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Oil and gas industries - Offshore production installations - Requirements and guidelines for emergency response (ISO 15544:2024)

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Industries du pétrole et du gaz - Installations de
production en mer - Exigences et lignes directrices
pour les interventions d'urgence (ISO 15544:2024)

Erdöl- und Erdgasindustrie - Offshore-
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für Notfallreaktionen (ISO 15544:2024)

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European foreword

This document (EN ISO 15544:2024) has been prepared by Technical Committee ISO/TC 67 "Oil and gas industries including lower carbon energy" in collaboration with Technical Committee CEN/TC 12 "Oil and gas industries including lower carbon energy" the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2024, and conflicting national standards shall be withdrawn at the latest by December 2024.

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Endorsement notice

The text of ISO 15544:2024 has been approved by CEN as EN ISO 15544:2024 without any modification.



International Standard

ISO 15544

Oil and gas industries — Offshore production installations — Requirements and guidelines for emergency response

*Industries du pétrole et du gaz — Installations de production
en mer — Exigences et lignes directrices pour les interventions
d'urgence*

**Second edition
2024-06**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 67, *Oil and gas industries including lower carbon energy*, Subcommittee SC 6, *Process equipment, piping, systems, and related safety*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 12, *Oil and gas industries including lower carbon energy*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 15544:2000), which has been technically revised. It also incorporates the Amendment ISO 15544:2000/Amd.1:2009.

The main changes are as follows:

- clarifications of requirements;
- editorial updates, including a merge of requirements and guidelines into one subclause for each clause;
- terms and definitions and abbreviations have been updated;
- several recommendations have been changed to requirements based on operational experiences;
- Annex G has been removed and references are made to IOGP guidelines,^[10] References [11] and [12].

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Successful safety and environmental protection during the recovery of hydrocarbon resources requires a structured approach to be applied to the identification and assessment of the hazards present during the various phases in the lifecycle of an offshore installation. These principles also apply to the development of emergency response strategy, emergency response measures and procedures. Understanding of the hazards can be achieved by application of ISO 17776,^[6] which gives guidelines for hazard identification and assessment for offshore installations.

The content in this document on escape, refuge, evacuation, recovery and rescue is consistent with the content of ISO 13702^[4] but addresses in more detail how these aspects are built into development of emergency response measures.

This document has been prepared primarily to assist in the development of new installations. Retrospective application of this document is only relevant where it is reasonable to do so. During the planning of a major change to an installation there can be more opportunities to implement the requirements, and a review of this document enables identification of clauses which can be practically utilized in the change.

This document is based on an approach where the selection of measures for emergency response is determined by an evaluation of hazards on the offshore installation. The methodologies employed in this assessment and the resultant recommendations differ depending on the complexity of the production process and facilities, type of facility (i.e. open or enclosed), number of POB, and the environmental conditions associated with the location of operation.

The principal objectives of this document are to describe both the approach to be used and important considerations in determining the emergency response measures that are required on an offshore installation to:

- a) protect people;
- b) minimize impact on the environment;
- c) minimize impact on assets and operations.

The requirements in [Clauses 6](#) to [15](#) are arranged as follows.

- Objectives identify the goals to be achieved by the emergency response measures being described.
- Functional requirements and guidelines represent the minimum conditions to meet the stated objectives. The functional requirements are performance-orientated measures and, as such, are applicable to the variety of offshore installations utilized for the development of hydrocarbon resources throughout the world.
- The provisions describe recognized practices for consideration in developing the measures for emergency response.
- Functional requirements are supplemented by guidelines in developing the measures for emergency response in [Annexes A](#) to [F](#). The guidelines and annexes are intended for use in conjunction with requirements, industry standards and individual company philosophy, to determine the measures that are necessary for emergency response.

Oil and gas industries — Offshore production installations — Requirements and guidelines for emergency response

1 Scope

This document specifies objectives, functional requirements and guidelines for emergency response (ER) measures on installations used for the development of offshore hydrocarbon resources. It is applicable to:

- fixed offshore structures;
- floating systems for production, storage and off-loading.

NOTE For mobile offshore units, the ER plans developed in conformance with the requirements and recommendations of the International Maritime Organization (IMO) are generally adequate for the normal, independent operation of the unit in most locations. The following aspects of ER planning are not generally addressed by IMO and are topics intended for inclusion in the scope of this document where relevant to the specific installation:

- area evacuation, e.g. precautionary evacuation in areas of tropical revolving storms;
- combined operations (where an integrated command and ER system is relevant);
- arctic operations;
- uncontrolled flow from a well.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

abandonment

act of personnel onboard leaving an installation in an *emergency* (3.7)

3.2

accommodation

place where personnel onboard sleep and spend their off-duty time

Note 1 to entry: Accommodation can include dining rooms, recreation rooms, lavatories, cabins, offices, sickbay, living quarters, galley, pantries, and similar permanently enclosed spaces.

3.3

control

control of hazards

limiting the extent or duration of a *hazardous event* (3.17)

ISO 15544:2024(en)**3.4****central control room**

place on the installation from which personnel can monitor the status of the installation, initiate appropriate shutdown actions and undertake *emergency* (3.7) communication

3.5**exercise**

periodic practice event based on a potential and credible *emergency* (3.7) scenario where the *emergency response* (3.8) arrangements (including interactions with relevant external parties) are tested to verify their workability, identify improvements, and build familiarity and competence

Note 1 to entry: Exercises include emergency response drills involving routine and regular events where an emergency response action (e.g. mustering) is practiced to maintain familiarity and awareness.

3.6**embarkation area**

place from which personnel abandon the installation during *evacuation* (3.13)

EXAMPLE A helideck and associated waiting area or a lifeboat or liferaft boarding area.

3.7**emergency**

hazardous event (3.17) which cannot be handled by normal measures and requires immediate action to limit its extent, duration or consequences

3.8**emergency response****ER**

action taken by personnel on or off the installation to control or mitigate a *hazardous event* (3.17) or initiate and execute *abandonment* (3.1)

3.9**emergency response plan****ERP**

systematic procedures that detail what is to be done, how, when, and by whom before, during and after the time an *emergency* (3.7) occurs

[SOURCE: ISO 27917:2017, 3.4.12, modified — The notes to entry have been deleted.]

3.10**emergency response measure**

systems, equipment and processes provided for use in the event of an *emergency* (3.7)

Note 1 to entry: This is a generic term including hardware provided for *emergency response* (3.8) as well as the planning, procedural and organizational aspects of responding to emergencies.

3.11**escape**

act of personnel moving away from a *hazardous event* (3.17) to a place where its effects are reduced or removed

[SOURCE: ISO 13702:2024, 3.16]

3.12**escape route**

route from an area of an installation leading to a *muster area* (3.24), *temporary refuge* (3.35), *embarkation area* (3.6), or means of *escape* (3.11) to the sea

3.13**evacuation**

planned method of abandoning the installation

ISO 15544:2024(en)**3.14****escape, evacuation and rescue****EER**

range of possible actions in an *emergency* (3.7)

Note 1 to entry: Such actions include *escape* (3.11), *muster* (3.23), *refuge*, *evacuation* (3.13), *escape to the sea* and *rescue* (3.30)/*recovery* (3.29).

3.15**evacuation route**

escape route (3.12) which leads from the *muster area* (3.24) to the place(s) used for primary or secondary *evacuation* (3.13) from the installation

3.16**hazard**

potential source of harm

Note 1 to entry: Hazard can be a *risk* (3.31) source of potential for human injury, damage to the environment, damage to property, or a combination of these.

[SOURCE: ISO/IEC Guide 51:2014, 3.2, modified — Note 1 to entry has been added.]

3.17**hazardous event**

event that can cause harm

EXAMPLE The incident that occurs when a *hazard* (3.16) is realized such as release of gas, fire, loss of buoyancy.

[SOURCE: ISO/IEC Guide 51:2014, 3.3, modified — EXAMPLE has been added.]

3.18**interested party**

individual or organization that can affect, be affected by, or perceive itself to be affected by your organization's decisions or activities.

Note 1 to entry: Interested parties can include, for example, customers, communities, suppliers, regulators, non-governmental organizations, investors, employees and trade unions.

3.19**key personnel**

persons with specific skills and training to perform their ER roles and if not available are replaced by nominated alternative persons

3.20**life-jacket**

personal flotation device

device worn by personnel which has sufficient buoyancy and stability in water to turn the body of an unconscious person and keep the person's mouth clear of the water

3.21**mitigation**

limitation of undesirable effects of a particular event

3.22**attended installation**

installation on which personnel are routinely accommodated

3.23**muster**

movement of people to a designated area so that the person in overall charge can account for all people and facilitate subsequent *emergency response* (3.8) actions

ISO 15544:2024(en)**3.24****muster area**

designated area to which personnel report when required to do so in an *emergency* (3.7)

3.25**on-scene commander**

person designated to lead ER efforts at the site of the *emergency* (3.7)

3.26**place of safety**

location, installation or vessel where medical treatment for the injured and other facilities for the care of survivors are available

Note 1 to entry: A place of safety represents an environment where they are not exposed to abnormally elevated *risk* (3.31) levels.

3.27**primary method for evacuation**

preferred *method of leaving the installation in an emergency* (3.7) which can be carried out in a fully controlled manner

3.28**redundancy**

use of more than one independent means to accomplish a given function

[SOURCE: ISO/TR 15916:2015, 3.90]

3.29**recovery**

process by which personnel in *survival craft* (3.34) are retrieved to a *place of safety* (3.26)

3.30**rescue**

urgent process by which those who have entered the sea are retrieved to a *place of safety* (3.26)

3.31**risk**

combination of the probability of occurrence of harm and the severity of that harm

Note 1 to entry: A more general definition of risk is given in ISO 31073.

[SOURCE: ISO 13702:2024, 3.35, modified — Note 1 to entry has been added.]

3.32**secondary method for evacuation**

method of leaving the installation in an *emergency* (3.7) which can be carried out in a fully controlled manner under the direction of the person in charge, independent of external support

3.33**survival suit**

protective suit made of materials that reduce body heat-loss of a person wearing it in cold water

Note 1 to entry: The suit can also have sufficient buoyancy and stability in water to turn the body of an unconscious person and keep the person's mouth clear of the water

3.34**survival craft**

vessel capable of sustaining the lives of people abandoning the installation until *recovery* (3.29)

ISO 15544:2024(en)**3.35****temporary refuge****TR**

place provided where personnel can take shelter for a predetermined period whilst investigations, emergency *response* (3.8) and *evacuation* (3.13) preparations are undertaken

Note 1 to entry: A temporary refuge, where provided, does not need to be useable under all accident scenarios.

3.36**tertiary method for escape to the sea**

method which relies on the individual's own action

4 Abbreviated terms

EPIRB	emergency position-indicating radio beacon
ER	emergency response
ERS	emergency response strategy
ESD	emergency shutdown
F&G	fire and gas
HSE	health, safety and environment
IOGP	International Association of Oil & Gas Producers
IMO	International Maritime Organization
IPIECA	International Petroleum Industry Environmental Conservation Association
GMDSS	global marine distress safety system
OPRC	International Convention on Oil Pollution Preparedness, Response, and Co-operation
POB	persons on board
SOLAS	Safety of Life at Sea (convention)

5 Objectives

Effective management systems are required to address the health and safety aspects of the activities undertaken by all companies associated with the offshore recovery of hydrocarbons. These management systems are applied to each stage in the life cycle of an installation and to all related activities. Such a management system, which has been developed for environmental issues, is described in ISO 14001^[2] and the principles contained therein can also be applied to issues relating to health and safety.

EXAMPLE Operators are expected to have an effective management system. Contractors are expected to have either their own management system or conduct their activities consistently with the operator's management system.

One key element of effective management systems is a systematic process of identification of hazards, followed by evaluation and risk management. Risk reduction is an important component of risk management, and the selection of risk reduction measures predominantly entails the use of sound engineering judgement. However, such judgements are supplemented by recognition of the particular circumstances, which can require variation to past practices and previously applied codes and standards. In certain circumstances, risk assessment can provide useful input to the decision-making process provided that the operator has established criteria for this purpose. Risk reduction measures include those to prevent incidents (i.e. reducing the probability of occurrence), to control incidents (i.e. limiting the extent and duration of a hazardous event) and to mitigate the effects (i.e. reducing the consequences). Preventative measures such as

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using inherently safer designs and ensuring asset integrity are emphasized wherever practicable. Measures to recover from incidents are provided based on the evaluation, and developed considering possible failures of the control and mitigation measures. Based on the results of the evaluation, detailed health, safety and environmental objectives and functional requirements are set at appropriate levels.

This document sets out an approach to treat ER in the same systematic manner.

ER measures shall be provided based on an evaluation that takes into account possible failures of the control and mitigation measures. It is these ER measures, which, as an integrated system, provide the appropriate response to an incident occurring on or near the installation.

The results of the evaluation process and the decisions taken with respect to the need for, and role of, any measures required for ER are recorded in the emergency response strategy, see [Clause 6](#).

ISO 13702^[4] introduces the concept of strategies but states that such strategies do not have to be separately documented, as the relevant information can be included with other HSE information for an installation or can be contained in recognized codes and standards that are relevant to the operating location. Indeed, there can be significant overlap between strategies and other HSE information, so that combining this information into one source is likely to assist the understanding of the people on the installation of how the various measures are integrated.

The ERP shall be developed to set out the operational and procedural requirements to be followed under the various emergency scenarios that are relevant for a particular installation.

The resources that typically are involved in ER can be divided into three categories:

a) Installation resources

Resources which are under the direction of the person in overall charge of the installation, and which are immediately available. They include personnel and equipment, vessels and helicopters that have been assigned ER duties.

b) Area resources

Resources which are not under the direction of the person in overall charge of the installation, but which are located in the same area. The resources are made available by a mutual aid or cooperation agreement, and can include installations in the vicinity, supply vessels, other vessels and helicopters.

c) External resources

Resources which are not under the direction of the person in overall charge of the installation, and which are not located in the area. Such resources can be the organization and resources of national and international rescue services, as well as other resources who professional bodies or others can place at the disposal of the field or installation manager. These resources can include aircraft, helicopters, coast guard and navy vessels, shore-based personnel resources, regional or national oil pollution resources, the public health service and resources governed by international agreements and other agreements among the operators of installations.

6 Emergency response strategy

6.1 Objectives

The objectives are to identify and record the intended approach for ER, including the underlying risk evaluation.

6.2 Functional requirements and guidelines

An emergency response strategy (ERS) shall be developed for offshore installations based on an assessment of the potential emergencies that can arise.

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The ERS shall:

- address the issues of organization, procedures, equipment, information, training and the role of other measures that are necessary to achieve a successful ER;
- identify ER measures;
- set out performance requirements for each ER measure consistent with its role specified in the ERS;
- set out how ERS performance requirements are measured and verified;

EXAMPLE The time to muster is an example of a performance requirement.

- account for how an emergency could escalate as the situation progresses;
- account for reliability and availability of ER equipment to determine whether additional components are required to deal with periods of non-availability, e.g. due to maintenance or breakdown;
- account for survivability of ER equipment under emergency conditions;
- account for availability of ER measures during an emergency; and
- account for the potential unavailability of personnel with key ER roles in an emergency.

NOTE 1 The ERS is subject to local regulations, as applicable.

The ERS shall be:

- periodically re-evaluated;
- updated whenever there is a change in risk which affects the content of the strategy; and
- subject to ongoing improvement by learning from incidents, accidents, exercises and drills.

Emergency planning should include sufficient flexibility to remain effective given the uncertainties in how an emergency could develop. Emergency communication arrangements shall inform relevant personnel of their required actions.

For new installations the development of the ERS, and the associated emergency response measures, should be an integral part of the design process.

The results of the evaluation process and the decisions taken about the need for, and role of, the emergency response measures shall be recorded in the ERS. This record shall be made available to those who operate the installation and to those involved in subsequent change to the installation.

Key assumptions used in the development of the ERS shall be recorded, so that they can be reviewed to confirm that they are still valid.

The ERS shall be periodically reviewed by the owner of the strategy.

ER measures to deal with acute oil pollution shall be integrated into the overall ERP. The company responsible for an offshore installation shall liaise with relevant authorities to develop plans to deal with environmental incidents identified in the ERS.

When developing the ERS, the maximum number of people who might be involved in an emergency shall be evaluated and documented. During some phases of life cycle of an installation, such as during major construction work, the number of people on the installation can be significantly higher than assumed in the ERS. Prior to such phases of work, the impact on ER shall be evaluated so that changes to the ER measures can be implemented before number of people increases.

Further guidelines on strategies are given in [Annex A](#).

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7 Emergency response plan

7.1 Objective

The objective is to provide a statement of the key ER actions expected under emergency conditions and the information required to support those actions.

7.2 Functional requirements and guidelines

An emergency response plan (ERP) shall be developed that:

- covers each stage of an ER, from identification of the emergency until the emergency is over;
- addresses the full range of emergencies identified in the ERS;
- addresses the operational and procedural requirements for persons that have a role in responding to an emergency;
- specifies individuals' roles and responsibilities for the emergency response;
- addresses the transfer of emergency roles in the event of an individual becoming unavailable (e.g. due to injury in the initial incident);
- accounts for the range of potential weather conditions;
- accounts for human factors (see [B.1.4](#)); and
- describes alarm signals used on the installation, as well as their meaning and required actions.

The ERP shall also cover other groups who provide services in the event of an emergency, but who are not themselves directly involved in the installation operations. Those groups shall be consulted during the development of the ERP.

The presence of another installation alongside (e.g. during workovers or where a flotel is brought alongside) can impair certain options for evacuation or escape, but can also provide other options via the other installation, for example, if a bridge link is established. Where installations are involved in combined operations:

- ERP for both installations shall be reviewed and, if necessary, revised;
- combined ERP or a bridging document shall be agreed prior to commencing operations, and the arrangements of both installations modified accordingly;
- command structure for the combined operations shall be established to specify the respective emergency command responsibilities.

In preparing the ERP, the various emergency scenarios requiring a response shall be evaluated and the appropriate organization to deal with these scenarios put in place. To avoid excessive detail and repetition, for the purposes of planning, emergencies may be grouped into generic types.

A competent person shall be appointed who is responsible for maintaining the effectiveness of the ERP and for including lessons learnt from the use of the ERP in drills, exercises or actual emergencies.

Locations at which the ERP is used in an emergency shall be identified and copies be made available.

The ERP shall be revised to reflect changes in operation, plant and equipment or personnel.

Arrangements shall be provided to enable persons involved with installation operations to submit ERP improvement opportunities for evaluation.

To enable an effective and comprehensive ERP, the following factors are relevant in preparing the plan:

- identified responsibilities for decision-making;

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- identified lines of command, including how the 'on-scene' commander interfaces with area and external resources;
- competence of those with responsibility for decision-making;
- contingency arrangements for key personnel being unavailable;
- effective communications to provide sufficient information for decision-making;
- effective communications to enable all personnel to be informed of their required actions resources available to provide assistance;
- drills and exercises required to demonstrate effective ER including internal and external communication protocols.

In order to maintain the ERP, there shall be a process to verify that:

- assumptions made in establishing the ERP are met in practice;
- people with roles in an emergency have the required competencies;
- ER equipment is being maintained in an operational ready status;
- ER procedures match current understanding of the events that require ER and how they can escalate; and
- area and external resources can perform their roles.

Where frequency of drills is not dictated by regulations, the ERP shall document the minimum frequency that is judged necessary so that all personnel on the installation, whether direct employees, contractors or visitors, are familiar with their responsibilities in the plan.

Some drills or exercises shall be conducted without prewarning, to test the effectiveness of the ER procedures.

The consequences of a loss of containment can be significantly increased if installations connected by pipelines continue to export hydrocarbons in the event of an emergency. Instructions shall be included in the ERP on the actions to be taken to shutdown hydrocarbon export on these connected installations under emergency conditions. The ERP shall also detail how connected installations are alerted of the need to respond.

Examples of issues that are relevant in developing the ERP are described in [Annex B](#).

8 Command and control

8.1 Objectives

The objectives are to:

- provide a command structure to deal with events specified in the ERS;
- establish the roles of individuals and organizations in the management of an emergency;
- identify key personnel functions in the organization with emergency response leadership roles.

8.2 Functional requirements

A command structure shall be established, which:

- has a clear hierarchy;
- addresses the full range of emergencies specified in the ERS;

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- is adaptable to uncertainties in the way emergencies can develop;
- addresses effective liaison with area resources, external resources, and other interested parties; and
- addresses primacy of command when a vessel is attached to an offshore installation.

NOTE 1 Shorter chains of commands are most effective in emergency situations.

NOTE 2 The command structure includes people who will cover in the event of key personnel being unavailable.

Emergencies shall have a single person accountable for the coordination of ER actions. Command and control arrangements in an emergency should be developed which take into account the normal lines of command.

The respective responsibilities between the roles in the company and external parties shall be specified and communicated to the entities involved.

The individual with responsibility for coordinating ER is typically the person in overall charge of the installation. For escalating emergencies, requiring assistance by area or external resources, the overall coordinator of ER is likely to be on another installation or onshore.

Arrangements for handover of command-and-control functions for different stages of the emergency shall be established.

Allocation of ER tasks shall be reviewed to determine that the various demands placed on individuals can realistically be performed in an emergency.

To enable effective direct handling of the emergency, the ER organization shall include specific onshore resources to handle enquiries from media, governmental entities, interested parties and relatives.

9 Detection of the need for emergency response

9.1 Objective

The objective is to provide arrangements that indicate the need for ER in time for the necessary actions to be successfully executed.

9.2 Functional requirements and guidelines

Criteria shall be established to recognize when an emergency has started, to enable rapid mobilisation of the ERP.

EXAMPLE Emergencies can arise both from situations on the facility (e.g. exceeding the operating envelope) as well as those from adjacent facilities (e.g. subsea equipment, flotels, jack-up rigs, drifting vessels).

Personnel shall be alerted in a timely manner of the need to perform their allocated ER activities as described in the ERP.

Alarms to alert people of the need for ER shall include audible and visual alarms, and voice communication systems.

Controls for systems needed to operate in case of emergency shall be safely accessible during the emergency, normally in central control room, e.g.:

- ventilation, including its shutdown;
- emergency shutdown of equipment that can cause ignition;
- prevention of the escape of flammable liquids and gas;
- active fire protection;
- well control.

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Detection systems shall provide information on the nature and location of the incident to allow ER activities to be initiated.

Facilities to enable an emergency to be notified manually shall be provided.

The primary alarm shall be audible, supplemented by flashing lights in high noise areas. Alarms should be kept as simple as possible to avoid misinterpretation.

Alarms annunciation shall include locations where individuals are expected to initiate control or mitigation measures.

Alarm and other key emergency status information shall annunciate at the main control point.

Where it is not reasonable to actuate an alarm automatically (e.g. in remote, rarely visited parts of an installation), procedures shall be established for communicating emergency information to the people in those locations.

Availability and reliability of detection systems shall take into account the risks to persons and/or the environment and may be improved by introducing redundancy and/or diversity.

For systems with in-built redundancy, the potential for spurious detection should be evaluated. Spurious detection can be dealt with, for example, by the introduction of voting logic.

Detection systems shall be maintained in working order. Contingency arrangements (e.g. limiting operational activities) shall be established for situations where all or part of a detection system is not available (e.g. during maintenance).

Further details on detection are provided in [Annex C](#).

10 Competence

10.1 Objectives

The objectives are to:

- identify the competencies that are required to deal with emergencies;
- provide individuals with the ability to fulfil their role in an emergency.

10.2 Functional requirements and guidelines

Information and training on ER shall be given to all personnel before, or on, arrival at the installation.

Training of personnel with key ER roles (e.g. person in overall charge and the control room operator) shall be conducted before they take up their role.

The ERS shall identify key roles that need assigned replacements in the event of unavailability of the primary person.

The ERS shall identify competence requirements for personnel filling the key ERP roles.

The operating organization for the installation shall identify personnel for ER roles and verify that the competence requirements are met.

When an installation is attended, there shall be competent personnel present on the installation to carry out the required emergency duties, including the operation of equipment specifically provided for emergencies.

Emergency response competence shall be assessed for:

- the general workforce on the installation;
- people on the installation with specific emergency response duties;

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- senior staff in the company's organization, including the person in overall charge; and
- people on other installations or vessels and onshore, who have a role in an emergency.

Individual competencies shall be periodically tested to determine whether further training and knowledge is required to effectively perform their emergency duties. The ERS shall include the measures to be taken to maintain this competence by, for example, drills, exercises and refresher training.

People with key roles in ER shall be given competency and training in ER to enable them to:

- competently perform their ER duties;
- understand the strategy for managing the emergency;
- make good use of the available ER equipment;
- assess the adequacy of individual or group performance in drills, exercises and emergency events;
- lead in stressful situations; and
- communicate information.

A plan and schedule shall be drawn up for drills and exercises on a range of representative scenarios.

To be demonstrated competent, individuals shall be assessed to be able to apply training, experience and knowledge to undertake ER tasks for which they are responsible. Where practical, the assessment should be carried out under simulated conditions, either individually or with the ER team.

The organization used for ER should reflect the organization used in normal operating conditions. In this way ER is emphasized as a responsibility embodied in the normal management structure. However, in the case of non-routine activities such as combined operations with a crane barge or flotel, an alternative organization for ER can be appropriate.

The ER organization should be flexible, taking into account human behaviour under stress and that key personnel can be unavailable or injured in the emergency. Flexibility in the ER organization shall be included in training, exercises and drills so that those required to substitute for key personnel are competent to do so.

Arrangements shall be made for visitors (e.g. short-term contractors) who are less familiar with the installation. These arrangements shall include general training in emergencies, installation-specific induction training and training based on the ERP. Information, instructions and training shall be periodically refreshed or revalidated.

Further details on competence are given in [Annex D](#).

11 Maintenance of emergency response equipment

11.1 Objective

The objective is to maintain the condition of ER equipment and systems so that they are operationally ready when required.

11.2 Functional requirements and guidelines

As part of an overall management system, each operator shall establish operational, inspection, testing and maintenance procedures to ensure that the functional requirements of the equipment and systems provided for ER are maintained. Applicable standards shall be identified and implemented.

Systems shall be tested prior to first use, to confirm that they meet the appropriate functional requirements.

A schedule shall be prepared, detailing the inspection, testing and maintenance routines and frequencies to be followed.

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Systems shall be inspected, tested and maintained following the established procedures.

Records of the results of the inspection, testing and maintenance shall be kept and periodically reviewed to verify that the procedures are effective and are being implemented.

Operational tests shall verify the condition of ER systems.

Use, impairment and restoration of equipment or systems shall be recorded and reported.

Identified failures or impairments shall be promptly corrected. Where equipment cannot be promptly returned to service, contingency plans shall be implemented.

If arrangements provided for ER are not available, the person in overall charge shall evaluate the impact on emergency response and, introduce additional measures so that effective ER is still possible.

Since some ER equipment can be unavailable from time to time (e.g. survival craft for routine maintenance), the ERP shall set out the actions that are required when such non-availability occurs.

Escape and evacuation routes shall be provided and maintained.

Equipment provided for ER purposes shall not be used for other purposes, not even temporarily.

Maintenance, inspection and testing of emergency equipment shall only be undertaken by people who are competent to perform this task and interpret the results of tests. In some cases, this maintenance can require resources from the equipment supplier or other expertise not routinely available on the installation.

Examples of typical frequencies of inspection and testing of equipment associated with mitigation and control of fires and explosions and in evacuation, escape and rescue are addressed in ISO 13702^[4].

12 Communications

12.1 Objectives

The objective is to provide communication arrangements between the person in charge, the people on board and external resources to enable emergency response, including means for the person in charge to:

- receive accurate information about the emergency via internal communication on the facility;
- issue emergency instructions to the people on board;
- communicate with external parties who have a role in performing the emergency response.

12.2 Functional requirements and guidelines

Personnel with ER roles shall be trained in the use of ER communication systems.

The ERP shall describe communications methods related to ER. Communication should be given in a manner and in the language or languages of the recipients. The ERP and supporting procedures and checklists intended for use in an emergency should be in a concise and readily usable format.

Locations at which workers can be present shall be provided with audible and visual systems. Two-way ER communication systems shall be provided where people muster as part of ERP or at general muster areas.

The audio system shall be supplemented by communication systems fed by uninterrupted power supply. Communication arrangements shall remain available throughout the ER.

Arrangements shall be in place to enable effective communication between persons with command and control responsibilities and all others on the installation or engaged in activities connected with it.

Suitable equipment, information processing and procedures should be in place to enable effective communication between persons with command and control responsibilities and all others on the installation or engaged in activities connected with it (e.g. diving, support or construction vessel activities,

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loading and unloading operations, and shoreside organization). The purpose of these communication arrangements is two-fold:

- to enable information on the developing incident to be reported to those in command (to facilitate an assessment of what action is required); and
- to enable the person in overall charge to take the action necessary to safeguard people, environment and assets on the installation.

There shall be provision for communicating with persons or organizations who take action in an emergency (e.g. to shut down pipelines) and with possible sources of external assistance, such as other installations, vessels, other search and rescue facilities and shore-based facilities.

When selecting the means of communication, both for internal use and for communication with area and external resources, the operational conditions under which they are to function should be taken into consideration, including:

- noise (both operational and weather);
- ambient conditions;
- light and visibility conditions, including smoke;
- gas concentrations (flammable and toxic);
- susceptibility to damage;
- ease of use.

The person in charge of visitors shall ensure that they have been given instructions on the correct actions in an emergency. Day visitors who have not undergone training should be accompanied during their stay, in addition to being given instructions for the time that they are on the installation.

Further details on communications are given in [Annex E](#).

13 Escape, refuge, evacuation and rescue

13.1 Objectives

This clause addresses escape, evacuation and rescue including refuges for muster, including:

- escape routes, which are used in an emergency, from work locations to the place where people muster;
- safe areas where people can muster while evacuation preparations are being made;
- arrangements to allow people to abandon the installation in a controlled manner under emergency conditions;
- arrangements to recover and rescue people who abandon an installation in an emergency and transport them to a place of safety;
- accounting for the location of all personnel on board during an emergency.

13.2 Functional requirements and guidelines

Escape and evacuation routes shall be available for the duration needed for people to reach their assigned muster area and rescue teams to safely bring injured people to areas where medical treatment can be given.

Locations on the facility where people can be present during routine operation shall be identified. At least two escape routes shall be provided from all areas of an installation where people are expected to be present during their normal activities. Diverse escape routes should be as far apart as possible. For other areas and activities, specific means of escape and rescue shall be established in each case.

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Escape routes and exits shall be clear of obstructions and lead by the most direct route to a safe area, a safe assembly point or a safe evacuation point.

Escape routes and exits shall be indicated by signs and markings. Signs shall indicate the direction to muster areas, embarkation areas. The type, effectiveness and location of signs shall be selected to be readable in conditions, such as the presence of smoke, that can occur when the signs are needed. All personnel on the installation shall be informed about emergency signs and markings as part of the installation induction process.

Signs should also mark the location of:

- ER equipment such as evacuation equipment, safety equipment and first aid equipment; and
- temporary refuges and muster areas.

Emergency lighting shall be provided which illuminates the route for, at least, the time that people will use it.

Dimensions of escape routes shall be determined based on the number of people who could be required to use them. Escape routes shall have vertical clearance to enable use by anyone.

Requirements for redundancy in the escape, refuge, evacuation and rescue equipment shall be evaluated.

Doors in escape routes shall:

- open in the direction of escape or be sliding doors;
- be operable in an emergency by an individual; and
- be designed to minimize the potential to impair their function when used (e.g. self-closing doors).

Casualty recovery can extend the time for which routes need to remain available.

- Use of stretchers and associated space requirements shall be accounted for, particularly regarding corners, stairway platforms and doorways.
- A route suitable for stretcher cases shall be identified between the sickbay and a preferred evacuation point.

Arrangements shall be made for recovery and rescue of people from the sea who have:

- abandoned the installation because of an emergency;
- entered the sea as a result of a helicopter ditching close to the installation; and
- fallen into the sea whilst undertaking a work activity on the installation.

Evacuation arrangements shall account for constraints on their use imposed by weather conditions, the nature and location of the emergency and the time available to evacuate. The means of evacuation shall take into account the likely distribution of personnel and likely evacuation scenarios, and be accessible from the muster areas.

Arrangements shall be provided to account for all persons on board during the emergency. Additional arrangements shall be made for those with particular needs, e.g. colour blind, injured people and divers in saturation.

Spare capacity shall be provided in the evacuation system (e.g. survival craft) such that, in the event of some part of the system becoming unavailable, there remains capacity elsewhere to safely accommodate persons on the installation. The degree of spare capacity shall be determined and justified by the assessment of the EER arrangements.

Each individual shall be:

- provided with personal equipment needed to escape, in alignment with the ERS, e.g. survival suits, lifejackets; and

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- be equipped to allow people to escape from them in case they stop in an emergency.

Survival time of structure and equipment needed for evacuation shall be long enough to enable safe evacuation of the platform to occur, including primary installation structure, temporary refuge, fire walls, escape routes and evacuation equipment.

In developing the ERS, the use of TR should be evaluated, and the ERP should address the actions required if people are not able to use the muster area. The designation of alternative muster locations should be evaluated for such situations.

A variety of evacuation measures shall be provided to allow the person in overall charge to organize the evacuation, accounting for the conditions that can be present when there is a need to evacuate the installation.

For normally attended installations there shall be three alternative evacuation means:

- a) primary means of evacuation, e.g. helicopter, "walk-to-work";
- b) secondary means of evacuation, e.g. survival crafts;
- c) tertiary means of evacuation, e.g. escape chutes, life rafts.

For normally unattended installations alternative means of evacuation, that would allow the person in overall charge to organize the evacuation, shall be assessed and documented.

Arrangements shall be made for recovery of personnel in launched survival crafts. It shall be demonstrated that these arrangements are effective and available when required. The evacuation, recovery and rescue process is complete when all personnel reach a place offering a level of safety comparable to that existing before the emergency, and are provided with suitable medical facilities. In many emergencies, it is possible to evacuate using area or external resources, if necessary, as this is the normal method of travelling to and from the installation. However, the evacuation arrangements provided on the installation should allow the person in overall charge to evacuate the installation in a controlled manner, without reliance on area or external resources. Area or external resources should be used, where available, to assist in the recovery of people from survival craft and rescue of people from the sea.

Some emergencies can develop so rapidly that the person in overall charge cannot evacuate the installation in a controlled manner. To cover this situation, arrangements for individual escape to the sea should be provided (e.g. life rafts, escape chutes, leg ladders). Maintaining tracking of POB is important in this situation.

Means of evacuation to sea should be located to be readily accessible to all persons from muster areas and recovery related duties, the vessel shall be equipped to allow people in the sea to be quickly brought onto the vessel without exacerbating or causing injury.

The ERS should determine whether a vessel permanently stationed in the vicinity of an installation is required in order to assist with evacuation of the installation or recovery of people from the sea. Where such a vessel is required, the vessel and associated equipment provided should be specified to ensure that the vessel can perform the required functions.

When the vessel is provided with fast rescue craft for man overboard scenarios:

- launching and recovery arrangements for the fast rescue craft shall be compatible with the weather conditions that can be present when rescue activities are carried out; any restrictions in rescue capability shall be communicated to the person in overall charge of the installation, so that suitable control measures (e.g. limiting over-side working) can be instigated;
- fast rescue craft used should be compatible with the vessel provided for rescue, so that patients can easily be taken from the craft to a suitable place on the vessel; it should be compatible with lifting injured people in fast rescue crafts to the installation for medical attention.

The design of the evacuation facilities shall take into account that there can be multiple casualties needing to be taken to the muster area and evacuated under emergency conditions.

ER equipment that is designed to enter the water shall be marked with the name of the installation.

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Additional guidelines are given in [Annex F](#).

14 Environmental emergency response

14.1 Objective

The objective is to eliminate, reduce and/or mitigate the environmental impact of an uncontrolled, unplanned or accidental release of a hazardous material into the environment.

14.2 Functional requirements and guidelines

During the design of the installation, the possible impact to the environment that can arise during accidental conditions shall be evaluated and measures provided to avoid these discharges or to reduce their likelihood.

The ERS shall identify if there are likely to be periods of increased environmental sensitivity that would require additional mitigation of risk (e.g. wildlife breeding seasons).

Based on the environmental risk assessment, an environmental emergency plan/spill plan shall be developed to handle the possible spill scenarios.

ISO 14001^[2] and the guidelines contained in ISO 14004^[3] set out requirements for management of environmental incidents.

The environmental ER plan specifies the response strategies and identifies in advance the resources (response means, personnel and logistics) required for an effective environmental ER.

The impact of accidental discharges to the environment can be felt for a considerable distance from the installation. The ER plan should be based on a full assessment of the potential impact and prepared in consultation with those who have a role in minimizing the environmental effects.

The environmental ER plan should be based on a logical and structured analysis in:

- identifying and analysing possible spill scenarios;
- specifying response strategies for identified scenarios;
- analysing the regulatory context in terms of emergency response capability;
- identifying the resources for implementing the response strategy;
- setting up an organization to implement the strategy.

Many emergencies involve mitigation of both safety and environmental consequences, and ERP shall, where relevant, be integrated to enable effective handling of all aspects of the incident. In addition to safety aspects, the ERP shall account for potential environmental impact based on the environmental risk assessment.

Further details on environmental ER is given in IOGP/IPIECAs good practise guideline “Contingency planning for oil spills on water”^[11] and “Oil spill risk assessment and response planning for offshore installations”^[12].

International convention OPRC (in convention on oil pollution preparedness, response and co-operation)^[13] provides valuable information.

15 Medical emergency response

15.1 Objectives

The objectives are to provide:

- medical care system on the installation, including medical facility that can be used for medical treatment and first-aid care before evacuation to a medical facility that can provide definitive care, can be organised;

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- medical evacuation to a medical facility that can provide definitive care, when necessary.

15.2 Functional requirements and guidelines

The medical care system for attended installations shall consist of:

- procedures and competence requirements to ensure the quality of medical personnel;
- medical records system;
- medicines;
- facilities and equipment to manage predictable illnesses and injuries;
- arrangements for transportation and evacuation of patients (e.g. medevac);
- verification activities for the medical care system.

Medical facilities shall facilitate predictable medical care and first aid (e.g. heart attack, stroke, food poisoning, epidemic, contagious diseases).

Medical personnel should be included in installation ER drills and exercises.

Medical care shall be provided by authorised medical personnel. A medical doctor shall have professional authority and oversight for the medical service on the installation. Telemedicine is commonly available.

Controlled drugs and medicines shall be stored in a secure place accessible only to authorised personnel.

All normally attended installations should have a place where a qualified person can supervise and manage care of patients.

The designated place on the installation for patients should be readily accessible to people carrying a stretcher and have easy access to the places on the installation used for evacuation.

Medical emergencies that should be planned for, particularly if the operating environment means that external assistance could be unavailable, include food poisoning and epidemics.

The level of medical facilities and trained personnel provided should be in line with the ERS and/or a medical emergency response plan.

ISO 15544:2024(en)**Annex A**
(informative)**Guidelines on the development and assessment of an emergency response strategy****A.1 General**

The general approach for the design should be to:

- a) avoid or withstand events that require ER;
- b) integrate ER into design through, for example, increasing capacity of the structure to withstand accidental loads, separating hazards from accommodation and from non-hazardous areas, providing passive fire protection, providing a secure refuge and evacuation routes that are likely to be available under emergency conditions.

A.2 Emergency response strategy

The ERS should:

- specify and explain the objectives of the ER arrangements;
- explain in general terms how the objectives are to be achieved;
- specify the role of external resources;
- take account of any installation and location-specific factors that have significance for the ER.

The information needed to prepare an ERS varies depending on the scale of the installation and the stage in the installation lifecycle at which the identification and assessment process is undertaken.

EXAMPLE 1 Production platforms incorporating complex facilities, drilling modules and large accommodation modules, require detailed studies to address hazardous events such as fires, explosions, ship collisions, structural damage.

EXAMPLE 2 For installations in the early design phases, the evaluations are necessarily less detailed than those undertaken during later design phases and focus on design rather than on the organization of ER. Assumptions used during early stages are verified during subsequent project development stages.

The ERS or other supporting documents describe the role and functional requirements for each of the systems required for ER including:

- functional intent of the particular system, i.e. a statement of the purpose and essential duties that the system is expected to perform;
- integrity, reliability and availability of the system;
- survivability of the system under the emergency conditions which can be present when it is required to operate;
- dependency on other systems which could be unavailable in an emergency.

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A.3 Description of ER measures

Emergency response measures include hardware, equipment, emergency response organization and procedures, that are identified in the ERS. Performance requirements for each ER measure are set consistent with its role specified in the ERS.

As the ERS is periodically reviewed, the ER measures are also reviewed and assessed. This is to assure that:

- strategic objectives are met;
- performance requirements are met;
- ER measures are still valid and serve the purpose they were intended.

For installations at the design stage, the ER measures can be only specified in general terms. Nevertheless, the proposed measures should be set out in as much detail as the progress of design development allows.

A.4 Assessment, development and review of ER measures

The assessment of either existing or proposed measures essentially comprises an analysis of their performance followed by a judgement as to their adequacy. If the measures are judged to be inadequate, then some change is required which could be a combination of either modifying the measures or reducing the hazard to a level which can be handled by the measure. Following such modifications, the assessment stage can be repeated to determine if the inadequacy has been corrected. Typical data used for an ER assessment includes:

- production parameters:
 - production rates and maximum blow out rates, well stream properties;
 - reservoir conditions and fluids, e.g. sour wells;
- location constraints:
 - distance to the nearest installation and distance to shore;
 - area and external resources available (e.g. through local agreements);
 - environmental conditions and sensitivity, including variations throughout the year.
- operational parameters:
 - effect of time of day and day of week when an emergency arises;
 - immediate effects of the incident on the installation and people (e.g. effects of blast, effect of flammable and toxic clouds.);
 - development of heat and smoke in the event of fire;
 - capacity for treatment at available medical facilities;
 - revision of acceptance criteria for risk in the activity concerned.
- human factors:
 - crew and variations in the crew;
 - human behaviour under stress;
 - competence requirements;
 - operational experience, which suggests that an alternative ERP can be more effective;

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- experience from ER drills and exercises.
- ER framework:
 - emergency scenarios that can arise;
 - specific ER requirements for activities on the installation;
 - data assumptions used in the ER analysis;
 - ER equipment;
 - ER organization;
 - ER procedures;
 - ER control methods;
 - agreements with area resources and external resources;
 - information regarding the capabilities of external organizations to assist in ER;
 - experience from incidents, including near misses on comparable installations;
 - changes in environmental assumptions and knowledge;
 - research results and new knowledge within technology, organization and management theory, etc.;
 - changes in:
 - legislation,
 - recognized standards.
 - conversion of an installation or change in the use of the installation.

In selecting ER equipment, the following issues are typically evaluated in developing the functional requirements:

- location;
- type;
- number;
- capacity;
- accessibility and survivability under emergency conditions;
- procedures required when equipment is unavailable for any reason;
- ease of use;
- maintenance and training requirements;
- reliability, availability and spare capacity.

Once the immediate threats of an emergency have been managed, such that no further evacuation is necessary, there can be a recovery phase. This phase can involve:

- organizing transportation for injured or sick personnel, with due regard given to the patient's condition and need for treatment and care;
- transfer and support of evacuated and rescued personnel to their final destination;
- recovery of released oil at sea and ashore;

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- collection of released chemicals and debris caused by the hazardous event.

ISO 15544:2024(en)**Annex B**
(informative)**Guidelines on emergency response plans****B.1 Formulation of the plan****B.1.1 General**

The ERP is part of the ER measures, and as such its formulation, assessment and development follows [Clause 7](#). It sets out the operational and procedural part of the arrangements by laying down who does what, who is responsible for what, where, when, how and for what purpose. The ERP is a working tool that is used regularly for training and exercises, and is the basis on which a real emergency is handled. It should be clearly written with the emphasis on ease-of-use and practical information that would be required in an emergency.

The plan covers all stages of an ER, from detection of the emergency until the emergency is over and persons are considered to be in a place of safety. For example, the stages in an ignited hydrocarbon release can involve detection, alarm, fire-fighting, muster, evacuation and recovery from the sea. Other emergency situations can involve a very different sequence of events.

Where onshore facilities are involved in the plan, the interface between the installation's arrangements and the onshore arrangements should be specified.

Most ERPs are installation-specific, but in some circumstances the ERP may cover a number of nearby installations. In this case installation-specific variations are made available on each installation.

The ERP provides instructions and procedures to be followed in the event of an emergency.

The ERP also addresses the implications and procedures required for an installation that is part of a larger production and transportation system. Depending on how the installations are interlinked, (e.g. through a common pipeline system; host platform receiving hydrocarbon streams from third-party installations), it can be necessary to define specific ER requirements and communication protocols.

Weather conditions can have a major impact on the options available during offshore emergencies. The ERP accounts for the range potential of weather conditions, whether helpful or adding additional challenge.

It is important that deployment of the ERP is practical and realistic given the specific facility design and EER measures present. Typical areas for review include:

- accessibility of muster areas, means of evacuation and lifesaving appliances under specific emergency conditions;
- ability of facility leadership to make ER decisions under stressful conditions;
- accessibility of the firefighting systems and their control stations;
- alternative means of communication (including the public address and general alarm system) in the event of system non-availability or damage caused by the emergency;
- time for patient transportation to shore;
- weather criteria for safe evacuation (e.g. for launch of lifeboats and/or life rafts);
- availability of medical facilities on the installation;

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- maximum acceptable mobilization time for helicopters involved in medical emergencies, rescue, evacuation or proactive reduction of POB (e.g. in advance of storms);
- availability of sufficient helicopters for evacuation;
- potential conflicts for personnel with multiple duties/ER roles;
- ability of personnel to perform multiple physical duties and competence and training to support the roles;
- maximum acceptable time for:
 - mustering;
 - establishing a count of POB;
- maximum recovery time in the event of:
 - person overboard;
 - helicopter ditching in the vicinity of the installation;
 - installation abandonment;
- oil spill management;
 - handling capacity of the anti-pollution control equipment;
 - response time of anti-pollution means;
 - storage capacity for recovered oil;
 - training of personnel participating in anti-pollution control operations;
 - endurance of anti-pollution control equipment and anti-pollution ER organization;
 - available for oil spill means;
- environmental risk management:
 - oil spill preparedness and response, see IOGP/IPIECA report 520^[10].

B.1.2 Organization

In the event of an emergency the prime role of management is to implement the ERP with a view to achieving the objectives laid out in the ERS. Ensuring effective ER depends on an effective management command structure, both offshore and onshore.

It is important for the ERP to reflect the management command structure and contain information to enable command actions to be taken.

For simplicity of transition, emergency command structures are typically selected to be as similar as practical to the command structure used in normal operation.

Where contractor's employees form part of the ER organization, contractual arrangements should address the availability and competency of the relevant contractors.

The design of the command structure ensures that enquiries and requests, for instance from media and next of kin, do not obstruct the handling of hazardous situations and accidents that have occurred.

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B.1.3 Command and control

B.1.3.1 General

Command and control on the installation, including communications with other agencies off the installation, should lie with one clearly designated individual (usually the person in overall charge), with a designated alternative person in the event of an unplanned transfer of command (e.g. if the person in overall charge is injured).

The ERP addresses

- the transfer of command at different stages of the emergency, or
- when individuals become unavailable,

for example, after all the personnel have left the installation.

B.1.3.2 Flexibility

It is not possible to accurately predict the actual conditions that could arise during an emergency. Therefore, the plan should not be overly prescriptive and, where appropriate, allow flexibility to ensure the most effective response.

The ERP should include flexibility to adapt in the knowledge of the actual progression of the emergency and the conditions in which it occurs.

B.1.3.3 Familiarity

The organization described in [B.1.2](#) typically follows as close as practical the day-to-day organization for normal operations. A familiar command structure is likely to give more effective command and control in an emergency. This also has the advantage that skills and experience can be directly transferred from the 'normal' role to 'emergency duties'. Suitable ER often relies on quick decisions and actions. It is important that personnel are not only aware of the command structure, but also how their role and actions could affect others.

B.1.3.4 Decision-making

In an emergency, the situation can change rapidly, and it is essential that the transmission of information and decisions are effective. Decision-making processes in emergency situations are different from normal operation due to time constraints and ambiguous information. Training for personnel in charge should include decision-making in emergency situations.

B.1.3.5 Redundancy

No area of the organization should rely totally on the availability of any single element. This means that key personnel have designated alternative persons who can take over their role. Alternative persons should have the same level of training as those in the roles they will step into.

B.1.3.6 Availability

In some cases, personnel are assigned multiple ER roles. There should be no conflict created by personnel being assigned to two or more ER roles.

B.1.4 Human factors

In formulating the ERP, it is important to focus on the behaviour of people and their interaction with the plant and equipment. Realistic assumptions should be made regarding the likely pattern of human behaviour in an emergency so that, for example, allowance is for the potential effect on human performance levels of

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factors such as increased stress, reduced visibility, etc. and personnel are not automatically assumed to be capable and reliable in carrying out their duties. In particular:

- where a person is required to perform a key task as part of the ERP:
 - factors relevant to its success (information flows, physical requirements, etc.) should be assessed; and
 - the possibility of the situation being made worse by incorrect actions should be evaluated;
- time allowed to complete an action, e.g. mustering, should account for potential delays introduced by stress, physical conditions, etc. and not only be based on times obtained in exercises where such performance modifying factors can be absent;
- nature of the emergency can limit the time available for the decision-making process; decision-making aspects of the ERP should place realistic expectations on those making decisions given their need to receive and process relevant information.

B.1.5 External resources

External resources which have roles in the ERP should be periodically consulted to:

- verify their capability to perform the role;
- inform each other about relevant changes.

EXAMPLE 1 Typically the coast guard can have statutory responsibility for the coordination of search and rescue operations.

EXAMPLE 2 Standby vessels that can execute man overboard manoeuvres.

Other external resources that can be involved in ERP include other operators, air/sea rescue services, helicopter operators, and marine support operators should be consulted.

Information on the external resources that are likely to be available should be identified within the ERP including the functions which they perform, the timescale and mechanism.

B.1.6 Installations connected by pipelines

Installations connected by pipelines coordinate their ERPs, as an installation continuing to export into a pipeline could increase the consequences of a loss of containment. The coordinated ERPs include how to communicate between installations to shutdown pipelines.

It is good practice for any installation that suspects that there can be a loss of containment fed by a pipeline system to immediately stop export of fluids until they have confirmed that it is safe to resume export, see [7.2](#).

B.2 Implementation of the plan

B.2.1 Presentation

Although the topics addressed in the ERP are wide-ranging, the plan itself should be clear, concise and user-friendly to assist understanding and inspire confidence.

Preparing a series of schematic diagrams is useful to support the response to emergencies and the decisions faced by the person in overall charge, including key information on the:

- incident itself;
- status of support;
- environmental conditions.

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The information presentation should take into account the requirements for diagnosis of technical information, to enable timely response to the emergency.

Content of the ERP can vary for different operators, locations and installations, however an ERP typically includes:

- role descriptions and organization charts;
- description of ER measures;
- escape route plans;
- drawings showing layout of safety equipment;
- schematic drawings illustrating ER scenarios and action plans;
- emergency contact arrangements.

Further details should be provided in the ERP on the criteria for choosing particular courses of action (e.g. when to instigate reduction of POB, when to inform the coast guard). In most situations it is obvious when there is an emergency requiring a response. However, there can be circumstances when the transition from normal operations to an emergency is less obvious, and further details should be provided on deciding when to initiate the ERP in these circumstances. For example, when a situation has the potential to rapidly deteriorate such as loss of well control.

B.2.2 Training

The objective of training is to ensure that individuals are familiar with their role in the ERP, and any equipment that they are required to operate in an emergency. It is also necessary that they retain this awareness in demanding circumstances.

For most training courses and competency assessments, industry-approved guidelines should be applied to provide sufficient training standards. However, where specialist requirements are identified, specific training for these requirements should be provided (e.g. fire-fighting teams).

Where contractor's employees have specific ER duties and require specific training, this should be discussed with the contractor to ensure that this training is provided and to agree on who is to provide it.

Training should enable:

- persons with command or other specific responsibilities within the ERP to achieve and maintain their required competence;
- everyone on the installation to become familiar with the actions expected of them in an emergency;
- all persons required to use specific equipment to be proficient in the use of this equipment;
- persons new to the platform are given familiarization in the aspects of the ERP relevant to them.

The training programme, including refresher training, should be subject to regular reviews so that it remains aligned with the current status of the facility and incorporates lessons learned.

B.3 Monitoring of the plan

B.3.1 General

The ERP should be subject to a monitoring programme to confirm that the ERP continues to meet the needs of the installation. Drills are an important part of this monitoring process, including times to achieve certain aspects of the plan.

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B.3.2 Drills and exercises

Drills and exercises should:

- provide practical experience to all personnel;
- provide practical experience in communications and the use of equipment;
- test related procedures;
- test area and external resource capabilities to fulfil their role in the ERP;
- test all related procedures (e.g. pipeline emergency procedures, diving emergency procedures);
- test performance of individuals and groups.

Safety is a prime consideration when carrying out practice drills, requiring effective management judgement to avoid unnecessary risk.

For incidents that can escalate rapidly, it is recommended to use the detection system to activate the early stages of ER.

EXAMPLE Automatic control action on a fire-monitoring system initiating the general alarm.

There is generally a need to assess an incident and its potential once it has been detected and a local alarm raised before deciding whether or what continued ER is required. Assessment activity continues throughout the emergency, depending on the type of incident and the way it develops. Generally, incidents which have no potential to deteriorate into a situation requiring abandonment require less reassessment.

Arrangements should be made on an installation to:

- practice evacuation procedures as part of the weekly drills on the installation;
- undertake an ER team exercise during every routine offshore trip;
- organize an ER exercise whenever there is a significant change to part of the ER organization, such as when a new contractor is introduced;
- undertake an ER exercise on a regular basis involving onshore support organizations;
- undertake an installation-based oil-spill exercise on an annual basis involving relevant external parties and facilities; major oil-spill response is likely to involve several organizations which are often shared with other operators;
- vary scenarios to cover all emergencies.

Lessons learned during exercises and drills should be submitted into a corrective action system for evaluation and implementation.

Benefit can be gained from involvement and liaison with external parties such as the coastguard, stand-by vessels, shared resources and helicopter operators.

ISO 15544:2024(en)**Annex C**
(informative)**Guidelines on detection**

The hazard identification and assessment process for an installation identifies potential major accidents that require an ER. In addition, there are lesser incidents which have limited potential to escalate to a point at which partial or complete evacuation is necessary, but which nevertheless require an ER. Arrangements should be made for the detection of these incidents so that those responsible for the management of emergencies are made aware that a response is required.

The means of detection of an incident can range, for example, from complex automatic systems that continuously monitor for the occurrence of an incident, to operational procedures that inform personnel of the actions to take on observing an incident. Examples of the latter include fire-watch arrangements for certain hot-work operations and man-overboard procedures.

Detection systems are provided to detect the abnormal conditions associated with a potential emergency. The nature of a detection system is determined by the characteristics and location of the potential emergency as well as the environment in which the detection system is located.

For events that can develop rapidly into major accidents in the absence of successful control action, it can be appropriate to install continuous monitoring devices. For more slowly developing emergencies, periodic monitoring can be adequate.

Detection can also arise as a result of people noticing abnormal conditions. Personnel on the installation can be instructed to take relevant actions when such detections occur (e.g. abnormal smells, vibration, noise).

Following detection of an incident, alarms should be raised so that appropriate persons are alerted in a timely manner to the need to perform their allocated ER activities. For example, these activities range from making safe the workplace and mustering at predetermined locations, to assessing the nature of the incident and deciding which, if any, subsequent parts of the ERP are needed.

An alarm may be given by means of technical, operational and organizational measures, such as:

- automatic and manual warning systems, e.g.:
 - sounders;
 - warning lamps;
 - computer screens;
 - optical signals;
 - loudspeakers and telephones;
 - fire alarms;
 - global marine distress safety system (GMDSS);
- location of warning systems in relation to the various work positions;
- alert procedures which determine who is to do what, and when;
- organization of personnel, e.g. by:
 - continuous operational control;
 - fire watch during hot-work;

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- guard during work over open sea.

Selection of types and locations of alarms account for the:

- environment in which they are located;
- speed with which the incident can escalate;
- expected distribution of personnel around the installation.

EXAMPLE For alarm arrangements on a normally unattended installation, it can be appropriate to relay alarms to those responsible for mobilizing emergency resources external to the installation.

ISO 13702^[4] identifies audible and visual alarms that are being adopted in many offshore operating environments in an attempt to harmonize such alarms across the industry.

ISO 15544:2024(en)**Annex D**
(informative)**Guidelines on competence**

People with key roles in the ER organization should understand:

- industry practice of ER for offshore installations;
- emergency response strategy;
- environmental data;
- status and condition of safety systems;
- methods and media for information communication;
- ER organization and management;
- human behaviour in stressful situations.

It is important for effective ER that the organization act in a manner that is suited to the purpose, logical and systematic. Those with roles in ER should be capable of dealing with the situation irrespective of the:

- time of day;
- duration of required effort (such as during oil-pollution control);
- shift duty rosters;
- phase of the activities;
- size of crew on the installation;
- capability of personnel.

All people on an installation have basic training in ER, basic first aid, use of life-saving appliances and fire-fighting. In addition, as part of the installation induction process, new people are introduced to the installation-specific:

- evacuation routes, designated muster areas and ER equipment;
- main hazards and incidents that can arise;
- ER procedures and action plan;

EXAMPLE Station bills can have simplified presentations of procedures and plans.

- individual expected actions.

Competence can be acquired through training, exercises and drills, but requires a plan to be developed to build up competence for those who are new to a role or who do not have a demonstrable level of competence.

Management of competence involves;

- acquisition of new knowledge and skills, e.g. through courses, attitude campaigns and safety meetings;
- maintenance of knowledge and skills to enable handling of individual parts of the total ER;
- refresher courses, familiarization with the use and operation of ER equipment and with the emergency control centres onshore;

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- verification of competence using exercises and drills. A plan for drills should account for relevant factors including:
 - shift duty roster;
 - types of operation which can be in progress when an emergency arises;
 - level of activity on the installation;
 - organizational changes;
 - time of year.

ISO 15544:2024(en)**Annex E**
(informative)**Guidelines on communication**

Emergency response relies upon effective and reliable communication between all on-board people. The ERP describes the communications required or available for any incident (both on and off the installation) including detection and alarms, the information needed, and time it is to be transmitted.

The following factors should be evaluated and included in the procedures for each type of incident:

- what incident information needs communicating and for what purpose?
- who needs this information?
- when is the information required?
- how long and frequent will communications be required?
- information prioritisation to avoid overload from non-essential information.

In addition to the specific communications concerning the management of each incident located on and off the installation, some information is given to personnel on the installation including people not directly involved in the incident management, e.g. those personnel who are only required to muster.

Communications systems are designed to remain available during an incident, to ensure that all personnel are warned of the emergency and informed of the appropriate action to take. The locations from which the system can be initiated are identified including both manual and automatic initiation. Manual initiation should be possible from the control points and at appropriate locations around the installation.

Personnel should be provided with adequate information to allow them to:

- initiate alarms where necessary;
- distinguish between alarms;
- respond to alarms.

In an emergency situation, the telecommunication systems provided for normal operation should remain active, provided that their continued operation does not create additional hazards. In order to prevent an incident such as a fire or explosion from disabling any part of the emergency communications critical to the ERS, the following are evaluated:

- system diversity/duplication;
- separation/mechanical protection;
- selection of materials (e.g. fire-resistant cables).

Communications arrangements are likely to include:

- electronic messaging systems;
- telephones;
- public address system;
- radio equipment, with frequencies according to national or international agreements;
- satellite transmission equipment;

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- sound and light signals;
- manual or electronic systems for editing and presentation of information, including systems for use in ER centres onshore.

When designing the installation and selecting equipment for communications, the following should be evaluated:

- possibility of radio signal transmission for internal communication to and from every location on the installation where people can be found;
- audibility of the public address system;
- functionality to allow people to easily use the communications equipment whilst performing their ER role.

During an emergency it is good practice to keep a record of:

- time and contents of important messages and decisions, e.g.:
 - alarm calls;
 - summoning of ER resources;
 - arrival of ER resources;
 - changes in strategy to manage the emergency (e.g. start or suspend fire-fighting);
 - decision to evacuate;
 - weather reports;
- muster list of personnel before and after rescue and evacuation, e.g.:
 - number of injured and, if applicable, fatalities;
 - type of injuries;
 - whereabouts of personnel;
- description of significant milestones in the development of the accident or the hazardous situation.

In the event of situations that entail increased risk for the activity in question, a preliminary alert to relevant ER resources should be considered.

Communications with visitors need special care, as they could be unfamiliar with the installation and unsure of both the emergency procedures and the actions expected of them in an emergency situation. It is good practice to take them on a tour of the installation soon after their arrival and to specifically inform them of the emergency alarms and the actions that they are expected to take when the alarm is sounded. Visitors who are unfamiliar with offshore installations should be accompanied whenever they leave the accommodation area. Installation booklets (or similar) providing visitors with essential information, including alarms and ER actions, are frequently found to be useful and should be used on installations which are likely to have visitors.

ISO 15544:2024(en)**Annex F**
(informative)**Guidelines on escape, refuge, evacuation and rescue****F.1 Escape**

Safe and rapid movement of persons on the installation to muster areas and then from muster areas to evacuation and escape points is essential for successful ER.

Escape and evacuation routes should preferably be achieved by positioning, or direct protection, of the route rather than by the use of personal protective equipment. Nevertheless, personal survival equipment (e.g. breathing apparatus, smoke hoods) may be used to facilitate escape from certain locations on the installation if safe positioning or direct protection is not practical.

Emergency doors should open in the direction of escape or be sliding doors.

If hazards in a room could result in injuries that would make it difficult to open an escape door in an emergency, easy opening devices, such as push bars, should be provided.

EXAMPLE Burns and injuries.

Escape routes should be made easily identifiable using lighting, signs and markings. The type and location of signs should be selected to be suitable for emergency conditions e.g., limited visibility and smoke.

Escape routes, the protection required for these routes and the time for which they remain available, is critical to the success of the ER and typically have defined functional requirements. Functional requirements account for the number of personnel who will use the route, the distribution of personnel on the installation and the way in which incidents could affect the route. Dimensions of escape routes are determined based on the number of people who could be required to use them. In general, escape routes should be greater than 1 m wide. For routes that are unlikely to be used frequently (and then only by a small number of people), a reduction of this width can be acceptable. External escape routes and those used by personnel escaping from more than one area typically need to be wider.

Casualty recovery can extend the time for which routes need to remain available and it is important to account for the possible requirement to use stretchers.

On large or complex installations, plans showing local escape routes should be placed in prominent positions around the installation to assist personnel. Where doors are present on an escape route, it is useful for plans to indicate the layout on the other side of the door so that people know what to expect when they pass through the door.

Escape and evacuation routes should, wherever practicable, be designed to remain passable by position rather than by special protection. To achieve this condition, external escape routes should wherever practicable be physically separated from explosion vent panels, sacrificial walls and open hazardous modules. Where separation is not possible, alternative routes should be provided which are unlikely to be affected in the same incident.

The surface of escape routes should be safe and secure such that people can use the route without needing to exercise excessive care. Where practicable, the surface should be non-slip and free of water if freezing is a possibility.

F.2 Refuge and muster areas

A refuge is a place where people can muster whilst investigations, ER and evacuation preparations are undertaken. A refuge may be an enclosure, more than one enclosure, or an area of open deck. If provided,

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the refuge is designed or selected to maintain the safety of personnel during the period required for the evacuation process to be completed. This period includes:

- time to complete full muster at the refuge;
- time to account for personnel not reporting to their assigned muster stations;
- time to evaluate the situation and make decisions;
- time to initiate responses to minimize the consequences and control the emergency, if possible;
- time to complete the evacuation (if required); evacuation can be done in a phased manner, initially evacuating non-essential personnel;
- contingency time to allow for unforeseen circumstances.

These times are not necessarily additive.

The installation is normally designed so that the conditions which could impair the refuge do not arise whilst people are still in or at the refuge. These conditions include:

- loss of life support (e.g. due to smoke/gas, excessive heat stress, oxygen deficiency, toxic gas accumulation);
- loss of structure (e.g. collapse of supporting structure, impairment of exterior fabric of an enclosed refuge);
- loss of essential command support (e.g. loss of essential communications within an enclosed refuge and with third parties, ESD, F&G and monitoring, emergency power/lighting). It is important to provide effective communications between multiple refuges. The level of ESD, F&G and monitoring facilities required at a refuge should be evaluated in developing the ERS.

Whilst all installations have muster areas, there can be some incidents during which the normal muster area is not safe. The ERP addresses alternative muster arrangements for emergencies in which the primary muster location is impaired.

If it is not possible for all personnel to reach the refuge under certain emergency conditions, alternative arrangements can be made to allow safe evacuation of these personnel.

Personnel with emergency response duties are provided with a means of safe evacuation. A dedicated lifeboat can be reserved for those who evacuate the platform later, after performing emergency tasks.

Muster areas are:

- clearly identified by signs;
- provided with emergency lighting, giving illumination throughout the period for which they are used in an emergency; and
- maintained unobstructed and able to accommodate the number of people who need to use them.

All personnel on arrival at the installation are assigned to a muster area and be given information about its location and relevant procedures. A list of the assigned personnel should be displayed at the muster area. Procedures are maintained for mustering at these areas, for accounting for personnel and reporting back to the central control room and onshore as necessary. Procedures include contingencies to accommodate the possibility of personnel responsible for conducting the muster being unavailable.

F.3 Evacuation, rescue and recovery

F.3.1 Evacuation

Systems for evacuation and escape are supported by personnel training or familiarization, based on the system requirements.

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The normal method of getting to and from offshore installations is generally the preferred primary method for evacuation. Emergency conditions on the platform can restrict the safe access of the primary means of evacuation, particularly helicopters, thus there is a need to provide alternative ways of evacuating the installation. A secondary method for evacuation and a tertiary method for escape to the sea, independent of external assistance, is also normally provided.

Life rafts may be evaluated as secondary method for evacuation for normally unattended installations.

In many locations, the optimum secondary method of evacuation is by survival craft in accordance with IMO^[14] or other acceptable standards. It is important that consideration be given to the type and design of the survival craft, their location, their ability to be safely launched and the conditions they will experience (e.g., weather conditions, fires on the sea, smoke and radiation from topside fires). Free-fall lifeboats are less vulnerable to weather and launch conditions and their use should be evaluated, see DNV-ST-E406^[9].

Where provided, the survival craft should be readily accessible from the main TR and have a total capacity of at least the maximum personnel on board taking into account unavailability of one of the units. The EER analysis, considering all credible scenarios and conditions, can identify the need for additional survival craft so that the minimum capacity can be successfully reached. Special consideration should be given to floating facilities in severe weather conditions or damaged conditions where the positions of certain survival craft are particularly vulnerable. Evaluation of the need for further redundancy includes situations where:

- effect of weather, due to a leeward and windward face, could affect the ability to launch survival crafts;
- heeling can affect the ability to launch survival crafts.

NOTE 50 % spare survival craft capacity is often provided for floating facilities in the evacuation arrangements.

Survival craft provided as a means of evacuation should be easy to deploy, reliable in launch, give protection against hazards such as fire and smoke, be able to move away quickly from the installation and, where reasonable, should be oriented away from the installation on completion of launch.

The ERP give clear instructions on the actions to be taken after the launch of the survival craft. For instance, it is considered preferable to head away from the installation on a course that takes the survival craft out of the path of any smoke or gas clouds. However, heading directly upwind should be avoided as this presents the hazard of drifting back towards the installation in the event of engine failure. A lifeboat navigation assistance system (gyro heading display) can enable a more effective escape in limited visibility.

Tertiary methods for escape to the sea are intended for use only in circumstances where evacuation by the primary or secondary method (for evacuation) is not possible. Escape chutes with life rafts can be a tertiary method for escape to the sea.

The use of a tertiary method for escape to the sea is likely to introduce additional problems due to immersion of personnel in the sea and the requirement for subsequent rescue. Notwithstanding these problems, tertiary methods for escape to the sea should be developed for all installations to allow access to the sea. However, to maximize the chances of survival of personnel entering the rafts or to sea, life-jackets and, where relevant due to sea temperature, survival suits, should be provided at suitable locations on the installation.

Tertiary methods for escape to the sea should:

- enable escape from locations where personnel are unable to reach the secondary method of evacuation;
- provide a viable means to reach sea level (e.g. escape chute with rafts or life rafts ladders);
- provide liferafts capable of being easily deployed;
- be designed such that personnel who enter the sea can realistically enter available liferafts.

In selecting the types, number and locations of tertiary methods for escape to the sea, the likely demands from scenarios and the maximum personnel distribution should be evaluated. It is important that enough diversity and choice of method is available to enable personnel in a variety of situations to use them.

On small normally unattended installations, emergencies such as a major fire and explosion could prevent muster and planned evacuation. In these cases, the best approach may be for people to immediately use

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tertiary methods for escape to the sea. This approach is only likely to be viable where there is a low likelihood of harm to those escaping under these conditions, for example if:

- environmental conditions are benign;
- there is rapid recovery from the sea to a place of safety;
- life-jackets or survival suits (if appropriate) are readily available;
- there is no need to jump into the water from a height which is likely to cause injury.

Personal escape equipment, in alignment with the ERS can include:

- survival suit which provides a survival time in the water that exceeds the time required for rescue;
- life-jacket;
- device providing respiratory protection from smoke, asphyxiant or toxic gas which can be encountered during evacuation and escape;
- torch (flashlight);
- heat-resistant gloves;
- any other equipment found necessary in developing the ERS.

Additional survival suits and life-jackets should be:

- available for those not able to pick up their assigned equipment;
- accessible at mustering areas.

There should be sufficient spare capacity in evacuation systems such that, in the event of some part becoming unavailable, there remains available capacity elsewhere to safely accommodate all persons on the installation, including day visitors. The degree of spare capacity should be determined and justified by the assessment of the EER arrangements.

Recovery and rescue arrangements are provided for all personnel using secondary or tertiary methods to abandon the installation. These arrangements may be provided either by the installation operator (e.g., helicopters or dedicated vessels) or using resources provided by other operators and national resources (search and rescue helicopters). The availability and suitability of such resources should be evaluated when developing the EER strategy.

F.3.2 Rescue

Rescue is the urgent process by which those who have entered the sea directly or in liferafts are retrieved to a place of safety where medical assistance is available.

Important considerations in the rescue of personnel include:

- number of persons involved and their medical condition;
- time taken to find, reach and rescue persons in the sea;
- capacity of rescue facilities;
- operational weather limits and weather conditions;
- survival time for people in the sea, which is a function of sea state, sea temperature and degree of protection afforded by protective equipment such as liferafts and survival suits;
- risks to those undertaking the rescue.

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When vessels are stationed in the vicinity of an installation to assist in rescue and recovery, they may also have duties in connection with:

- man-overboard;
- threat from a drifting object or from a vessel;
- fire-fighting activity on the installation;
- oil pollution control;
- preventing violation of safety zone;
- rescue of personnel in the sea, both individuals and larger numbers;
- evacuation, including hyperbaric evacuation for divers;
- communications when this cannot be dealt with by the installation;
- providing an alternative landing option for helicopters, possibly with refuelling, particularly in areas with limited ER resources;
- installation support activities such as bunkering, transfer of cargo and control of remote underwater vehicles, if these activities do not compromise the performance requirements for emergency response.

The shift duty rosters and a programme of drills are important to maintain the skills and confidence of the crew and the speed of response of a vessel used for rescue and recovery.

Rapid rescue is crucial, as survival time in the sea is limited due to the effects of hypothermia, exhaustion and drowning, even for persons wearing survival equipment. Although rapid recovery (e.g. from survival craft) is desirable, personnel requiring recovery as opposed to rescue normally do not suffer unduly from a degree of delay. Indeed, in some cases some delay can significantly improve the chances of a successful transfer to a place of safety. For example, in severe weather it may be prudent to delay transfer of personnel from a survival craft until conditions improve, or until the survival craft reaches sheltered water can be prudent.

F.3.3 Recovery

The objectives of recovery are to enable the survival of people who need to escape from an installation. Important considerations in the recovery activity include:

- number and condition of persons involved;
- time taken to find and transfer personnel;
- operational weather limits and influence of weather conditions;
- risks to those being recovered and those undertaking the recovery.

In a total installation evacuation, the rescue and recovery resources are not under the direction of the installation; however the operator retains the responsibility of coordinating ER activities, including rescue of people from the water. As part of the ER exercises, it should be confirmed that effective arrangements are available for rescue and recovery when the person in overall charge of the installation orders evacuation, e.g. onshore coordination or main coordination centre.

Arrangements for recovery and rescue may include the use of a vessel stationed in the vicinity of the installation. Where provided, such a rescue and recovery vessel shall be designed for the operating environment and have the capacity, equipment and crew to allow it to meet its functional requirements and possibly the role of on-scene commander for rescue and recovery, at least in the early stages of an emergency.

If rescue and recovery involves a dedicated vessel provided for this purpose, the vessel constitutes an integral part of the EER arrangements and shall be included in EER exercises and drills.

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Some means of evacuation, for example helicopters, bridge link, marine transfer to a vessel, etc. involve personnel being taken directly from the installation to a place of safety. However, some means of evacuation, for example survival craft, are not in themselves a place of safety and are not capable of taking persons directly to a place of safety without additional recovery activity. In such cases arrangements are needed to recover these persons from the means of evacuation to a place of safety.

Means of recovery include:

- marine vessels;
- helicopters.

F.3.4 Location devices

Radio beacons should be installed on life boats and life rafts. Use of radio beacons should be evaluated for at-risk workers, e.g. those performing work over the side.

The ability to recover survival craft and liferafts is enhanced by the use of radar location devices such as EPIRB in line with SOLAS requirements.^[14] Some operators have found that use of personal locator beacons significantly improves the ability of helicopters and vessels to locate people in the water and thus reduce the time taken to recover them.

F.3.5 Place of safety

Persons who have been evacuated and particularly those who have escaped to sea are still at considerable risk, and their timely recovery or rescue to a place of safety is needed.

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