Title	Big people in lifeboats and lifesaving appliances		
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Introduction

The average weight and size of people working in the UK offshore industry has continued to increase since the first issue of this offshore information sheet in 2008. There is a significant risk that existing design loads, equipment specifications and space available in totally enclosed motor propelled survival craft (TEMPSC), other lifesaving appliances, and associated emergency equipment may be exceeded in 2025.

This information sheet provides guidance for dutyholders regarding actions and measures to ensure hazards associated with the increasing size and weight of offshore workers are suitably controlled and mitigated.

Background

HSE first published this information sheet (OIS 12/2008) to provide dutyholders with guidance relating to the increasing weight of UK offshore workers, and the associated adverse impact on evacuation and escape provisions provided on offshore installations.

In 2005, the UK Civil Aviation Authority (CAA) conducted a survey of the weight of helicopter passengers using Vantage data. The CAA survey showed the average weight of people travelling to and from UK oil and gas installations had increased to 87.8kg since the previous survey completed in 1984. The 2005 survey resulted in formal recognition within the industry that the weight of offshore personnel in the UK sector exceeded existing SOLAS design requirements for the weight of passengers in relation to marine evacuation systems. New guidance was required.

Within the original issue of OIS 12/2008, HSE defined a new passenger design weight of 98kg for all lifeboats installed on UK installations. The design weight was greater than the average worker weight of 87.8kg calculated by the CAA, as it included suitable allowances for the additional weight of evacuation personal protective equipment (PPE), and for the natural, random variation in average weight associated with smaller sample populations of personnel such as lifeboat passengers.

In 2023, Offshore Energies UK (OEUK) conducted a further study in relation to the average body weight of UK offshore workers using Vantage helicopter passenger weight data from December 2022. OEUK then held an industry HAZID workshop in September 2023, which recognised that the

average offshore worker weight had increased further since 2008. The potential increase in average weight was sufficient for the HAZID workshop team to conclude that the existing design weight of 98kg may no longer be suitable for all evacuation and escape systems installed on UK offshore installations.

In August 2024, OEUK published a summary report of the statistical analysis of the weight of UK offshore workers. The report analysed UK offshore worker population weight and shoulder width data for 38,933 personnel, taken anonymously from the Vantage system. It was demonstrated that the average weight of UK offshore workers in 2022 had increased to 96.56kg, with an associated standard deviation of 15.59kg. The calculated weight included the weight of normal offshore clothing but did not include the additional weight of PPE (lifejacket and immersion suit) that may be worn to enable evacuation and escape.

The OEUK report also confirmed that approximately 33% of the UK offshore workforce are heavier than 100kg, and a further 5% of the offshore population is heavier than 125kg.

The average size and width of UK offshore workers has also increased. Statistical analysis of the Vantage 2022 shoulder width measurement data indicates that the average width of UK offshore workers in 2022 was 49.56cm with an associated standard deviation of 3.26cm. Therefore, the average shoulder width of UK offshore workers exceeds the allocated seat width per passenger in many existing SOLAS compliant lifeboat designs, which can be 43cm or 48cm, depending on the date of construction.

The objective of the original offshore information sheet in 2008 was to ensure the maximum loaded weight of a TEMPSC installed on a UK offshore installation would not exceed the TEMPSC safe working load. This latest revision of this information sheet confirms updated requirements to address this same issue. However, it also extends HSE guidance to address design weights for all evacuation and escape systems, and other related considerations including lifeboat seat width, the load capacity of seatbelts and restraints, and the impact of increasing weight and size on other LSA equipment used offshore.

For compliance with the Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations (PFEER), and particularly Regulations 5, 15 and 19, dutyholders need to consider and address the following aspects of hazard management.

Design weights for evacuation and escape systems

The OEUK statistical analysis of the weight of offshore workers published in August 2024 states that the average weight of UK offshore workers in 2022 was 96.56kg. It also predicts that the average offshore weight of offshore workers may continue to increase, at least in the short term.

The previous version of this information sheet n 2008specified a new design weight of 98kg to be uniformly applied to all lifeboats, based on the average worker weight at the time of 87.8kg. However, it is now acknowledged that the definition of a ‘one size fits all’ approach to specifying the design weight for lifeboats does not allow dutyholders to optimise their existing lifeboat provisions. Design weights are naturally lower for lifeboats with larger passenger capacities, PPE

weight varies from installation to installation, and the allowance made for any increase in average weight of passengers will vary according to the remaining installation lifetime.

HSE require dutyholders to calculate updated design weights for the evacuation and escape systems onboard their offshore installations using the best available weight data for UK offshore workers. The design weight calculation methodology used by dutyholders should be equivalent to the general methodologies described in the OEUK report 'Anthropometry of Offshore Personnel Statistical Analysis of the Weight of UK Offshore Workers'. A suitable design weight calculation methodology and worked examples are provided in Appendix A of this information sheet.

The maximum allowable passenger capacity of the lifeboats and life-rafts on each installation should be adjusted by dutyholders in line with the updated design weight, to ensure the risk of overloading a lifeboat during an emergency is as low as reasonably practicable.

HSE recognise there is natural variability in the average weight of worker populations across different offshore installations. Therefore, dutyholders have the option to either:

- use the average weight and standard deviation data presented by OEUK in their 2024 statistical analysis to calculate new design weights, or
- calculate the average weight and standard deviation of the actual worker population on their installation using recent Vantage weight data.

Where dutyholders choose to calculate the average weight and standard deviation for the actual population of offshore workers on the installation, the data set must include a minimum of 3 months of weight data. The data set should account for all personnel who visit the installation within the indicated data reference period.

Given the upward trend in body weight of offshore workers, it may be prudent for dutyholders to allow a suitable margin for further potential weight increase to the calculation of the new design weight. However, HSE will assess control measures on the data available at time of assessment or inspection.

The unladen weight of lifeboats should be physically measured as part of the design weight calculation process, particularly if the margin between the apparent maximum weight of the fully loaded lifeboat and the lifeboat safe working load is small. There can be a variation of several hundred kilograms between the weights of nominally identical lifeboats, and the weighing process also helps to confirm if there is delamination of glass reinforced plastic (GRP) construction materials or deteriorating buoyancy foam.

When calculating updated design weights for evacuation and escape systems, dutyholders should also measure and account for the weight of the PPE used in conjunction with the specific evacuation and escape system. For TEMPSC, the minimum PPE provision required shall be a lifejacket. For all other escape systems to water, such as life-rafts, an immersion suit and lifejacket is required, unless the immersion suit is designed to be used without a lifejacket.

Dutyholders are required to provide a breakdown of the updated design weight calculation in their PFEER assessments and include the average weight and design weight used for design purposes within their safety case.

Dutyholders are expected to update and verify their design weight calculations periodically, or whenever new UK offshore weight data becomes available. Those who choose to use platform-specific population weight data should repeat the calculation of average weight at periodic intervals to monitor for adverse trends in average offshore worker weight.

HSE recognises recent discussions about setting body weight limits for offshore workers. If dutyholders choose to adopt a maximum acceptable upper limit to worker weight for their installation, this may reduce the average offshore worker weight and standard deviation they apply in respect of design weight calculations, and may limit the extent of any changes to lifeboat capacity, LSA provisions etc.

Additional TEMPSC considerations

Lifeboat maximum allowable seating capacity exceeds design load

If the lifeboat safe working load (SWL) will be exceeded following calculation of the new design load, the dutyholder has the following options.

- Limit the maximum number of people permitted to use the lifeboat to bring the maximum lifeboat weight within the safe working load.
- Remove non-essential items of equipment from the lifeboat, to reduce the lifeboat weight. Any such removal will need to be justified by an appropriate assessment. For example, it may be possible to replace the steel air cylinder with a composite one or remove surplus equipment.
- Replace the lifeboat and launch system with one which is designed to withstand the increased load.
- Revalidate the existing or modified lifeboat and launch systems for a higher design load. Such work will need to be conducted by a competent organisation and with reference to original equipment manufacturer (OEM) calculations and drawings, inspection of the equipment, further testing etc as necessary. Revalidation is likely to consume considerable resource, although this may depend on the size of increase in design load which is required. Additionally, testing should confirm that any changes to lifeboat loading does not impact on the ability of the lifeboat to self-right, and in the case of freefall boats on the ability of the lifeboat to follow a suitable trajectory during launch.

Note that for installations subject to marine regulations, it will be necessary to obtain flag-state acceptance of any modifications to the lifeboats, including changes to the standard provisions onboard.

The dutyholder should discuss the lifeboat load with the independent verifier (IV) and take account of the views of the IV as to the suitability of the lifeboat for that load, ensuring the maximum loaded weight of the lifeboat is adequately considered in the verification scheme and associated testing.

Ability of people to fit into lifeboat seats

It is recommended that:

- dutyholders confirm the seat width and seat belt or harness length are suitable to accommodate larger members of the workforce;
- a representative group of larger workers, wearing appropriate evacuation PPE, are positioned and strapped into adjacent and opposite seats within the lifeboat.

The exercise should also identify any particularly cramped seats that may result in a larger person having to adopt an unnatural seating posture.

Dutyholders should consider whether an alternative seating arrangement may be required. For example, it may be possible to establish a revised seating pattern so that the larger members of the workforce will be separated by smaller people and not placed in cramped seats. It is recommended that seats unsuitable for larger people are suitably marked to aid the coxswain. If this solution is adopted, suitable instruction must be given to the coxswain and any others responsible for loading the TEMPSC to ensure the seating pattern is implemented in an emergency.

Under SOLAS requirements, lifeboats are required to maintain positive stability when in an upright position in calm water and loaded with their full complement of persons. The dutyholder should inform the IV of any configuration changes to confirm stability is not affected.

Load capacity of lifeboat seat belts

The current SOLAS seat design limitations may place individuals of 100kg or more at greater risk of injury due to potential failure of the seating and restraint mechanisms, especially in rough weather, or if the TEMPSC capsizes during a launch.

Dutyholders should contact their lifeboat OEM to confirm that seats and associated restraints are strong enough to restrain personnel who weigh in excess of 100kg where lifeboats are designed to SOLAS, or 150kg for a DNV E-406 type approved lifeboat.

Restraints of inadequate strength must be reinforced or replaced to be suitable for the range of people who may need to use the lifeboat. It is recommended that dutyholders (with support from the OEM) identify and strengthen seating and restraints within the TEMPSCs for heavier personnel to ensure enough strengthened seats and harnesses are available.

Lifeboat loading preparations

Any person who may be involved in loading a TEMPSC, typically the coxswain, assistant coxswain and muster checker, must be aware of the quickest way to load the TEMPSC and should be encouraged to discuss and agree loading order and placement of larger people as part of evacuation exercises.

Factors to consider include the possibility that a larger person may be less able to descend steps to the front of a freefall TEMPSC or may require assistance fastening a harness. Consideration should also be given to optimising the trim of a TEMPSC, which is often best achieved by having larger people towards the stern. Dutyholders with freefall boats should consult the OEM to establish any effect this would have when the TEMPSC is launched.

Size and weight considerations for other LSA equipment

Life-rafts and life-raft davits

The original design parameters and capacity of a marine life-raft and davit were defined according to SOLAS standards, which is presently based on the average weight of 82.5kg per person. If the design load of the life-raft or life-raft davit is exceeded once the revised design weight is applied, the dutyholder shall be required to:

- downgrade the capacity of the life-raft, thereby reducing the total number of people who can board the raft;
- replace the life-raft and any davit arrangement with new equipment that is designed for the increased load;
- revalidate the existing design with the OEM.

Marine evacuation systems, escape chutes and personal descent devices

Using the updated average weight and design weight of personnel, the dutyholder should consult with the OEM to determine the new capacity of the life-rafts provided with any marine evacuation system. Additionally, dutyholders must ensure the girth of larger individuals (plus lifejacket and immersion suit) will not create a blocking hazard in the escape chute.

Dutyholders must also confirm that personal descent devices and the descender support frame are rated for all personnel, and the descender harnesses are of a suitable size for larger and heavier personnel within the installation offshore worker population.

Medical provisions

Duty-holders must confirm that suitable stretcher designs are available for transporting heavier weights and wider body frames, for example specialised bariatric stretchers.

They must review and ensure adequate ancillary provisions, such as slide sheets and transfers boards, are available to support the movement of larger individuals safely and efficiently. Stretcher parties and emergency response teams should be trained in handling and transporting large patients, including safe lifting techniques and use of any specialised equipment.

Rescue and recovery

The increase in average body weight may have an adverse effect on rescue and recovery provisions. The weight of people used for load testing of ERRV fast-rescue craft launch and recovery systems (LRRS) is 75kg for vessels built/ converted before 2011, and 82.5kg for vessels

built/ converted after 2011. -A full complement of average-sized casualties (12 casualties plus 3 crew) may exceed the capacity of the LRRS, and it may be necessary to reduce the maximum number of persons the fast-rescue craft can recover. This issue should be taken into account by the duty-holder during ERRV validation trials.

Dutyholders should discuss weight increases with their ERRV provider and jointly carry out an assessment of the affected elements of rescue and recovery provision.

Interim solutions

HSE recognises that it will take time for dutyholders to fully assess the situation, and to implement any necessary remedial measures. PFEER Regulation 15 may allow some interim arrangements to be applied. For example, in the shorter term, it may be possible for the duty-holder to reallocate lifeboat places to include use of lifeboats which would not normally be first choice, provided the risks associated with relying on these lifeboats are sufficiently low and are justified in the assessment required by PFEER Regulation 5. It is recommended that dutyholders should consult with HSE before making any changes.

Ongoing compliance with legislation

Dutyholders should assess any changes to their evacuation and escape arrangements and determine whether these changes constitute a material change. All material changes must be captured in the safety case and submitted to the competent authority for acceptance. Examples of material changes include:

- changes to TEMPSC redundancy standards (such as 150% or N+n);
- changes to (or implementation of) a weight management process (such as assigning personnel to specific lifeboats based on Vantage data);
- changes to the existing escape and evacuation provisions that result in an overall change to the maximum number of people on board (POB) for the installation as described in the currently approved safety case.

Other changes, such as replacing or strengthening harnesses or removing non-essential equipment to reduce weight, may not require a material change, but the assessment of passenger weights and actions taken by dutyholders may form part of a planned inspection. Dutyholders are encouraged to discuss the individual cases with their focal point HSE inspector.

Dutyholders must take adequate account of the current average and limiting weight and size of people when determining the suitability of the lifeboats provided on offshore installations as part of ongoing compliance with PFEER. Assessments covering this issue should form part of the PFEER assessment records. The following documents should also be updated to include or address any changes:

- the safety case for a new installation;
- a safety case revision for the number of POB;
- a thorough review summary;
- combined operations notifications;
- evacuation and escape performance standards.

Appendix A – Calculation of passenger design weights

Typical marine evacuation design weight methodology

The design weight value for a marine evacuation system, W_{SM-95} can be calculated as follows:

W_{SM-95} = the statistical allowance (SA) + the population average weight (μ)

The statistical allowance with confidence interval (CI), for the average weight W_{SM} of a smaller sample population such as a lifeboat POB, can be expressed as follows:

$$SA_{CI} = \frac{z.\sigma}{\sqrt{N}}$$

Where:

W_{SM-95}	= the 95% confidence interval for the average weight of the lifeboat POB;
μ	= the average weight of the parent population (UK offshore workers);
SA_{CI}	= the statistical allowance for a confidence interval CI (typically 95%);
z	= 1.645 for a 95% confidence interval (one tail only of the normal distribution);
σ	= the standard deviation of the parent population;
N	= the size of the smaller sample population (for example the lifeboat POB).

Illustrative examples of design weight calculations that may be of benefit to dutyholders are provided below.

Example 1 – Lifeboat capacity

A lifeboat on an existing installation has a nominal capacity of 60 personnel based on the 98kg design weight defined in OIS 12/2008: The following calculation should be applied.

- The equipped weight without passengers has been measured and is 5,350kg.
- The SWL according to the lifeboat certification plate is 11,230kg.
- The available payload for passengers is 5,880kg.
- The average passenger weight is 97.0kg and SD = 16kg (using installation-specific offshore worker weight data).
- The measured weight of the PPE used for TEMPSC evacuation is 2.5kg.
- W_{SM-95} = 97.0kg + 2.5kg + 1.645 x 16/ √60 = **102.9kg.**

Therefore, the updated lifeboat design weight is 102.9kg and the new maximum allowable lifeboat POB is 5,880kg/ 102.9kg = **57 personnel.**

Example 2 – Rescue and recovery craft and ERRV LRRS

An ERRV is required to recover 19 passengers who have escaped from a ditched helicopter. To calculate the maximum capacity of the daughter craft, the design weight of the passengers should be calculated. The following calculation should be applied.

- The assumed average passenger weight is 96.56kg and SD = 15.59kg (using OEUK 2022 offshore worker weight-measurement data).
- The allowance for the maximum weight of PPE used for helicopter travel is 6kg.
- W_{SM-95} = 96.56kg + 6kg + 1.645 x 15.59/ √19 = **108.4kg.**

Therefore, the design weight to be used to calculate the maximum allowable capacity of the daughter craft is 108.4kg.

Further information

For further information please contact:

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