



RP 44-9

DESIGN GUIDE FOR OFFSHORE EVACUATION AND ESCAPE

March 1993

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Document Title DESIGN GUIDE FOR OFFSHORE EVACUATION AND ESCAPE											
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SCOPE AND PURPOSE This document sets out the current provisions recommended for evacuation and escape for new offshore installations in the UK Sector of the North Sea and North West Europe. The guidelines have been produced primarily for manned offshore installations both fixed and floating. Special consideration is necessary for 'not-normally-manned' installations. This Recommended practice covers evacuation and escape, escape routes, life saving appliances and access to the sea. Recommendations from Lord Cullen's Enquiry are included. It has been prepared to comply with the most recent legislation but will require periodic revision to allow for changes to statutory requirements.											
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FOREWORD

Introduction to BP Group Recommended Practices and Specifications for Engineering.

The Introductory volume contains a series of documents that provide an introduction to the BP Group Recommended Practices and Specifications for Engineering (RPSEs). In particular, the 'General Foreword' sets out the philosophy of the RPSEs. Other documents in the Introductory volume provide general guidance on using the RPSEs and background information to Engineering Standards in BP. There are also recommendations for specific definitions and requirements.

Value of this Recommended Practice

This Recommended Practice collects, in one document, the guidance and requirements for offshore evacuation and escape equipment from several sources, including UK legislation.

Application

Text in *italics* is Commentary. Commentary provides background information which supports the requirements of the Recommended Practice, and may discuss alternative options. It also gives guidance on the implementation of any 'Specification' or 'Approval' actions; specific actions are indicated by an asterisk (*) preceding a paragraph number.

This document may refer to certain local, national or international regulations but the responsibility to ensure compliance with legislation and any other statutory requirements lies with the user. The user should adapt or supplement this document to ensure compliance for the specific application.

Feedback and Further Information

Users are invited to feed back any comments and to detail experiences in the application of BP RPSEs, to assist in the process of their continuous improvement.

For feedback and further information, please contact Standards Group, BP International or the Custodian. See Quarterly Status List for contacts.



1. INTRODUCTION

1.1 Scope

This Recommended Practice gives guidelines for the engineering design of evacuation and escape (E&E) systems for new offshore installations in the UK Sector of the North Sea and North West Europe. Much of the text discusses the current philosophy in the UK Sector which should also be of use in other jurisdictions, but the reader should make himself aware of the relevant legislation in his area of operation.

These guidelines cover all fixed and floating offshore installations and also apply to jack-ups, crane barges, emergency support vessels (ESVs), and drilling units where offshore regulations apply. They also cover not normally manned installations (NNMIs) which require additional consideration on a case by case basis. The guidelines do not include pipelay barges, ships or standby vessels which are subject to Department of Transport requirements.

The document scope includes evacuation and escape philosophy, escape routes, life saving appliances and access to the sea. It does not include recovery and rescue of personnel from the sea.

2. REGULATIONS AND REQUIREMENTS

2.1 Legislation

At time of writing, much of the important UK legislation pertaining to offshore safety is undergoing significant revision following the recommendations of the Cullen Inquiry and the subsequent transfer of responsibility from the Department of Energy to the Health and Safety Executive (HSE).

The important legislation on the subject consists of the HSE Offshore Safety Case Regulations [SI 2885](#) (1), [SI 289](#) (2) and [SI 486](#) (3). HSE Regulations on Evacuation, Escape and Rescue are currently being prepared which will lead to the replacement of [SI 486](#). Further guidance may also be found in the Department of Energy's Guidance Notes (4th Edition)(4) and the Recommendations of the Cullen Inquiry (5). Much of the philosophy from the latter document is embedded in the latest HSE legislation.

This design guide has been prepared to comply with the most recent legislation but will require periodic revision to allow for changes to Statutory requirements.

2.2 The Offshore Safety Case

The Safety Case is the Operator's most important submission to the Regulatory Authorities in defining and justifying his safety philosophy. In it, he must demonstrate to the HSE's satisfaction that, in the event of a major emergency, adequate provisions have been made for the safety and, if necessary, evacuation of all personnel.

Specifically, the Safety Case must demonstrate that there is provision for a Temporary Refuge (TR), safe access routes leading from workplaces to the TR and thence to evacuation points, and means of evacuation and escape from the installation. It must also quote justifiable performance standards for the integrity of these important facilities.

The responsibility lies entirely on the Operator to demonstrate that he has a satisfactorily safe E&E system.

Detailed requirements for the Safety Case are given in [SI 2885](#), The Offshore Installations (Safety Case) Regulations 1992, by the HSE.

2.3 Evacuation, Escape and Rescue Strategy

The EER Strategy is a vital part of an installation's Safety Case. Its purpose is to demonstrate that a satisfactory overall EER system is in place which takes into account the major accident hazards. The Strategy will also take account of all the installation safety systems and define their performance criteria, as required by the draft Safety Case Regulations. Only after an EER Analysis can the EER Strategy be shown to be satisfactory.

The Strategy will be developed at the commencement of a Concept Safety Evaluation (CSE) and will be required in order to prepare the Safety Case submission to the HSE. Further discussion is provided in Section 3.3.

2.4 Evacuation, Escape and Rescue Analysis

An EER Analysis will be performed in conjunction with the EER Strategy and is required as part of the Safety Case submission. The EER Analysis is an analytical method of examining evacuation and escape issues and will help to determine the required level of provision of E&E equipment.

Further discussion is provided in Section 3.4.

Throughout the lifespan of a project, the EER Analysis and Strategy will be developed together in an iterative fashion to ensure that the E&E systems and procedures are appropriate to contend with the potential installation hazards.

2.5 Internal BP Reviews

BP will undertake a number of Technical Safety Audits throughout the lifespan of each Project, from concept through to operations. These Audits address all aspects of health, safety and environmental issues, including the provision of evacuation routes, temporary refuge, emergency communications and lifesaving appliances.

3. EVACUATION AND ESCAPE

3.1 General

The Offshore Safety Case Regulations require the Operator to demonstrate, via his Safety Case, that he has provided a satisfactory level of safety. This applies both to the provision of equipment as well as safety procedures and management systems.

The evacuation and escape systems provided on the installation should be developed with due regard being paid to the major hazards which may occur on the installation. They should also take full account of other major safety systems, especially those related to major accident control and response (e.g. fire and gas detection systems and firewater systems).

3.2 The EER System

In an evaluation of the means of evacuation and escape from an installation, the Operator must consider the full extent of hazards and risks which face the installation and its workforce. He should then consider a broad range of facilities which serve to protect the workforce and allow them to leave the installation if necessary. These facilities may be defined as the EER System and include the following provisions:-

- The temporary refuge (TR)
- Escape routes leading from the workplace to the TR
- Evacuation routes leading from the TR to the point of evacuation
- TEMPSC (Lifeboats)
- Means of escape to the sea
- Personal survival equipment

The above points represent a significant proportion of those items which have to be specifically addressed in the Safety Case.



When evaluating any single evacuation or escape system, there are four critical aspects of its performance which should be considered:

- The time to complete departure from the installation
- The risks involved in the evacuation
- The vulnerability of the system to weather
- The vulnerability of the system to the effects of accidents

A good overall EER System will consist of a number of evacuation and escape options, each provided at different locations on the installation and allowing varying speeds of departure, with varying elements of risk. This approach ensures that there is a "balanced" approach to the problem, with a variety of methods of departure available.

Helicopters may in certain cases be considered part of the EER System if their availability and effectiveness have been demonstrated in the EER Analysis. However, in the event of an incident, they will usually be called up from elsewhere and are not a dedicated part of the installation's facilities. For this reason, the primary means of independent early evacuation on almost all installations will be by TEMPSC. An exception may be where gangway evacuation is possible.

To allow for incidents whose severity and speed are such that an orderly, controlled evacuation could not take place, methods of rapid escape from the installation should also be provided as part of the EER System. These will consist of liferafts and means of escape to the sea.

3.3 EER Strategy

The EER Strategy for a new installation should be considered during the concept design stage and will be specified by the Operator. The Strategy will evolve with time as more information becomes available during design development and as ideas change. EER Strategy will also be influenced by the results of the EER Analysis, and the two will develop through a series of iterations as improvements are made to the EER System.

The Strategy (following adequate analysis) should perform the following functions:-

- Demonstrate that a satisfactory EER System has been provided
- Take account of the major hazards, with due recognition of the contribution made by the installation's safety systems
- Define the required performance standards of the EER System.

- Provide information to personnel who have a role to play in the implementation of the EER System

Where a mobile unit, such as a jack-up or semi-submersible is to be operated alongside a fixed structure, the EER Strategy shall be reviewed to consider the combined system capability.

Typically, the Strategy should address the following topics:

- State the overall objectives of the EER System
- State the risks present on the installation which have an influence on the design of the EER System
- Describe the range of systems needed to provide a ‘balanced’ response to the range of possible incidents
- State the performance standards of all parts of the EER System
- State limitations of use e.g. sea state above which TEMPSC launch is considered hazardous.

3.4 EER Analysis

An EER Analysis is to be performed in order to identify what is required to be in place to provide, on the installation and connected facilities, evacuation and escape arrangements and other means available to personnel in the event of an emergency which makes it necessary or advisable to leave the installation.

The Analysis is an analytical method of examining E&E issues and will help to formulate the EER Strategy. It will determine whether or not the EER System matches the particular hazards of the installation and provides adequate redundancy and diversity of evacuation and escape options.

The Analysis should encompass all items of the EER system including the temporary refuge, escape and evacuation routes, TEMPSC, means of escape and survival equipment. It will address the hazards and consider the system needs, provision, forms, deployment and locations of items.

Such an Analysis should consider all the relevant factors e.g. variations in manning and activity levels, effects of wind and weather (e.g. on structures, plant, smoke and fire etc.), assumptions of human behaviour under stress, data on equipment reliability and performance, personnel transit times etc. Where appropriate, knowledge gained either from evacuation exercises or actual emergency situations may also be applied.

The EER Analysis, as part of the Safety Case, should demonstrate that, when considering the main installation hazards, the risks to personnel carrying out an evacuation are as low as reasonably practicable.

Guidance on the preparation of an EER Analysis may be obtained from HSQ, BPX, Dyce. Particular reference to the EER Analysis is made where appropriate hereafter.

3.5 Performance Standards

The HSE Safety Case Regulations require that performance standards be established for the major components of the EER System viz., the TR, routes leading to and from the TR and the means of evacuation and escape from the installation. These standards must then be accounted for when undertaking a quantitative risk assessment (QRA) of the installation.

Performance standards form the basis of the Safety Case philosophy and are required in order to demonstrate that the Operator has provided an EER System of known performance and reliability.

HSE requires that the Safety Case include statements on the following performance considerations:

- The functions to be performed by the relevant structures and equipment which comprise the EER System.
- The range of possible accidental events which may threaten the integrity of relevant structures and equipment.
- The Operator's criteria which he uses to define loss of integrity of structures and equipment.
- The minimum period for which structures and equipment are designed to maintain integrity in the face of "design events."

At time of writing, BP's views on performance standards have still to be clarified and formalised. However, it is anticipated that they will be published in the form of "goals" to be achieved in the EER System design. Examples of typical goals might be:

- *"The installed lifeboats will allow evacuation of the full POB (persons on board) with an acceptably high overall "success rate," taking into account variations in weather conditions and tidal currents."*
- *"In an emergency, at least one route to temporary refuge will remain passable (for sufficient time, say 10 minutes) from all potentially manned areas."*

The reader is advised to consult HSQ, BPX, Dyce for further information.



The provision and location of the TR, evacuation routes and lifesaving appliances shall all be addressed during the conceptual design phase.

4. DETAILED GUIDANCE

4.1 General

The approach to E&E issues discussed in Sections 2 and 3 represents a departure from historical prescriptive methods, where designers of E&E systems satisfied specific Statutory requirements by providing certain equipment. This equipment provision was then subject to approval by the Authorities. Current UK legislation now requires the Operator to demonstrate that he has provided a satisfactorily safe EER System.

There are, however, areas where a limited amount of prescription and specification is appropriate by way of design guidance and these are mentioned below where appropriate.

4.2 Evacuation and Escape Philosophy

Safe means of departure from all areas of offshore installations shall be provided, including work areas, accommodation and recreation areas, whether or not these areas are normally manned.

The basic evacuation philosophy should be:

- Move away from an immediate hazard
- Go as quickly as possible to the TR muster area(s)
- Leave the muster area(s) to the means of evacuation
- Evacuate

The basic evacuation philosophy for multi-platform installations should be:

- Leave the platform on which the incident has occurred (and which has made the platform unsafe to personnel) via the bridge to another platform in the group.
- Wait on the second platform until the incident has been dealt with.
- If the weather direction makes the bridge dangerous to use, evacuate as above from the first platform.
- If a change of weather causes the hazard to threaten the second platform, evacuate as above from the second platform.

4.3 Provision of Escape Routes

Escape routes are defined as those unobstructed routes which lead from the workplace, or hazardous area, to the TR. Recommendations are as follows:-

- A minimum of two clearly marked escape routes, so sited that they are true alternatives to each other, should be provided from all normally manned work areas, accommodation and recreation areas, control rooms, local equipment and plant rooms, drilling pipe racks, drill floor, storage areas and any other areas considered in a safety assessment.
- All working areas, large accommodation rooms and any corridors, longer than 5 m shall generally possess at least two exits which lead to alternative escape routes.

4.3.1 Helideck

The number of escape routes from helidecks should be a minimum of two. These should have a minimum clear width of 2 m with as straight a rundown as possible, to an adjacent area approximately 2 m below the helideck. Where the aiming circle diameter is 22 m or greater, the preferred number of escape routes is three.

4.3.2 Local Control Room

Any local control room within hazardous equipment areas should be provided with one direct means of escape not involving the hazardous area.

4.3.3 Derrick

Suitable provision shall be made to facilitate a derrickman's escape. This should provide descent and lateral movement away from the drill floor to an adjacent safe area providing access to escape routes. The means of escape may be made, for example, by harness or taut wire systems (speed of descent approximately 2 m/s), or by ladder and protected passageway to allow sufficient escape time in a hydrocarbon fire.

4.4 Provision of Evacuation Routes

Evacuation routes are defined as leading from the TR to the point of departure from the installation. They should be designed to allow for the fact that they need to be usable by a large number of personnel,

including stretcher cases and injured persons, at a time when a fire may be well established.

A minimum of two clearly marked routes should generally lead from the TR to enough TEMPSC spaces to accommodate all of the persons on board (POB), and to the helideck, where helicopter evacuation is preferable. On multi-platform installations, evacuation routes shall also be provided leading to the bridge landing points.

The EER Analysis will assist in determining the width and routing of evacuation routes (e.g. with due regard to location of hazards, prevailing weather, number of personnel likely to be present, expected behaviour of personnel etc.).

4.5 Design of Evacuation and Escape Routes

4.5.1 General

All evacuation and escape routes shall, as a minimum, be designed to satisfy [SI 289 \(1974\)\(4\)](#). They should be as direct as possible with the minimum number of changes in direction. The routing and protection of routes shall take account of fire and explosion risks nearby. Evacuation and escape routes are to be clearly marked out on decks.

For fixed platforms, escape routes should be incorporated around the perimeter of each working deck. Stairs shall be provided to interconnect these primary escape routes on each face of the installation. Escape routes from work areas should be sited to provide true alternatives to each other.

The HSE Safety Case Regulations require the Operator to demonstrate that, when subjected to their "design events," at least one escape route leading to the TR and one evacuation route remain passable.

The EER Analysis will identify the fire and explosion hazards to which escape routes to the TR, and personnel using them, may be exposed in the event of a major incident. Designers should ensure that sufficient thought is given to the protection of such routes. Protection measures might include, e.g. passive fire protection of supporting steelwork, alternative routing of walkways, provision of active fire protection where appropriate etc.

A connecting bridge on multi-platform installations should be located between the non-hazardous areas of the platforms. The bridge and access to the bridge shall be protected against the calculated radiation from predicted hydrocarbon fires or burning oil dropout, for an adequate duration as defined by the EER Analysis. However, a

minimum duration of one hour is recommended. Protection may take the form of fire-rated cladding or a water curtain to prevent smoke build-up in an enclosed area. Specific attention shall be given to fire protection for the bridge structure, particularly at its extremities.

Pipe runs on the bridge(s) should be fitted outside the fire protection.

Evacuation and escape routes should be designed not to be obstructed by equipment, access hatches or laydown areas. The minimum width of routes will depend on the number of personnel likely to be evacuating which will be determined by the EER Analysis. As a minimum, a width of 1000 mm is to be used, rising to 1500 mm where more than 50 people are likely to pass.

The floor to ceiling heights on all routes, including stairways, is to be 2.1 m as a minimum clear of all signs, lighting or beacons with a general ceiling height of 2.3 m. Consideration shall be given to allow adequate clearance for stretchers on evacuation and escape routes, particularly on landings of stairs.

Means of escape leading to an upper level shall, wherever practicable, be provided in the form of ramps or stairways and means of escape leading to a lower level shall, wherever practicable, be provided in the form of ramps, stairways or chutes. Fixed ladders should only be provided as a means of escape providing direct access to sea level, as a secondary means of escape from an area already served by a stairway, and from small access areas or areas not normally manned.

Special consideration shall be given to doors on escape routes. Hinged emergency doors shall open outwards in the direction of safety. The width of a route should not be restricted unduly by the presence of doorways, including fire doors, where access from other areas to escape routes is required, the general width must not be compromised. Sliding doors may offer advantages in some situations.

All doors on evacuation and escape routes shall be readily openable. This includes pneumatic doors where a manual override is required, or panic bars or similar on lockable doors. Consideration should be given at the design stage to the use of materials to prevent doors or hatches seizing up due to salt ingress.

4.5.2

Endurance Times

The endurance times for escape and evacuation routes, embarkation points and TEMPSC should be justified with reference to the EER Analysis. For escape routes the endurance time should be fully sufficient to enable personnel to travel from their workplaces to the TR,

possibly helping injured colleagues. Evacuation routes may be required some time after the development of a major incident and should be protected accordingly. Thus, evacuation routes may require greater endurance than the TR itself. (The TR endurance is based on the time to evacuate the platform.)

4.5.3 Marking and Illumination

Evacuation and escape routes shall be adequately illuminated by reliable lighting in both normal and emergency conditions, complete with emergency power sources. The TR, muster areas, evacuation systems and control rooms should also have adequate and reliable lighting and emergency lighting.

Evacuation and escape routes shall be marked by photoluminescent or retroflective arrow signs indicating the direction of escape. These signs shall be duplicated at or near floor level to aid escape in dense smoke.

Retroflective orientation notices shall be provided at all main working decks and stairways stating the precise location e.g. SW CORNER LEVEL 2, and showing the location on a plan of that deck.

Safety signs shall comply with [SI 1741](#) (1980)(6). All escape routes shall be adequately illuminated in accordance with [BS 5266](#) (7).

Muster areas and auxiliary safety equipment storage shall be marked distinctively with notices and by highlighting on deck and around doors. Where an escape route passes through a storage area or work area, the width of the route shall be clearly marked on the deck or floor with photoluminescent lines and shall be kept clear of any obstructions at all times.

Reference is made to [Cullen Recommendation 59](#) and [SI 289](#), Sched 2, Part VIII, Item 8.

4.5.4 Evacuation of Divers

Special consideration shall be given to the provision of means of evacuation for divers under saturation, in decompression chambers or similar.



4.6 The Temporary Refuge and Evacuation Routes

4.6.1 Temporary Refuge (TR)

The Safety Case Regulations require that the Operator provides protection on the installation for personnel against the hazards of weather, fires, explosions, heat, smoke, toxic gas or fumes during the period following an incident but prior to evacuation. This is the function of the TR, which will also be the centre of communications during an emergency.

The TR will be one or more location on the installation and will normally be the accommodation. On bridge linked platforms, it may be appropriate to provide a refuge on both platforms, should the EER Analysis show that the bridge is rendered impassable by a major incident.

The TR shall be designed to withstand specified fires and explosions and its detailed specification and performance will depend on the hazards present on the installation. It shall also be designed against the ingress of smoke or toxic gases via doors, HVAC system, cable penetrations etc. in order to maintain a breathable supply of air.

The Operator is required to specify the "design" events which the TR and its supporting structure can withstand. He must also identify those "extreme" events which will result in loss of integrity of the TR.

4.6.2 Muster Areas

Primary muster areas will normally be provided within the TR. There shall be sufficient free floor area at each muster location to accommodate one full survival craft complement at 0.5 m² per person, with an additional allowance made for stretchers. The number of muster areas may correspond with the number of survival craft but will depend on the evacuation strategy for the installation. A minimum requirement is to provide muster areas for each of the survival craft necessary to evacuate the full POB.

Muster areas shall be provided on the extreme platforms of multi-platform installations with sufficient space to accommodate the total number of persons on the group of platforms. The muster areas shall be located in a safe area/TR and remote from hazards within a space protected to a level determined from a risk assessment.

Muster areas shall have adequate first aid and welfare facilities, as well as emergency communications.

4.6.3 Evacuation Stairways from the Living Quarters

The number of evacuation stairways from the living quarters shall generally be a minimum of two. All stairways shall lead from all levels of the living quarters up to the helideck and down to the survival craft and emergency gangway access points. The main internal stairway of the living quarters may be utilised as an evacuation stairway provided it is fully enclosed and fire protected to a level determined by an assessment of fire and explosion risks.

One of the evacuation stairways shall be on the remote side of the living quarters away from the hazardous areas. The distance by escape route to an external exit shall be minimised. Where this is in excess of 20 m, an additional exit will normally be required.

4.6.4 Design

To avoid smoke build-up or chimney effects, external stairways should not be totally enclosed. However, local protection of external stairways against heat and falling debris should be considered.

All emergency exit doors shall be of sliding type or open outwards, from the accommodation muster areas onto the stairways. Exits opening onto the stairways shall not hinder persons escaping on the stairways, and shall maintain the minimum clear width of 1.2 m.

Marking and lighting of stairways shall be in accordance with 4.5.3.

4.6.5 Survival Craft Embarkation Areas

Survival craft embarkation areas shall be of sufficient area to allow assembly of the full complement of the survival craft. This area shall be a minimum of 0.5 m² per person, with additional space for stretchers. Sufficient quantitative risk assessment of fire and explosion risks shall be carried out to determine the required local protection of embarkation areas against radiant heat and falling debris.

The area of the walkways for boarding the survival craft shall be additional to the embarkation area above.

4.7 Evacuation Systems

4.7.1 General

Lifesaving appliances must comply with the latest Statutory Instruments and the Department of Energy's Guidance on Lifesaving Appliances (8). The Cullen Recommendations provide guidance on the

minimum provision of equipment and systems. The eventual level of provision is determined from these reference documents and confirmed by an EER Analysis.

Every lifesaving appliance shall, as a minimum, be to a type and class approved by the HSE for the UK sector of the North Sea, with due account taken of appropriate national regulations.

Every lifesaving appliance shall be constructed of materials having regard to the function that it will be required to perform. Each shall be suitably coloured to make it conspicuous when in use and marked with the words "BP Installation Name and the number of the appliance" in characters no less than 150 mm in height (75 mm for lifejackets and lifebuoys).

All lifesaving appliances which are in service shall be available for immediate use at all times. They shall be installed/stowed in such a way that they are protected from physical and environmental damage.

Guidance on specific items of lifesaving equipment, including advances in their technology, may be obtained from HSQ, BPX, Dyce.

4.7.2

Evacuation Systems

As discussed in 3.2, above, the primary means of evacuation will be by TEMPSC which are permanently at the disposal of the OIM. Provision may be made within the EER Strategy for evacuation either by helicopter or by a gangway to an emergency support vessel. Such forms of evacuation shall be addressed by the EER Analysis.

Survival Craft

The design of survival craft must comply with SOLAS Requirements (9,10) and, in the case of free-fall lifeboats, NMD regulations (11).

Consideration shall be given in the design of the lifecraft facilities of alternatives to traditional davit-launched TEMPSC. The Cullen Inquiry recommended that methods of launching TEMPSC clear of the installation be evaluated. Therefore, methods of enhanced launch arrangements should be reviewed (e.g. proprietary systems such as PROD, Seascope, TOES or free-fall) and the most appropriate system used. Cullen recommends that, on new installations, davit-launched boats should be orientated so as to point away from the installation.

HSQ, BPX, Dyce maintain current knowledge in this area of developing technology and should be consulted for advice on suitable equipment.



An EER Analysis shall consider the orientation and launch facilities for reliable deployment of TEMPSC in bad weather. This shall include considerations of limiting seastates and wind speeds, physical clearances and, for floating installations, platform heel due to loss of stability. The method of stowing shall be chosen to assist in embarkation and in allowing the craft to clear the installation quickly. Consideration shall also be given to the protection of craft and launching facilities from fires and extreme temperatures.

The layout and design of TEMPSC facilities on the installation shall be reviewed as part of the EER Analysis. This analysis shall consider the number, location and type of TEMPSC, orientation of craft and appropriateness of the launch method. (As discussed in 3.2, the EER System shall offer a number of methods of departure from the installation with varying degrees of risk. Therefore, the probable success rate, in an emergency, of the launch system is of prime importance.)

The analysis shall also identify the TEMPSC seating capacity required which may exceed the statutory minimum, recommended by Cullen, of 150% of the persons on board (POB). The number of craft required to meet this requirement will depend on the availability of suitable locations, boat design capacity and the conclusions of the EER Analysis.

Multi-platform installations and not normally manned installations (NNMI) shall also be subjected to EER Analyses which will address the required number and locations of boats, orientation etc. In these circumstances, the analyses shall take consideration of bridge evacuation to adjacent platforms, likely platform manning levels etc.

The lowering of survival craft shall be possible from within the craft or externally. Release of the falls under load shall be possible from within the craft. At least one of the craft shall be powered from the emergency services switchboard so that the craft can be recovered in an emergency.

Survival craft design shall include the additional features given in Appendix C.

4.7.3 Escape to Sea Systems

Liferafts

The Recommendations from the Cullen Inquiry require that liferafts are provided on the installation with a capacity of 100% POB. These are required in addition to TEMPSC. However, if the TEMPSC capacity



exceeds the minimum requirement for 150% POB and the Safety Case can demonstrate that this excess capacity represents a true surplus, the liferaft capacity may be reduced below 100%.

Davit launched liferafts or throw-in rafts should be specified with respect to the means of access.

The number, size, type and location of liferafts shall be addressed in the EER Analysis. Rafts shall be located close to means of direct escape to the sea, in accordance with the Cullen Recommendations, so that escaping personnel enter the sea for as short a time as possible. By implication, liferafts should not be located adjacent to TEMPSC.

Securing arrangements for liferafts shall facilitate rapid deployment. The liferaft painter provided on fixed platforms should be shortened to the minimum practical length to ensure successful deployment and will be to the height of the launch point above LAT plus 10 m.

Advice on the choice of liferafts and davit systems should be obtained from HSQ, BPX, Dyce.

Lifebuoys

Lifebuoys shall be located at strategic points around the installation in accordance with [SI 486](#) (3). Actual numbers of lifebuoys shall ensure that one lifebuoy is visible from any point on the outside walkway of the platform. The stowage places shall be adequately illuminated.

All lifebuoys shall have adequate brackets, cleats and a self-igniting buoyant light which is inextinguishable in water. There shall be an equal number of lifebuoys with and without securing lines. Securing lines shall be coiled into covered plastic containers with a drainage hole in the bottom. Lifebuoys shall be marked with the name of the installation in 75 mm retroflective letters and numbered. The length of the line attached to lifebuoys is also an important consideration and should be matched to the circumstances of use.

Escape Ladders

Ladders shall be fitted to the four corner installation legs and shall be accessible to rescue craft. They shall serve the purpose of emergency access to sea level and provide the opportunity for a man overboard to self rescue. The lowest rung shall be approximately 2 m below LAT. Safety cages should not be fitted below 10 m above LAT since these would be subject to wave action damage and could hinder escape and rescue. Ladders should be attached to robust padears or doubler plates

so that they can easily be replaced if damaged, and should be treated with anti-fouling paint.

Access to the tops of the ladders shall be addressed by the EER Analysis and protection from fires and explosions provided if required.

Descent Devices

Means of direct escape, other than fixed ladders, shall be provided to allow individuals to depart the platform in safety. Traditional methods such as knotted ropes and scramble nets are not recommended now and the design should consider the range of proprietary escape systems available.

Devices include mass escape systems (e.g. Skyscape, SJL Staircase, Telescape) or individual personal descent devices (e.g. Perry Portable Device, Donut, Invertek Ax-4). The provision and location of such devices shall be determined by the EER Analysis.

Advice on proprietary escape systems may be obtained from HSQ, BPX, Dyce.

4.7.4 Personal Protective and Survival Equipment

Lifejackets

Lifejackets of the automatically inflatable type shall be provided for an absolute minimum of 150% of the POB (5); one shall be at each berth. Storage shall be provided within the cabins in the accommodation areas in lockers, cabinets, shelving or netting. The additional 50% of lifejackets shall be provided in weatherproof cabinets at locations determined by the EER Analysis, with the cabinets clearly marked "Lifejackets."

The EER Analysis may identify the need for lifejackets in excess of 150% and shall be used to determine the most appropriate location for their storage. Generally, the lifejackets shall be stowed at locations at muster points, liferafts and points of access to the sea.

All lifejackets, when properly worn and inflated, shall ensure that the mouth of an unconscious or exhausted wearer is clear of the water, within five seconds of entering still water. They shall provide a minimum of 16 kg of buoyancy in fresh water and meet all Statutory requirements (3). In addition, they shall be fitted with lights, whistles and retroreflective patches.



Survival Suits

All personnel on the installation shall be provided with a helicopter transit suit of a size which can be used as a survival suit in an emergency. The survival suit shall be of the watertight type. The installation shall have an absolute minimum complement of suits of 150% POB (5), although the EER Analysis may indicate that a greater number are required.

Provision shall be made for hanging the suit in the recipient's cabin, with other suitable locations determined by the EER Analysis.

Smoke Hoods/Breathing Apparatus

Smoke hoods (e.g. the Draeger Parat-C design or equivalent) shall be supplied, one for each berth, with a further 50% in the living quarters, offices and plant where shown to be necessary (5).

The provision of sufficient emergency breathing apparatus sets as determined by assessment shall be provided within the process areas.

Additional Equipment

A torch and fireproof gloves shall be provided at each berth, with a further minimum of 50% around the installation at strategic locations. Overshoes may also be specified in some cases.

4.7.5

Not Normally Manned Installations

Special consideration shall be given to the provision of EER equipment on NNMI's. The installation Operations Manual will define the POB for times of inspection, maintenance and repair. This will then be used to establish the provision of equipment using the minimum requirements recommended by Cullen. During periods of major maintenance, however, a work vessel and gangway may be brought alongside which will alter the number of persons on board and, consequently, the "percentage provision."

The EER Strategy shall address the likely methods of platform operation and manning and assess the equipment provision accordingly, making due recognition of the Statutory minima.



DEFINITIONS AND ABBREVIATIONS

Definitions

Standardised definitions may be found in the BP Group RPSEs Introductory Volume.

offshore installation:	a fixed or floating system maintained for underwater exploitation or exploration to which the Mineral Workings (Offshore Installations) Act 1971 applies.
evacuation:	the planned method of leaving the installation without directly entering the sea. Successful evacuation result in those on board the installation being transferred to an onshore location or to a safe offshore location or vessel.
escape:	the process of leaving an offshore installation in the event of part or all of the evacuation system or command structure failing. Personnel on board make their way into the sea by various means or by jumping.
escape routes:	unobstructed spaces leading from any potentially manned location or workplace on the installation to the TR.
evacuation routes:	unobstructed spaces leading from the TR to points of departure from the installation e.g. muster areas, embarkation areas for survival craft, helideck, bridge landing, access points to sea level etc.
alternative escape route:	an independent route for evacuation or escape.
muster area:	an allocated space normally within the living quarters where personnel can assemble in preparation for evacuation.
temporary refuge:	one or more location where personnel will be adequately protected from relevant hazards while they remain on the installation.
emergency command centre	an area used for communications coordination during an incident.
central control room:	an area used to monitor hydrocarbon production and safety facilities.

Abbreviations

CIMAH:	Control of Industrial Major Accident Hazards Regs.
CSE:	Concept Safety Evaluation
E&E:	Evacuation and Escape
EER:	Evacuation, Escape and Rescue
ESV:	Emergency Support Vessel
HSQ:	Health, Safety, Environmental and Quality Assurance
LAT:	Lowest Astronomical Tide
NNMI:	Not Normally Manned Installation
OIM:	Offshore Installation Manager
POB:	Persons on Board
QRA:	Quantified Risk Assessment
TEMPSC:	Totally Enclosed Motor-Propelled Survival Craft
TR:	Temporary Refuge
TSA:	Technical Safety Audit
VHF:	Very High Frequency



LIST OF REFERENCED DOCUMENTS

A reference invokes the latest published issue or amendment unless stated otherwise.

Referenced standards may be replaced by equivalent standards that are internationally or otherwise recognised provided that it can be shown to the satisfaction of the purchaser's professional engineer that they meet or exceed the requirements of the referenced standards.

1. [SI 2885](#), Offshore Installations (Safety Case) Regulations 1992 - Health and Safety Executive, HMSO.
2. [SI 289](#), Offshore Installations (Construction and Survey) Regulations, 1974, HMSO.
3. [SI 486](#), Offshore Installations (Lifesaving Appliances) Regulations, 1977, HMSO.
4. [Offshore Installations: Guidance on Design, Construction and Certification](#), 4th Edition, Department of Energy, June 1990.
5. [The Public Inquiry into the Piper Alpha Disaster](#), The Hon Lord Cullen, Department of Energy, November 1990.
6. [SI 1741](#), Safety Signs Regulations, 1980, HMSO.
7. [BS 5266](#), Emergency Lighting, Part 1 1988, Part 3 1981.
8. [Department of Energy, Offshore Installations: Guidance on Life-Saving Appliances](#), 1978, HMSO.
9. [SOLAS 1983 Amendments to the International Convention for the Safety of Life at Sea](#).
10. [SOLAS, International Convention for the Safety of Life at Sea, Consolidated Text](#), 1986.
11. [NMD Regulations for Lifesaving Appliances on Floating Installations](#), 1986.
12. [UKOOA Guidelines for Emergency Drills and Exercises On Offshore Installations](#), 1991
13. [UKOOA Guidelines for Offshore Emergency Training](#), 1991

ADDITIONAL REQUIREMENTS FOR SURVIVAL CRAFT

In addition to the SOLAS regulations for survival craft, the following features shall be included:-

- (a) Sufficient buoyancy and propulsion means such that in the event of puncturing the hull at a bulkhead to the extent that two compartments fill with water, the craft will retain integrity and power to ensure escape from the installation.
- (b) On-load release gear in the case of davit-launched TEMPSC with precautions against premature release.
- (c) All ventilators and engine air intakes shall be of the self-closing type to prevent water ingress if the craft is rolled over.
- (d) A drip tray shall be fitted under the engine.
- (e) The engine and fuel tank spaces shall be effectively ventilated. The engine shall be provided with exhaust spark arrestors. The engine exhaust system shall be insulated and unpainted and kept clear of the bilges.
- (f) The controls for operation of the air supply, water sprinkler system and close ventilators shall be provided with clear and conspicuous notices regarding their use at both the operating position and the coxswain's position.
- (g) The controls should be so positioned that the number of persons required to operate them is a minimum, and they shall be capable of operation by the coxswain preferably or crew member strapped in his seat.
- (h) Instructions shall be provided at the coxswain's position indicating the main and emergency means of starting, means of controlling the engine and the means of emergency steering.
- (i) Cold start levers shall be clearly marked and readily accessible. Provision shall be made for reliable cold starting of engines under all expected climatic conditions. All engine controls shall be easily operable from the coxswain's position.
- (j) The towing attachment points shall be robust enough to enable the survival craft to be towed at 3 knots in Beaufort 6 conditions when filled with water. All internally operated emergency towing release shall be fitted.
- (k) A comprehensive instruction manual detailing the recommended frequency, testing and maintenance of equipment shall be provided. This shall also provide instructions for use of all equipment.

- (l) Propellers shall be of phosphor-bronze or similar material and shall be guarded to prevent fouling.
- (m) An external ladder shall be provided above and below the design waterline to enable persons in the water to enter the craft, and handrails shall be fitted on the exterior of the canopy roof.
- (n) A built-in emergency position-indicating radio beacon and a VHF system with marine bands designed for lifeboat use for all weather communications between survival craft and the evacuated installation or another offshore facility.
- (o) A diesel engine propulsion system capable of driving the craft at 6 knots minimum in calm water and 3 knots minimum in Beaufort 6 conditions and capable of accelerating and manoeuvring the craft away from the installation.
- (p) An easily read illuminated fixed compass located at the coxswain's position, along with a clear indication of the course to steer away from the installation.
- (q) At least three access openings in the canopy. One of the openings shall be onto the roof of the canopy with an inward-opening hatch to assist in the evacuation of personnel from the craft including stretcher cases. Means of access to this hatch from within the craft shall be provided via an access platform, with adequate handrailing, to the roof hatch. An alternative to the roof hatch is the provision of an open self-draining cockpit at the aft end.
- (r) Good all-round visibility from the coxswain's normal position. The design shall include an electric windscreen wiper and protection against hook release damage.
- (s) The minimum width of seat shall be 0.45 m per person. This shall be increased to 0.6 m per person if breathing apparatus is needed. Individual alternating colour seat belts, shoulder lap belts and head restraints shall be fitted.
- (t) Internal lighting and external purple strobe light with back-up power, e.g. batteries, to operate for 24 hours.
- (u) Fixed radar reflector.
- (v) Clear marking of the installation name and lifeboat number on the roof of the lifeboat canopy (600 mm high, retro-reflective characters) to aid identification from the air.

NOTE The HSE will shortly be publishing an Evacuation Steering Committee report on Lifeboat Equipment which should be consulted for further guidance.

