**

This Step Change guide is not intended to cover maritime legislation in detail. However, as some floating installations will also, at times, be classed as ships, a brief overview of SOLAS requirements will be provided, in so far as they relate to lifeboats.

The main objective of regulations made under the SOLAS Convention is to specify minimum standards for the construction, equipment and operation of ships, compatible with their safety. Flag States are responsible for ensuring that ships under their flag comply with its requirements, and a number of certificates are prescribed in the Convention as proof that this has been done.

The current SOLAS Convention includes Articles setting out general obligations, amendment procedure and so on, followed by an Annex divided into 12 Chapters. “Life Saving Appliances and Arrangements” are covered under Chapter III.

Under the 1996 revision of SOLAS, specific technical requirements were moved to a new International Life-Saving Appliance (LSA) Code, made mandatory under Regulation 34, which states that all life-saving appliances and arrangements shall comply with the applicable requirements of the LSA Code. These are implemented in maritime law by the International Maritime Organisation (IMO).

The main regulations which are of interest to operators of floating offshore installations (in so far as the scope of this guide is concerned) are Regulations 19 and 20 in Chapter III. These may also be applied as good practice on fixed installations, since much of the equipment is common.

Regulation 19 covers “Emergency training and drills”. This includes the requirements for: familiarity with safety installations, practice musters, drills, abandon ship drill, fire drills, on-board training and instructions and record-keeping.

Regulation 20 covers “Operational readiness, maintenance and inspections”. This includes the requirements for; operational readiness; maintenance; maintenance of falls; spares and repair; weekly inspections; monthly inspections; servicing of inflatable liferafts, inflatable lifejackets, marine evacuation systems and inflated rescue boats; periodic servicing of hydrostatic release units, marking of stowage locations and; periodic servicing of launching appliances and on-load release gear.
Strategy adopted by Work Group

The strategy which was adopted by the Step Change Work Group was to; identify all European manufacturers of lifeboats and obtain information from them and; to review literature pertinent to lifeboat operations (in particular lifeboat drills).

Lifeboat OEM Study

The lifeboat OEM (Original Equipment Manufacturers) study was undertaken by members of the Work Group and it achieved the following:

- All European manufacturers of lifeboats were identified and an approach made to ask for information.
- Information was sought in writing and technical clarification achieved through discussions.
- Responses were collated and the findings fed back to the Work Group.

The following manufacturers participated in this study:

- Schat Harding
- Survival Craft Inspectorate
- Safety Systems International
- Verhoef Aluminium Scheepsbouw

It was identified that there was a wide variety of types of lifeboat in use in the industry although they could be broadly classified by launch category as either davit launched or freefall (e.g. Verhoef specialise in freefall boats whilst Schat Harding manufacture both types). Different materials are used for construction (GRP is typical but some freefall boats are constructed in aluminium).

General findings from this study were as follows:

- The load path of the suspended boat is designed to take the full load of the boat plus the POB complement.
- Drills should be regularly undertaken to familiarise personnel with mustering and loading the boat.
- On davit launched boats one manufacturer recommended not fitting maintenance pennants during drills because they felt that there was a danger of them being left in place in error or of becoming stuck if the boat lowered.
- On GRP hulls, ultra violet from sunlight can degrade the structure but this typically would be in excess of 10 years from new and could be as much as 35 years.

The Work Group debated these points and they are considered further in the Risk Assessment (Section 6) and the SADIE Alert (Appendix 1).

Literature Review

Relevant literature, which was reviewed and discussed by the Work Group, was as follows:

- Safety Alerts from SADIE (102, 254, 274, 357), HSE (1.66), IMCA (05/02), IADC (02-31).
- “Structural design basis determination of TEMPSC lifeboats”, Smedley, PAFA Consulting.
- OCIMF “Results of a survey into lifeboat safety” July 1994.
- MAIB Safety Study 1/2001 “Review of Lifeboat and launching systems accidents”.
- OCIMF “Lifeboat Incident Survey - 2000"
5 discussion of cross-industry drivers for loading lifeboats

Strategy adopted by Work Group

The strategy which was adopted by the Step Change Work Group was to use a questionnaire based approach, involving as many offshore installations as possible, to elicit information on current practices for loading lifeboats for the purposes of drills.

Lifeboat User Study

The lifeboat user study was undertaken by members of the Work Group and it achieved the following:-

• 120 questionnaires were issued.
• 29 responses were received of which 22 were usable.
• Lifeboat types covered in the 22 responses were; Watercraft (ie Schat Harding) (18), Verhoef freefall (1), Norsafe (1), Balmoral (1) and Welin Lambie (1).

The key questions asked were as follows: -

• Should lifeboats be fully loaded for the purposes of drills?
• When loading lifeboats for drills, should the maintenance pennants be fitted?
• How do you inspect/maintain the load path?
• What is the Safe Working Load (SWL) of your maintenance pennants?

Conclusions from User Study

The Working Group collated the results from the questionnaires received and the following conclusions were drawn:-

• A survey response of 22 out of 140 represented a low response rate hence caution needed to be exercised about the validity of the results.
• One manufacturer dominated the responses.
• Only 18% of those who responded (4 responses) admitted to fully loading the lifeboats for the purposes of drills and all of these stated that they used maintenance pennants during these drills.
• The rationale for the load rating of maintenance pennants was unclear across the survey population, with a number of inconsistencies being evident.
• A number of other inconsistencies were evident from the responses. These included; the use and configuration of maintenance pennants, the policy for load testing, the procedures for load path inspections, the load ratings of the davits etc.

The Work Group debated these responses and they became a core focus for discussions at subsequent Working Group meetings. The key issues were then debated and evaluated at the cross-industry risk assessment, the outcomes of which are presented in Section 6 of this guide and in the SADIE Alert (Appendix 1).
Background to Risk Assessment

Once the Work Group had gathered the data on current systems and operational practices, it was agreed that a risk assessment should be undertaken to evaluate risks associated with loading lifeboats for the purposes of drills, and to weigh these against the benefits offered by the drills.

The process which was recommended by the group was to arrange a professionally facilitated one-day workshop with as wide a representation as possible present. This would include operators of fixed and mobile installations, designers, OIMs, Safety Representatives, Coxswains, the Regulator, manufacturers etc.

Overview of Workshop

The Risk Assessment workshop was held at Aker-Kvaerner offices on Thursday September 26th 2002. A wide cross-section of people was present with over 30 participating (list can be found on Step Change website). The Risk Assessment was facilitated by Pat McIntosh of Smith Rea Energy Ltd who was also responsible for producing a clear analysis of the outcomes. The Work Group are grateful for his help.

The deliverable from the risk assessment workshop was stated to be “Create a risk model to demonstrate factors affecting loading lifeboats with personnel during emergency drills”.

It was agreed that the scope of the risk assessment should cover “The risks involved with the loading and launching of lifeboats for the purposes of drills and maintenance. This should include both davit launched lifeboats (with and without maintenance pennants in place) and freefall lifeboats”.

Structure to Risk Assessment

The structure of the day was as follows:-

- Introductions
- Background and objectives
- Overview on current Lifeboat issues
- Process description (ie how would the Risk Assessment be conducted)
- Risk brainstorm (in groups)
- Risk classification
- Risk review
- Risk comparison
- Brainstorm alternative solutions (pair-wise comparison)
- Rank alternative solutions
- Discussion and close

Outcomes from Risk Assessment Workshop

1. Risk Brainstorming/classification

The risk classification exercise involved the allocation of risks identified by all workshop participants to appropriate categories on a 5 x 5 risk matrix (probability vs consequence). Three themes were assessed:

- Risks in an emergency evacuation where no lifeboat drills have been undertaken by the crew
- Risks in an emergency evacuation where fully loaded lifeboat drills have been undertaken by the crew
- Risks associated with full crew loading of lifeboats during drill exercises.

These are shown in Diagrams 1, 2 and 3 respectively.

Diagram 1 represents the risk position where asset crews are involved in an emergency evacuation without having previously been involved in any form of drill or lifeboat loading training.

Diagram 2 represents the impact of current lifeboat drills on the base case (no drills) scenario.

Diagram 3 summarises risks associated with carrying out fully loaded lifeboat drills offshore.
### LIFEBOAT LOADING RISK ASSESSMENT MATRICES

#### DIAGRAM 1 - EVACUATION RISKS - NO DRILLS UNDERTAKEN

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Probability</th>
<th>Likelihood</th>
<th>Probability</th>
<th>Likelihood</th>
<th>Consequence</th>
<th>Frequency</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Extremely Significant</td>
<td>Individuals unable to learn in a drill without familiarisation in an emergency</td>
<td>Inappropriate loading (F/F)</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Multiple personnel fatalities</td>
<td>Multiple personnel fatalities</td>
</tr>
<tr>
<td>4</td>
<td>Major</td>
<td>Inadvertently launch lifeboat (F/F)</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Single fatality</td>
<td>Single fatality</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
<td>Inadvertently launch lifeboat (F/F)</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Minor injury to personnel</td>
<td>Minor injury to personnel</td>
</tr>
<tr>
<td>2</td>
<td>Minor</td>
<td>Muster list - loading numbers not controlled</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Discomfort to personnel</td>
<td>Discomfort to personnel</td>
</tr>
<tr>
<td>1</td>
<td>Insignificant</td>
<td>Muster list - loading numbers not controlled</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Discomfort to personnel</td>
<td>Discomfort to personnel</td>
</tr>
</tbody>
</table>

#### DIAGRAM 2 - EVACUATION RISKS - FULLY LOADED DRILLS UNDERTAKEN

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Probability</th>
<th>Likelihood</th>
<th>Probability</th>
<th>Likelihood</th>
<th>Consequence</th>
<th>Frequency</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Extremely Significant</td>
<td>Individuals unable to learn in a drill without familiarisation in an emergency</td>
<td>Inappropriate loading (F/F)</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Multiple personnel fatalities</td>
<td>Multiple personnel fatalities</td>
</tr>
<tr>
<td>4</td>
<td>Major</td>
<td>Inadvertently launch lifeboat (F/F)</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Single fatality</td>
<td>Single fatality</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
<td>Inadvertently launch lifeboat (F/F)</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Minor injury to personnel</td>
<td>Minor injury to personnel</td>
</tr>
<tr>
<td>2</td>
<td>Minor</td>
<td>Muster list - loading numbers not controlled</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Discomfort to personnel</td>
<td>Discomfort to personnel</td>
</tr>
<tr>
<td>1</td>
<td>Insignificant</td>
<td>Muster list - loading numbers not controlled</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Communication - command and control weaknesses</td>
<td>Discomfort to personnel</td>
<td>Discomfort to personnel</td>
</tr>
</tbody>
</table>

#### DIAGRAM 3 - FULLY LOADED DRILLS RISKS

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Probability</th>
<th>Likelihood</th>
<th>Probability</th>
<th>Likelihood</th>
<th>Consequence</th>
<th>Frequency</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Extremely Significant</td>
<td>Unattended start of drills</td>
<td>Unattended start of drills</td>
<td>Overworking into exhaustion</td>
<td>Overworking into exhaustion</td>
<td>Multiple personnel fatalities</td>
<td>Multiple personnel fatalities</td>
</tr>
<tr>
<td>4</td>
<td>Major</td>
<td>Inadvertently launch lifeboat (F/F)</td>
<td>Overworking into exhaustion</td>
<td>Overworking into exhaustion</td>
<td>Overworking into exhaustion</td>
<td>Single fatality</td>
<td>Single fatality</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
<td>Unattended start of drills</td>
<td>Overworking into exhaustion</td>
<td>Overworking into exhaustion</td>
<td>Overworking into exhaustion</td>
<td>Serious injury to personnel</td>
<td>Serious injury to personnel</td>
</tr>
<tr>
<td>2</td>
<td>Minor</td>
<td>Inadvertently launch lifeboat (Davit)</td>
<td>Overworking into exhaustion</td>
<td>Overworking into exhaustion</td>
<td>Overworking into exhaustion</td>
<td>Minor injury to personnel</td>
<td>Minor injury to personnel</td>
</tr>
<tr>
<td>1</td>
<td>Insignificant</td>
<td>Inadvertently launch lifeboat (Davit)</td>
<td>Overworking into exhaustion</td>
<td>Overworking into exhaustion</td>
<td>Overworking into exhaustion</td>
<td>Discomfort to personnel</td>
<td>Discomfort to personnel</td>
</tr>
</tbody>
</table>
2. Alternative drill exercises

An evaluation of alternatives to current drill practices was also undertaken in the workshop. This adopted a technique of paired preferences, high scoring alternatives offering the most attractive option. Two themes were assessed (see Diagrams 4 and 5):

- Davit lifeboats training preferences
- Freefall lifeboats training preferences

The baseline scenario for the paired preference exercise was “fully loaded drills offshore”. This was then compared with the following scenarios:

- Fully loaded drills onshore
- Partial loaded drills (% of lifeboat capacity)
- Partial loaded drills (fixed number eg 5)
- Fully loaded simulation on deck/cradle offshore
- Current BOSIET
- Training small groups - familiarisation with rafts, lifeboats etc.
- Re-introduce boats into FOET
- Offshore installation induction
### AN EVALUATION OF ALTERNATIVES TO DRILL PRACTICES

#### DIAGRAM 4 - Davit launched Lifeboats - Paired Preference Exercise

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Fully loaded drills offshore</th>
<th>Fully loaded drills onshore</th>
<th>Partial loaded drills (% of boat capacity) offshore</th>
<th>Fully loaded simulation on deck/cradle offshore</th>
<th>Current BOSiET</th>
<th>Training small groups - familiarisation with rafts, lifeboats etc.</th>
<th>Offshore installation induction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully loaded drills offshore</td>
<td>N</td>
<td>N</td>
<td>MS</td>
<td>N</td>
<td>MS</td>
<td>S</td>
<td>MS</td>
</tr>
<tr>
<td>Fully loaded drills onshore</td>
<td>MS</td>
<td>N</td>
<td>MS</td>
<td>MS</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Partial loaded drills (% of boat capacity) offshore</td>
<td>S</td>
<td>MW</td>
<td>N</td>
<td>N</td>
<td>MS</td>
<td>N</td>
<td>S</td>
</tr>
<tr>
<td>Partial loaded drills - fixed number (eg. 5)</td>
<td>S</td>
<td>MW</td>
<td>N</td>
<td>N</td>
<td>MS</td>
<td>N</td>
<td>S</td>
</tr>
<tr>
<td>Fully loaded simulation on deck/cradle offshore</td>
<td>MS</td>
<td>N</td>
<td>MS</td>
<td>N</td>
<td>MS</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Current BOSiET</td>
<td>MS</td>
<td>MS</td>
<td>MS</td>
<td>MS</td>
<td>N</td>
<td>W</td>
<td>MW</td>
</tr>
<tr>
<td>Training small groups - familiarisation with rafts, lifeboats etc.</td>
<td>S</td>
<td>MW</td>
<td>N</td>
<td>N</td>
<td>MS</td>
<td>N</td>
<td>S</td>
</tr>
<tr>
<td>Re-introduce boats into FOET</td>
<td>S</td>
<td>W</td>
<td>N</td>
<td>N</td>
<td>W</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>Offshore installation induction</td>
<td>S</td>
<td>MW</td>
<td>W</td>
<td>MW</td>
<td>S</td>
<td>N</td>
<td>W</td>
</tr>
</tbody>
</table>

#### Legend

<table>
<thead>
<tr>
<th>Strength</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much Stronger (MS)</td>
<td>Evidence is available to indicate that the column 'A' value measure is strongly dominant over the row '1' value measure</td>
</tr>
<tr>
<td>Stronger (S)</td>
<td>Experience and judgement favour the column 'A' value measure over the row '1' value measure</td>
</tr>
<tr>
<td>Neutral (N)</td>
<td>Both value measures contribute equally to the project</td>
</tr>
<tr>
<td>Weaker (W)</td>
<td>Experience and judgement favour row '1' value measure over the column 'A' value measure</td>
</tr>
<tr>
<td>Much Weaker (MW)</td>
<td>Evidence is available to indicate that the row '1' value measure is strongly dominant over the column 'A' value measure</td>
</tr>
</tbody>
</table>

* Strong preferences
### AN EVALUATION OF ALTERNATIVES TO DRILL PRACTICES

**DIAGRAM 5 - FREEFALL LIFEBOATS - PAIRED PREFERENCE EXERCISE**

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Fully loaded drills offshore</th>
<th>Fully loaded drills onshore</th>
<th>Partial loaded drills (x% of boat capacity) offshore</th>
<th>Partial loaded drills - fixed number (eg. 5)</th>
<th>Fully loaded simulation on deck/cradle offshore</th>
<th>Current BOSET</th>
<th>Training small groups - familiarisation with rafts, lifeboats etc</th>
<th>Re-introduce boats into FOET</th>
<th>Offshore installation induction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully loaded drills offshore</td>
<td>N</td>
<td>M W</td>
<td>W</td>
<td>N</td>
<td>W</td>
<td>MW</td>
<td>N</td>
<td>MW</td>
<td>W</td>
</tr>
<tr>
<td>Fully loaded drills onshore</td>
<td>M S</td>
<td>N</td>
<td>N</td>
<td>S</td>
<td>S</td>
<td>N</td>
<td>S</td>
<td>S</td>
<td>17.5%</td>
</tr>
<tr>
<td>Partial loaded drills (x% of boat capacity) offshore</td>
<td>S</td>
<td>W</td>
<td>N</td>
<td>N</td>
<td>W</td>
<td>N</td>
<td>W</td>
<td>W</td>
<td>4.9%</td>
</tr>
<tr>
<td>Partial loaded drills - fixed number (eg. 5)</td>
<td>N</td>
<td>W</td>
<td>N</td>
<td>N</td>
<td>W</td>
<td>MW</td>
<td>N</td>
<td>MW</td>
<td>W</td>
</tr>
<tr>
<td>Fully loaded simulation on deck/cradle offshore</td>
<td>S</td>
<td>N</td>
<td>S</td>
<td>S</td>
<td>N</td>
<td>N</td>
<td>S</td>
<td>N</td>
<td>S</td>
</tr>
<tr>
<td>Current BOSET</td>
<td>M S</td>
<td>S</td>
<td>S</td>
<td>M S</td>
<td>N</td>
<td>N</td>
<td>S</td>
<td>N</td>
<td>22.3%</td>
</tr>
<tr>
<td>Training small groups - familiarisation with rafts, lifeboats etc</td>
<td>N</td>
<td>W</td>
<td>N</td>
<td>N</td>
<td>W</td>
<td>W</td>
<td>N</td>
<td>W</td>
<td>2.7%</td>
</tr>
<tr>
<td>Re-introduce boats into FOET</td>
<td>M S</td>
<td>N</td>
<td>S</td>
<td>M S</td>
<td>N</td>
<td>N</td>
<td>S</td>
<td>N</td>
<td>20.1%</td>
</tr>
<tr>
<td>Offshore installation induction</td>
<td>S</td>
<td>W</td>
<td>S</td>
<td>S</td>
<td>W</td>
<td>W</td>
<td>S</td>
<td>W</td>
<td>11.9%</td>
</tr>
</tbody>
</table>

**Legend**

- **Much Stronger (MS)**: Evidence is available to indicate that the column ‘A’ value measure is strongly dominant over the row ‘1’ value measure.
- **Stronger (S)**: Experience and judgement favour the column ‘A’ value measure over the row ‘1’ value measure.
- **Neutral (N)**: Both value measures contribute equally to the project.
- **Weaker (W)**: Experience and judgement favour row ‘1’ value measure over the column ‘A’ value measure.
- **Much Weaker (MW)**: Evidence is available to indicate that the row ‘1’ value measure is strongly dominant over the column ‘A’ value measure.

* Strong preferences
3. Analysis of Results - The Benefit of Drills

The safety risk associated with each of the drill strategies was calculated using the impact and likelihood ranges defined on the risk matrices. An industry accepted formula for assessing the aversion to multiple fatalities was then used to combine the consequence impacts onto a consistent scaling. Using this scale the safety risk for each drill strategy was evaluated and compared. Whilst it was not possible to confidently predict the exact evacuation risk level associated with each strategy (i.e., those who have experienced loading in drills and those who have not), it was possible to produce a comparison against a range of possible outcomes.

**Diagram 6 - Evacuation Risk Between Crews Who have Experienced Lifeboat Loading and Those Who have Not**

Diagram 6 shows that there is a significant improvement in the risk profile when drills are undertaken.

4. Analysis of Results - The Risks vs the Benefits of Drills

The final stage of the risk assessment was to evaluate the benefits of undertaking drills (in terms of yielding a reduction in evacuation risks) against the risks in actually carrying out the drills. In particular, this exercise focused on the risks of partially loading vs fully loading boats during drills.

Diagram 7 shows the risk benefit which can be achieved by partially loading boats during drills.

**Diagram 7 - Overall Risk Profile (Risk vs Benefit) When Partially Loading Lifeboats for Drills**

5. Analysis of Results - Paired Preference Exercise

The paired preference exercise (Diagram 4) demonstrated a strong preference for the following options in relation to davit-launched lifeboats:

- Undertaking fully loaded drills onshore.
- Undertaking fully loaded drills on deck or on a solidly supported cradle from which it cannot fall.

These preferences recognised the benefit of undertaking fully loaded drills, but removed the risks evident when the boat is hanging in the davits (even with maintenance pennants fitted). The paired preference exercise (Diagram 5) demonstrated a strong preference for the following options in relation to freefall lifeboats:

- Undertaking fully loaded drills onshore.
- Undertaking fully loaded drills during BOSIET.
- Re-introduce lifeboats into the FOET.

These preferences recognised the benefit of undertaking fully loaded drills, but removed the risks evident when the boat is suspended on the maintenance ram. They also recognise the benefit of formal training under the BOSIET and FOET.

**Note:** A copy of the Lifeboat Loading Workgroup Workshop Risk Assessment can be found on the Step Change website (www.stepchangeinsafety.net)
6. Conclusions from the Risk Assessment

The outcomes of the risk assessment workshop were discussed at length in a Working Group meeting on 31st October 2002. The conclusions were summarised as follows:

- Lifeboat loading drills provide a significant reduction in evacuation risk.
- Training exercises carried out offshore on installation survival craft expose crew members to risk.
- The evacuation risk reduction achieved by offshore drills is greater than the risk experienced due to offshore drills.
- Alternative methods for achieving crew training are preferred to the offshore drills option.
- Further risk reduction can be achieved by optimising crew training methods.

The Work Group discussed the key points in these conclusions. It was agreed that the key improvement lay in optimising crew training methods to achieve further risk reduction. The group discussed whether or not lifeboats should be fully loaded during drills and, if not, what should be the maximum allowable number in the boat? It was agreed that the practice recommended in the final SADIE Alert (5 POB maximum) should be formally endorsed.

The subject of ad-hoc workers was also considered, noting that current practice tended to miss them out particularly if they were only on site for a day or two. The key would be to capture them during installation inductions. The Work Group endorsed a 3-stage approach to the issue, as follows:

1) Offshore Induction to include familiarisation with lifeboat loading for all persons coming on to the installation (subject to maximum POB of 5 at any one time with boat suspended on falls, maintenance pennants optional).

2) Offshore drills (boat suspended on falls, maintenance pennants optional) to include familiarisation with lifeboat loading subject to maximum POB of 5 at any one time.

3) Fully loaded drills to be carried out only in an unsuspended state ie not over water and with boat solidly supported either on the deck or in other suitable hard landing area (or onshore).

7. SADIE Alert

The final outcome of the Group’s work, and in particular the risk assessment, was the issue of a SADIE Alert on 24th April 2003. This is shown in Appendix 1 of this guide.
Loading of Lifeboats during Drills (revised)

Publication Date: 24/04/2003

Abstract: This notice updates a previous SADIE alert (254) and it makes recommendations for the loading of lifeboats with personnel and for the use of maintenance pennants during drills.

Activity Location: Lifeboats (davit launched, freefall).

Activity Type: Emergency exercises/drills.

Keywords: Lifeboat, exercise, loading personnel, maintenance pennants.

Background: Lifeboats have been involved in a number of serious/fatal incidents during maintenance operations and drills (e.g., see SADIE 102) when the boat has inadvertently fallen into the sea. The following recommendations for loading lifeboats with personnel, and for the use of maintenance pennants during drills, have been made for the continued practice of lifeboat drills among crews. These recommendations reflect the outcomes of a risk assessment. These outcomes will be published, along with others from the work of the Step Change Lifeboat Loading & Launching Work Group, in a Step Change Guidance document during 2003.

Recommendations:

1. Individuals should be offered the opportunity to become familiar with lifeboats during onshore induction and by means of regular drills, however:

2. The launching of lifeboats with any personnel on board should not be carried out for the purpose of drills.

3. The maximum number of persons in an in-situ lifeboat at any given time be restricted to an absolute maximum of 5 (five) persons, on condition that this is within the Safe Working Load of the maintenance ram for free-fall lifeboats, or maintenance pennants for davit-launched lifeboats, should this option be selected (see 7 below).

4. Fully loaded drills are only to be carried out when a lifeboat cannot fall eg with the lifeboat in an unsuspended state, not over water and with the boat solidly supported either on the deck or in other suitable hard landing area (or onshore).

5. Notwithstanding (3) and (4) above, when a Duty Holder has decided to permit lifeboats to be loaded to their full capacity then a full written risk assessment must be carried out and justification should be provided by way of outlining the benefits to be achieved, identifying the safety measures in place and confirming that these are suitable to ensure the safety of the personnel involved. All personnel must be in agreement with this.

6. When carrying out the above assessment it is incumbent on the Duty Holder to take account of the number, type and integrity of the various securing devices and measures which may be put in place. These differ in extent and effectiveness dependant on the type of launching appliance and the specific devices available on each installation.

7. For davit launched lifeboats, maintenance pennants may be fitted at times when persons are in the lifeboat but this is at the discretion of the Company on whose installation the lifeboat is located and it is dependent on the activity being undertaken.

Note: for maintenance activity such as the testing of release gear the fitment of maintenance pennants would be mandatory.

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appendix 2: key terms and definitions

ACoP  Approved Code of Practice

BOSIET  The Basic Offshore Safety Induction and Emergency Training

DCR  The Offshore Installations and Wells (Design and Construction) Regulations 1996

Drill(s)  An event to practice and train for an emergency response also known as an 'exercise'

Duty Holder  The company responsible for the operating of the installation

FOET  Further Offshore Emergency Training

F/F  Freefall lifeboat

GRP  Glass Reinforced Plastic

HSE  Health and Safety Executive

HSWA  Health and Safety at Work Act 1974

IADC  International Association of Drilling Contractors

IMCA  International Maritime Contractors Association

IMO  International Maritime Organisation

LOLER  Lifting Operations and Lifting Equipment Regulations 1998

LSA Code  Merchant Shipping Life Saving Appliances Regulations

MCA  Maritime and Coastguard Agency

MHSWR  Management of Health and Safety at Work Regulations 1999

MAIB  Marine Accident Investigation Branch

OCIMF  Oil Companies International Marine Forum

OEM  Original Equipment Manufacturer

OIM  Offshore Installation Manager

PFEER  The Offshore Installations (Prevention of Fire and Explosion and Emergency Response) Regulations 1995

POB  Personnel On Board

PUWER  Provision and Use of Work Equipment Regulations 1998

Regulator  The Health and Safety Executive Offshore Safety Division

Risk Assessment  A system used for the identification of the hazards associated with a particular activity, assessing the risks and identifying the controls/precautions required to mitigate the risk

SADIE  Safety Alert Database Information Exchange

SCR  The Offshore Installations Safety Case Regulations 1992

SOLAS  International Convention for the Safety Of Life at Sea

SWL  Safe Working Load

TEMPSC  Totally Enclosed Motor Propelled Survival Craft

UKOOA  United Kingdom Offshore Operator’s Association