



HEALTH AND SAFETY
AUTHORITY



Code of Practice for Offshore Diving

Safety, Health and Welfare at Work
(Diving) Regulations 2018

Our Vision: Healthy, safe and productive lives and enterprises

Acknowledgments

This code of practice is based on the Health and Safety Executive (United Kingdom) approved code of practice and guidance for commercial diving projects offshore. The Authority would like to thank the Health and Safety Executive (UK) and the Irish Maritime Administration within the Department of Transport, Tourism and Sport for their assistance in the development of this code of practice.

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Foreword

The Health and Safety Authority (the 'Authority'), with the consent of Pat Breen TD, Minister of State, at the Department of Business, Enterprise and Innovation, publishes this code of practice entitled *Code of Practice for Offshore Diving* in accordance with Section 60 of the Safety, Health and Welfare at Work Act 2005 (the '2005 Act').

This code of practice provides practical guidance as to the observance of the provisions of the Safety, Health and Welfare at Work (Diving) Regulations 2018 (S.I. No. 254 of 2018).

This code of practice comes into operation on May 1st 2019.

Notice of the publication of this code of practice was published in *Iris Oifigiúil* of April 30th 2019.

As regards the use of codes of practice in criminal proceedings, Section 61 of the 2005 Act provides as follows:

61 (1) Where in proceedings for an offence under this Act relating to an alleged contravention of any requirement or prohibition imposed by or under a relevant statutory provision being a provision for which a code of practice had been published or approved by the Authority under Section 60 at the time of the alleged contravention, subsection (2) shall have effect with respect to that code of practice in relation to those proceedings.

(2) (a) Where a code of practice referred to in subsection (1) appears to the court to give practical guidance as to the observance of the requirement or prohibition alleged to have been contravened, the code of practice shall be admissible in evidence.

(b) Where it is proved that any act or omission of the defendant alleged to constitute the contravention—

- (i) is a failure to observe a code of practice referred to in subsection (1), or
- (ii) is a compliance with that code of practice,

then such failure or compliance is admissible in evidence.

(3) A document bearing the seal of the Authority and purporting to be a code of practice or part of a code of practice published or approved of by the Authority under this section shall be admissible as evidence in any proceedings under this Act.

Dr Marie Dalton
Secretary to the Board
Health and Safety Authority

Background

1.1 Offshore diving can be a pressurised and dangerous work environment and can present a unique combination of occupational health and safety issues. Serious incidents can occur unless appropriate planning has been carried out and safety measures are in place.

1.2 This code of practice specifically relates to all offshore diving projects as described in paragraph 2.4 of this code of practice.

Status and Scope of this Code of Practice

1.3 This code of practice is published by the Health and Safety Authority under Section 60 of the Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005) – hereafter the ‘2005 Act’ – and with the consent of Pat Breen TD, Minister of State at the Department of Business, Enterprise and Innovation.

1.4 The aim of this code of practice is to provide practical guidance on the safe management of diving at work. It provides assistance on the observance of the requirements of the Safety, Health and Welfare at Work (Diving) Regulations 2018 (S.I. No. 254 of 2018) – hereafter the ‘Diving Regulations’. It is targeted at clients, diving contractors, diving supervisors, divers and other people who may be involved in offshore diving projects (as defined in Section 2 of this code).

1.5 Diving at work is covered by a wide range of legislation. In addition to the Diving Regulations and the 2005 Act, other health and safety legislation may apply, including:

- Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (S.I. No. 299 of 2007 as amended)
- Safety, Health and Welfare (Construction) Regulations 2013 and 2019 (S.I. No. 291 of 2013 as amended)
- Safety, Health and Welfare (Offshore Installations) Act 1987 (No. 18 of 1987) and associated Regulations.

1.6 It should not be assumed that compliance with the Diving Regulations means compliance with all aspects of the law. The requirements of other legislation will also need to be fulfilled, as appropriate. The Diving Regulations need to be read in the general context of the 2005 Act and associated Regulations and any other relevant statutory provisions. It is essential to place the safe management of diving projects in the context of the overall safe management of work as detailed in the Safety Statement, which is required under Section 20 of the 2005 Act.

1.7 In addition, the requirements of the Merchant Shipping Acts and associated Regulations apply to all vessels being used in connection with diving at work. Compliance with this code of practice in no way removes the obligation to comply with the applicable merchant shipping legislation.

References to Legislation and Standards

1.8 As legislation is always under regular review, where reference is made in this code of practice to legislation, the status of this legislation should be checked on the Attorney General's website at www.irishstatutebook.ie.

1.9 A list of national, European and international standards relevant to diving is available in the diving section of the Health and Safety Authority's website at www.hsa.ie. As standards are also under regular review, the status of such standards can also be checked at the National Standards Authority of Ireland's website at www.nsai.ie.

02

Definitions

2.1 The definitions given here are for the Diving Regulations and this code of practice only and selected terms are explained in that context. Other key terms used in this code of practice are defined in Appendix 1. The Safety, Health and Welfare at Work (Diving) Regulations 2018 are made under the Safety, Health and Welfare at Work Act 2005. Definitions in the 2005 Act are in general not redefined in the Diving Regulations.

2.2 **Diver** means a person who dives in the course of his or her work.

2.3 **At work** means that there is a contract of employment and divers are working in the context of an employer–employee relationship. It can mean working as an employee or as self-employed person. The phrase covers divers who dive as part of their duties as employees. It also covers divers who are in business for themselves, during the time that they devote themselves to work as a self-employed diver. Diving does not have to be the main work activity of the employee or the self-employed person.

2.4 **Offshore diving projects** means all diving projects:

- (a) at sea outside the State's territorial seas adjacent to the State (generally twelve nautical miles from the low water line) which are subject to the 2005 Act; this will include, for example, all diving operations in the State's designated area of the continental shelf undertaken in connection with offshore installations, wells and pipeline works;
- (b) at sea off, or in connection with, offshore installations, pipelines and cable works within the State's territorial seas;
- (c) in connection with alternative energy resources such as structures generating power from wind, waves, tide or currents;
- (d) where closed bell or saturation diving techniques are used;
- (e) from vessels maintaining station by use of dynamic positioning; and
- (f) involving diving operations at depths greater than 50 metres.

2.5 **Competent person** means, taking account of Section 2(2) of the 2005 Act, that a person, having regard to the task (diving and/or working while diving) he or she is required to perform, and taking account of the size or hazards (or both of them) of the undertaking in which he or she embarks, possesses sufficient training, qualifications, experience and knowledge appropriate to the nature of the work and diving method to be undertaken.

2.6 **Person** is as defined in the Interpretation Act 2005.

- 2.7 **Diving operation** is the portion of a diving project identified in the diving project plan that can be safely supervised by one diving supervisor. An operation can be made up of either a number of dives or just a single dive. It will normally be clear what this portion of work is, but factors such as the task, the site conditions and the diving methods and techniques to be used contribute to making the decision. For example, a 28-day diving project might be made up of 40 diving operations. Members of a dive team are engaged in a diving operation from the time they start preparing plant, equipment or personnel for diving until any associated decompression is completed.
- 2.8 **Diving project** is the term used for the overall diving job, regardless of its duration. Depending on the size of the diving project, it can be made up of one or more diving operations. A diving project can apply to both a continuous period of elevated pressure, as in saturation diving, as well as to a number of diving operations, possibly taking place over several days, where the divers are not under continuous elevated pressure. The diving project does not necessarily finish once the last diver has returned to atmospheric pressure. Most decompression procedures require the diver to remain in the close vicinity of a compression chamber for a specified time in case there is need for treatment of symptoms of decompression illness. The diving project is only completed once that time period has expired.
- 2.9 **Compression chamber** means, as appropriate, a recompression chamber, a decompression chamber, a hyperbaric chamber or a hyperbaric oxygen therapy chamber; these terms reflect the different purposes for which compression chambers are designed.
- 2.10 **Inland** means the internal or inland waters of the State.
- 2.11 **Inshore** means within the territorial seas of the State (generally twelve nautical miles from the low water mark).
- 2.12 **Offshore installation, pipeline** and **pipeline works** are as defined in the Safety, Health and Welfare (Offshore Installations) Act 1987.
- 2.13 **Submersible compression chamber** means a manned compression chamber that is used underwater to support divers. It is technically a pressure vessel for human occupancy and is used to transport divers under pressure either to or from the underwater worksite. It may also be known as a closed bell, closed diving bell or diving bell.
- 2.14 **Closed bell diving** is the term used for diving using a submersible compression chamber.

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Application

- 3.1 The Diving Regulations apply to any diving project in which a person who dives is at work. They apply to all places of work and work activities where diving projects are carried out and to which the 2005 Act applies.
- 3.2 The Diving Regulations apply to any diving project in which at least one person is at work. Diving does not have to be the main work activity of the employee or the self-employed person.
- 3.3 The Diving Regulations and this code of practice apply to diving projects in support of:
- (a) gas, oil or offshore installations and floating structures;
 - (b) pipeline and cable works whether inshore or offshore; or
 - (c) alternative energy resources such as structures generating power from wind, waves, tide or currents.
- 3.4 The Diving Regulations and this code of practice apply to all diving projects, whether inshore, inland or offshore, that involve diving operations:
- (a) deeper than 50 metres;
 - (b) from vessels maintaining station by use of dynamic positioning; or
 - (c) using closed bell or saturation diving techniques.
- 3.5 For diving operations not covered by paragraphs 3.3 and 3.4, the *Code of Practice for Inland Diving and Inshore Diving* will apply.
- 3.6 The Diving Regulations and this code of practice do not apply to:
- (a) environments such as scientific clean rooms subject to an internal pressure of less than 100 millibars above local ambient atmospheric pressure;
 - (b) maintenance or testing work on an aircraft that may necessitate working in the body of the plane while pressurised;
 - (c) work carried out in any compressed air where the primary purpose is either to keep ground water out or to make a structure stable (for example, working in raised pressure environments out of water such as in caissons is covered by the Safety, Health and Welfare at Work (Construction) Regulations 2013 and 2019);
 - (d) the use of emergency breathing systems in helicopter underwater escape and escape training (HUET); and
 - (e) submersible craft, including the use of atmospheric diving suits.

3.7 The use of compression chambers within diving projects, where the chamber is under the control of the diving contractor, is covered by the Diving Regulations. However, those receiving hyperbaric treatment at a hospital or other place of treatment are outside the scope of the Regulations – this is to avoid duplication of responsibilities when another authority is involved in the medical treatment of a diver.

3.8 Where hyperbaric treatment is to be given in a compression chamber provided by a person other than the diving contractor for that diving project, the arrangements for this should be covered in the diving project plan. The Diving Regulations do not apply to the hyperbaric treatment provided by that other person.

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Duties of Persons

4.1 The main duties under the Diving Regulations are placed on the diving contractor; however, other people (including clients, divers, people in control of the dive site, diving vessel operators and other people's employees) may also have general duties under Regulation 5 of the Diving Regulations to ensure a safe diving project.

4.2 The actions and activities of people outside the dive team may affect the safety of the dive team and, therefore, such people may have responsibilities for ensuring that the Diving Regulations and this code of practice are complied with for those matters under their control. Such people include:

- (a) the client who has placed a contract with a diving contractor to deliver a diving project (the client will usually be the operator or owner of a proposed or existing installation, pipeline or cable where diving work is going to take place, or a contractor acting on behalf of the owner or operator – if the owner or operator appoints an on-site representative, they should be satisfied that that person is competent (see paragraph 2.5) for the task);
- (b) the main contractor/project supervisor for the construction stage (PSCS) of a construction project carrying out work for the client and overseeing the work of the diving contractor;
- (c) a consultant acting for the client, operator, owner or contractor;
- (d) a master of a vessel or floating structure from which diving is to take place, who controls the vessel or floating structure and who has overall responsibility for the safety of the vessel or floating structure and all personnel on it;
- (e) the manager of an offshore installation from or near which a diving project is carried out;
- (f) a superintendent, or other similar person, provided by the diving contractor who may or may not be a member of the dive team, but nevertheless has a responsibility to ensure that the diving project is conducted safely because he or she is in overall control of the project – such a person must be competent (see paragraph 2.5) for the task;
- (g) any other person whose acts or omissions may affect the safety of the diving project.

4.3 The people described in paragraphs 4.1 and 4.2 should consider carefully the actions required of them to comply with the Diving Regulations and this code of practice. They should, where appropriate:

- (a) take reasonable steps to ensure that any diving contractor selected is capable of complying with the Diving Regulations;
- (b) make available to the diving contractor the results of any risk assessments undertaken by other persons, or under other relevant legislation, that could affect the health and safety of the dive team;
- (c) agree to provide facilities and extend all reasonable support to the diving supervisor or diving contractor in the event of an emergency (the diving project plan should reflect this);

- (d) consider whether any known underwater or above-water items of plant under their control may cause a hazard to the dive team (for example, a ship's propellers, water intakes or discharge points causing suction or turbulence, gas flare mechanisms that may activate without warning or plant likely to start automatically) and inform the diving contractor of the location and nature of such hazards – this information should be provided in sufficient time so that it can be taken into account by the diving contractor when preparing the risk assessment before producing the diving project plan; the diving contractor should also be provided, in good time, with details of any changes to this information occurring before or during the course of the diving project;
- (e) ensure that suitable facilities and time are available to the diving contractor to allow for a familiarisation programme;
- (f) consider whether other work activities in the vicinity may affect the safety of the diving project – it may be necessary to arrange for the suspension of, for example, the loading or unloading of vessels, seismic operations, scaffolding work;
- (g) ensure that they have a formal control system in place to cover diving activities (for example, a permit-to-work and/or permit-to-dive system);
- (h) provide the diving contractor with details of any possible substance likely to be encountered by the dive team that would be a hazard to their health (for example, drill cuttings on the seabed, presence of impressed current anti-corrosion systems or naturally occurring radioactive materials) – this information should be provided in writing and in sufficient time to allow the diving contractor to carry out the relevant risk assessment and, if necessary, to take appropriate action;
- (i) keep the diving supervisor informed of any changes that may affect the supervisor's diving operation (for example, vessel movement) so that diving can be suspended if the dive site is, or may be, endangered; and
- (j) co-operate with other people involved in or connected with the diving project in order to protect persons at work from accident or injury.

4.4 When diving from a dynamically positioned (DP) vessel, the responsible person on the DP vessel's control panel should inform the diving supervisor of any possible change in position-keeping ability as soon as it is known.

4.5 Other groups of people (for example, harbour masters) may have authority over the dive under legislation other than the Diving Regulations.

4.6 The duties under Regulation 5 of the Diving Regulations extend to clients, diving contractors, diving supervisors, divers and people involved in the diving project whether directly or indirectly (including, for example, crane operators, maintenance personnel). Such persons should ensure that their tasks and how they undertake them do not affect the safety of the dive team.

4.7 The master and crew of any vessel used in diving work must ensure that the operation of the vessel complies with relevant maritime legislation. The vessel must be suitable for the number of persons and the equipment carried and must not be overloaded.

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Duties of Clients

5.1 The client is the person who commissions the diving project. The client has a general duty to take reasonable measures to ensure compliance with the Diving Regulations and this code of practice under Regulation 5 and also has specific duties under Regulation 6 of the Diving Regulations.

5.2 The client should clearly define the scope of the work, including any health and safety specifications for the work. The client must appoint, in writing, one competent person (see paragraphs 2.5 and 2.6) to be the diving contractor for every diving project. The diving contractor has overall responsibility for and control of the diving project (see Section 6).

5.3 The client must receive written confirmation from the diving contractor that they accept the appointment. Diving work must not proceed without a diving contractor being appointed.

5.4 Although likely to be a rare event under this code of practice, a client may appoint themselves to be the diving contractor for the diving project if they are competent to do so. In such a case, the requirement for written appointment and confirmation is not required, but the self-appointment must be recorded (for example, in the diving project plan).

5.5 The client must be satisfied that the diving contractor they plan to appoint and they actually appoint is competent. The client should make reasonable enquiries about competence, especially with regard to adequate training, knowledge, experience and resources for the work to be performed. However, the client would not be expected to evaluate and monitor diving skills.

5.6 The extent of the client's enquiries about the diving contractor's competence will depend on the scale, complexity, hazards and any particular risks of the specific diving project. Such enquiries may include, but are not limited to, enquiring and seeking proof about:

- (a) membership of professional or industry bodies or trade associations such as the International Marine Contractors Association (IMCA);
- (b) knowledge of diving and the work task, particularly in relation to the nature of the project;
- (c) safety and health knowledge, qualifications and training (for example, knowledge of the Diving Regulations, formal health and safety training);
- (d) evidence of a good safety record and regulatory compliance (for example, enquiring about accidents or incidents, notices issued by the Health and Safety Authority or other regulatory bodies, any prosecutions);
- (e) the availability of sufficient staff with qualifications, training and experience in the method of diving and the work task being carried out;
- (f) the resources they intend to use on the project, including equipment;

- (g) evidence of a functioning safety management system (for example, an up-to-date Safety Statement); and
- (h) references from previous clients.

5.7 The client must co-operate with the diving contractor. They must also provide the diving contractor with information about any known hazards that could affect the safety of the diving project of which they are aware or could be aware if they made reasonable enquiries.

5.8 Any plant or equipment provided by the client for the purposes of the diving project must be readily available for use, safe to use, of sound construction and suitable material, in good working order, well maintained and fit for purpose.

06

Duties of Diving Contractors

- 6.1 The diving contractor has the main responsibility and duties under the Diving Regulations for ensuring that a safe diving project is carried out.
- 6.2 The Diving Regulations require that one diving contractor is appointed for each diving project. The diving contractor will normally be the employer of the divers engaged in the diving project or a person who manages the diving project for a fixed or other sum and who supplies equipment, labour or both (whether the diving contractor's own labour or another person's).
- 6.3 The diving contractor's general responsibilities are to ensure that:
- (a) the diving project is properly and safely planned, managed and conducted;
 - (b) a diving project plan is prepared, including emergency plans and procedures (see Sections 7 and 11 and Appendix 2) – the diving project plan should be authorised and dated by a responsible person acting on behalf of the diving contractor;
 - (c) risk assessments are carried out as required under Regulation 10 of the Diving Regulations and Section 19 of the 2005 Act (see Section 7);
 - (d) the place from which the diving is to be carried out is suitable and safe;
 - (e) diving supervisor(s) and the dive team are fully briefed on the diving operation that they will be involved in and are aware of the contents of the overall diving project plan;
 - (f) there are sufficient personnel in the dive team to enable the diving project to be carried out safely (see Section 10);
 - (g) the personnel are competent and qualified (see Sections 10, 13 and 14);
 - (h) diving supervisors are appointed in writing and the extent of their control is documented (see Section 13);
 - (i) where appropriate, a suitable mobilisation and familiarisation programme is completed by all the members of the dive team (see paragraphs 10.28–10.30) – other personnel involved in the diving project may also need to complete the programme, for example ship's crew;
 - (j) adequate arrangements, personnel and equipment exist for first aid and medical treatment (see Section 11);
 - (k) suitable and sufficient breathing gas and plant and equipment are provided and, as appropriate, are correctly maintained, inspected, examined and tested (see Sections 8 and 12);
 - (l) so far as is reasonably practicable, the divers are medically fit to dive (see Section 15);
 - (m) diving operation records are kept containing the required details of the diving project (see paragraph 6.10 and Appendix 3);

- (n) suitable and sufficient personal flotation devices/lifejackets are available and worn on board the dive vessel/floating installation when required;
- (o) a clear reporting and responsibility structure is laid down in writing; and
- (p) so far as is reasonably practicable, the diving project plan and all other relevant legislation are complied with.

6.4 The Diving Regulations require that the name of the diving contractor is identified in the diving project plan. The name should also be clearly identified on all diving project records. It should also be notified in writing to the other personnel with responsibility for any location from or in the vicinity of which diving projects are carried out. Account must be taken of Section 21 of the 2005 Act, which requires employers who share a place of work to co-operate.

6.5 The diving contractor must ensure that a risk assessment is carried out and a diving project plan is prepared (see Section 7). The diving contractor should ensure that they have adequately assessed and provided for any health and safety problems that might arise.

6.6 After studying the risk assessment, the diving contractor must determine how many diving operations the diving project is to be broken down into and must appoint a competent diving supervisor(s) to supervise each diving operation (see Section 13).

6.7 A diving operation is the proportion of the diving project that can be safely supervised by one diving supervisor at any one time (see paragraph 2.7). Factors to consider in determining whether a diving operation can be safely supervised by one person include the work task, the dive site location and conditions, the number of people in the team and the method of diving.

6.8 For each diving project, the diving contractor must evaluate how much of the project can be supervised safely by one person, taking account of both routine operations and emergencies. Enough diving supervisors must be appointed to cover the entire diving project. If a diving project is taking place over such an area or time-scale that it cannot be safely controlled by one diving supervisor, it should be divided into separate diving operations with further supervisors being appointed for each identified diving operation. Written appointments should clearly define the times and areas of control.

6.9 The diving contractor is responsible for ensuring that all parts of a diving project are managed in such a way as to ensure the safety of the people involved in it. If the project involves more than one diving operation being conducted at the same time, the diving contractor is responsible for ensuring that there is proper coordination.

6.10 The diving contractor must keep the diving operation record for a period of two years after the date of the last entry in the record.

Diving Project Plan and Risk Assessment

7.1 Pre-planning is critical to the safety and success of any diving project. All diving projects must be well planned, organised, managed and conducted.

7.2 The diving contractor is responsible for planning the diving project and for ensuring that a risk assessment is carried out and a diving project plan prepared. The diving contractor must identify the hazards and assess the risks and put in place control measures to eliminate or reduce the risk to as low a level as possible.

Risk Assessment

7.3 In conducting the risk assessment, account must be taken of the general principles of prevention (Schedule 3 of the 2005 Act). Diving should be avoided where the level of risk cannot be controlled to an acceptable level. The use of alternative means should be considered for carrying out the work task (for example, use of a remotely operated vehicle).

7.4 When diving cannot be avoided, the diving contractor must carry out a detailed risk assessment of the work that is to be conducted, assess the time necessary to complete certain tasks and prepare a diving project plan that is copied to the diving supervisor. The diving supervisor should use the risk assessment and make it site and date specific, taking account of any changing circumstances. The client will usually be involved in the production of the site-specific risk assessment.

7.5 The site-specific risk assessment must identify site-specific hazards and their risks. The risk assessment should be based on site-specific information (for example, turbine/cable maps) and take into account the diving activity and the location. Tidal restrictions and access and egress arrangements to and from vessels may also need to be considered.

7.6 As a matter of safe working practice, the project risk assessment should be reviewed at regular intervals, even if the risk is minimal, to ensure that the risk assessment is still adequate and does not need to be revised.

7.7 A risk assessment made under the Diving Regulations will cover, in part, the obligation to make an assessment under the 2005 Act and associated Regulations. There will be no need to repeat those aspects of the assessment, so long as they remain valid, in any other assessment that is carried out. However, all significant risks not covered by the diving project risk assessment (including risks to members of the public arising from the diving project or diving activities) must be covered by the risk assessment carried out under the 2005 Act and associated Regulations, or in any assessment required to be carried out under any other statutory provisions.

7.8 Some examples of common hazards are given in Section 9; but this is not an exhaustive list of all hazards or all measures needed to control risk and in special circumstances, or if certain contingencies arise, more stringent safeguards may be needed.

Diving Project Plan

7.9 The diving project plan should record the outcome of the planning carried out in preparing the risk assessment. It must include all information and instructions necessary for divers and others taking part in or associated with the diving project to protect the health and safety of all those taking part in the diving project.

7.10 The diving project plan must cover the general principles of the diving methods and techniques to be used as well as the needs of the particular operation. It must also provide contingency procedures for any foreseeable emergency (for example, lost bell recovery, retrieval of injured and/or unconscious divers from the water) (see Section 11). When devising the plan, consideration should be given to the matters detailed in Appendix 2, as appropriate.

7.11 The diving project plan may include a diving contractor's standard operating rules including generic risk assessments and documented work procedures that incorporate control measures. The plan may also need to consider the interface with other operations that are ongoing (for example, crane operations, transition piece works, barge operations).

7.12 All documents should show the date upon which they were prepared. Details should be provided on when and how reviews of the diving project plan, the dive site and the specific risk assessments will be conducted.

08

Diving Methods

8.1 SCUBA diving – diving using self-contained underwater breathing apparatus – has inherent limitations and difficulties, such as limited breathing gas supplies, and is unsuitable for diving activities covered by this code of practice.

8.2 Surface-supplied diving can be used for depths up to 50 metres under this code of practice (see also paragraph 11.18).

8.3 Closed bell diving methods and techniques should be used when diving deeper than 50 metres. In such cases, a submersible compression chamber with its associated equipment and facilities must be available at the dive site (see also paragraph 9.5).

Breathing Gases (Compressed Air or Gas Mixtures)

8.4 A diver breathing a mixture of oxygen and nitrogen under pressure, whether compressed natural air or an artificial mixture, is at risk of both oxygen toxicity and nitrogen narcosis as the depth increases. The maximum depth for breathing gases of compressed air or oxygen and nitrogen is 50 metres of water. The recommended maximum partial pressure for oxygen is 1.4 bar. This partial pressure does not apply to therapeutic recompression.

Quantity of Gases

8.5 The quantities of gases required for diving operations (including primary, secondary and therapeutic treatments) should be calculated and procedures for the provision of them stated when planning a diving project. Allowances should be made for, for example, leakage, wastage and contingencies.

8.6 The diving supervisor must not allow a diving operation to take place unless there is an adequate quantity of breathing gas for all divers engaged in the diving operation. Diving should be stopped if the quantity of gas acceptable for safety purposes falls below an agreed minimum.

8.7 Divers must have an adequate independent alternative (secondary) source of breathing gas, which must be readily available for immediate use in the event of failure of the primary supply (see also paragraph 8.17).

8.8 Where the breathing gas is supplied via an airline/hose and compressor, there must be an adequate reserve supply of breathing gas in the event of the failure of the compressor.

8.9 Where a closed bell is being used, a reserve supply of breathing gas must be readily available for immediate use by divers located inside or outside the bell in the event of an emergency such as failure of surface supplies.

8.10 There must be sufficient breathing gas to enable the standby diver to reach the working diver and to enable both divers to return to a place of safety, carrying out any appropriate decompression procedures during their return.

8.11 Where a closed bell is being used, there must be sufficient breathing gas to enable the standby diver to reach the working diver and to enable both divers to return to the bell and then to surface in the bell and to start appropriate decompression procedures at the surface (see also paragraph 11.9).

Quality and Content of Gases

8.12 Procedures for checking and maintaining gas purity standards should be provided.

8.13 Breathing gases should comply with appropriate national, European or international standards. Breathing gases coming from suppliers should be clearly marked to indicate contents, colour-coded and accompanied by an analysis certificate. The contents should not be accepted as correct until a competent member of the dive team has analysed at least the oxygen content. This analysis should be conducted on delivery and immediately before use of the gas. Records of this analysis should be kept.

8.14 Pure helium or nitrogen should not be used in diving operations except as a calibration gas or for a specific operational requirement. A small percentage of oxygen should be present in helium or nitrogen; the industry norm is 2 per cent.

8.15 When an oxygen–helium or oxygen–nitrogen mixture is used as the diver-worn reserve supply, it should contain a percentage of oxygen that allows it to be breathable over the largest possible depth range.

Divers' Breathing Gas Supply Systems

8.16 Each diver's breathing gas should be of the correct composition, temperature and flow for all foreseeable situations. This requirement includes independent primary and secondary supplies. Gas supplies should be arranged so that any interruption of supplies to one diver will not affect other divers' supplies.

8.17 Whatever type of breathing apparatus is in use, each diver should carry an independent alternative supply of breathing gas that can be quickly switched to the breathing circuit in an emergency. This alternative supply should have sufficient capacity to allow the diver to reach a place of safety.

8.18 An on-line oxygen analyser with a suitable alarm (for example, an audible hi-lo alarm) should be fitted to the diver's gas supply line in the dive control area, even if the breathing medium is compressed air. This device will assist in preventing the diver being supplied with the wrong percentage of oxygen. In addition, a carbon dioxide analyser with a suitable alarm should be fitted in all saturation diving projects using gas reclaim plant.

Emergency Breathing Gas Cylinders for Diving Basket

8.19 When a diving basket is used by surface-supplied divers, emergency breathing gas cylinders should be supplied in the basket in a standard layout – this allows divers to access the cylinders rapidly in an emergency.

Oxygen

8.20 Pressurised oxygen can fuel a serious fire or cause an explosion; it must therefore be stored and handled correctly. Any gas mixtures containing more than 25 per cent oxygen by volume should be handled as if they were pure oxygen and treated with extreme care.

8.21 Any materials used in plant intended to carry oxygen should be cleaned of hydrocarbons and contaminants to avoid explosions. Formal cleaning procedures for such plant should be provided by the diving contractor, together with written confirmation that such procedures have been followed.

Exposure Limits for Surface-Orientated Diving

8.22 Diving carries an inherent risk of decompression illness (DCI). The incidence of DCI drops when the length of time that a diver spends at any particular depth is limited. Recognised decompression tables should be used such as United States Navy or Canadian Diving Tables. As decompression according to recognised tables does not eliminate all risk of DCI, conservative diving practices should be followed.

8.23 When breathing oxygen–nitrogen mixtures with oxygen percentages higher than in natural air, the equivalent air depth should be established. It is this equivalent air depth that should be used to establish bottom time limits.

Length of Diver's Umbilical

8.24 The length of a diver's umbilical in relation to the worksite should be included in the diving project plan, particularly where an emergency situation might require the rapid location and recovery of a diver.

8.25 Where a diver's movement needs to be limited due to the presence of underwater hazards, an in-water tender or other means of limiting diver movement may be required.

8.26 When a diving bell is being used from a dynamically positioned vessel, fouling and snagging hazards in relation to umbilical length should be considered.

Diver Monitoring

8.27 Diving supervisors should monitor divers' breathing patterns and receive verbal reports from divers of their condition.

Saturation Diving

8.28 The transfer of divers or equipment into or out of the saturation chamber, or between chambers under pressure, increases the risk of catastrophic depressurisation. Internal doors (that is, those between the transfer chamber and the trunking to the diving bell and those separating living chambers within the chamber complex) should be kept closed at all times other than when divers are passing through them.

8.29 When planning a dive, consideration should be given to the previous saturation exposures of each diver and the time that they have spent at atmospheric pressure since completing their last saturation dive.

8.30 Given the effects of long periods under pressure on the diver's health, safety and efficiency, divers should not be in saturation for a continuous period of more than 28 days including decompression.

8.31 Saturation diving should be planned so that each period spent in saturation by the diver is followed by a surface interval of equal duration. Shorter periods at atmospheric pressure may be acceptable but only in consultation with the diving contractor's hyperbaric medical adviser.

Hazards Associated with Diving

9.1 Divers can be exposed to environmental hazards, physiological and psychological hazards associated with the process of diving and hazards associated with equipment. Additional hazards may also be associated with the actual work being carried out. Outlined below are some common hazards that should be considered during the risk assessment process. It should be noted that this is not an exhaustive list of all hazards that may be encountered. The type of dive, the frequency of diving and the type of work being carried out may all increase the risks associated with diving.

Environmental Hazards

Restricted Surface Visibility

9.2 Restricted surface visibility can affect the safety of the operation. It may be caused by, for example, darkness, heavy rain or fog. The diving project plan should identify when restricted surface visibility should cause an operation to be suspended. Visibility should be good enough to, for example, enable the speedy location and recovery of a diver in the water, locate a positively buoyant diving bell, allow access to medical assistance and ensure surface vessel or supporting surface personnel such as tenders or riggers are safe.

Sea State

9.3 Rough seas can affect the safety of both the vessel crew and the dive team, especially when working from a support vessel or floating structure. Consideration needs to be given to the environmental limits for diving and diver recovery.

Temperature

9.4 Excessive heat or cold can affect a diver's thermal balance as well as affecting diving equipment. Appropriate personal protective equipment (PPE) and clothing should be provided for the type and duration of the diving project.

9.5 External body heating should be available for dives greater than 50 metres. For dives greater than 150 metres, active gas heating should be available (see also paragraph 9.48).

9.6 Cooling may be required if working in a hot environment.

Underwater Currents

9.7 Currents can impose limitations on a diver's operational ability and safety. Tide meters and tide tables may provide information on the current at different depths and can be used to help assess diving conditions. Divers operating from a bell will be able to operate better in currents than surface-orientated divers because their umbilical is shorter and, as it is deployed in the horizontal plane, it is not affected by water movement as much.

Water Quality

9.8 Divers may be exposed to chemically or biologically contaminated water, due to, for example, industrial effluent being released in the area of the dive or man-made and natural petroleum products. Such contamination may result in obscured vision, infections and possible toxic effects on

the diver under pressure. In addition, certain pollutants may cause material damage to equipment. The dumping of industrial effluent should not take place when diving operations are being carried out. Appropriate procedures should be in place to protect divers from poor water quality and to prevent pollutants from entering the diving bell. Where appropriate, protective vaccinations should be provided.

Weather

9.9 Adverse weather conditions may affect the safety of a diving operation. For example, bad weather may make working on deck hazardous for the vessel crew and the dive team; wind speed and direction can make station-keeping difficult for support vessels or floating structures; electrical storms or lightning may be a hazard to personnel and equipment. The diving project plan should identify when adverse weather should cause an operation to be suspended.

Site Hazards

Access and Egress

9.10 A means capable of supporting a diver should be provided for entering and exiting the water. There should also be a means to assist an injured diver from the water or into a bell.

Floating Structures

9.11 Diving from a floating structure can be hazardous to divers due to rotating propellers and thrusters. A remotely operated vehicle or other alternative method of carrying out the task should be used if the diver or the diver's umbilical cannot be prevented from coming into contact with a thruster or propeller.

Underwater Obstructions

9.12 Lines associated with the diving operation (for example, equipment lines, taut wires used to dynamically position a vessel) need to be considered in relation to diver safety.

Vessels

9.13 Moored vessels are vulnerable to collision. The vessel must be cognisant of the International Regulations for Preventing Collisions at Sea (COLREGs).

Water Flow, Intakes and Discharges

9.14 Divers are vulnerable to water flow, suction or turbulence whether natural or caused by water intakes or discharges. Other differential pressure situations such as blanked pipelines or void spaces also pose a significant hazard. Where any intakes or discharges are known or suspected, suitable measures, including physical or mechanical isolation where practical, should be taken to ensure that these cannot be operated while a diver is in the water. Measures to protect divers should be part of a safe system of work such as a permit-to-work system.

9.15 Water movement due to, for example, proximity to a vessel or floating structure thrusters can affect a diver's ability to remain in position and needs to be considered.

Work/Task-Related Hazards

Abrasive Cutting Discs

9.16 The adhesive used in cutting discs tends to degrade underwater and this can cause discs to break during use. Only dry discs that have not previously been exposed to water should be used, and only those discs required for use by a diver at any one time should be taken underwater.

Chemical Agents

9.17 Improper handling, use and storage of chemicals used in life-support systems can have a detrimental effect on divers. For example, compromised seals on carbon dioxide absorbents can allow moisture to enter, shortening their shelf life. Such chemicals should be closely inspected on delivery and then used and stored in accordance with the manufacturer's guidelines. Where exposure to chemicals may occur, the risk assessment must comply with the requirements of the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001 and 2015.

Debris

9.18 Debris, such as wire debris on the seabed, can make it difficult for divers to operate safely and should be collected.

Dive Support Vessels

9.19 An appropriate Code Flag A (Alpha), or appropriate marine lighting, should be deployed when divers are in the water.

Dynamically Positioned (DP) Vessels

9.20 Diving from DP vessels can be hazardous to divers due to the presence of rotating propellers and thrusters. Practical steps should be taken to prevent a diver or a diver's umbilical coming into contact with a thruster or propeller.

9.21 Any vessel operating on dynamic positioning should meet industry technical and operational standards and maritime requirements.

Electricity

9.22 Divers often come into contact with plant, including battery-powered equipment, operated by or carrying electricity. Battery-operated equipment used inside compression chambers can be a hazard. Care should be taken to ensure that divers and other members of the dive team are protected from the risk arising from the use of electricity, in particular from any shock hazard.

9.23 Recharging lead-acid batteries generates hydrogen, which can present an explosion hazard in confined spaces. Adequate ventilation should be provided.

Explosives/Blasting

9.24 All importation of explosives is regulated and licensed by the Department of Justice and Equality; information is available at www.justice.ie. Appropriate safe systems of work must be in place to protect divers if blasting operations are being carried out. Explosives should not be detonated while a diver is in the water.

Falling Objects

9.25 Dropped items, loads or equipment such as scaffolding can seriously endanger divers. Appropriate procedures must be in place to ensure that there is appropriate separation between divers and any overhead/over-the-side work or lifting activities.

Flat-Bottomed Vessels

9.26 Precautions to help divers avoid disorientation when working beneath a flat-bottomed vessel should be considered.

High-Pressure Water Jetting

9.27 Even an apparently minor accident with high-pressure water jetting equipment has the potential to cause a serious internal injury to a diver. Infection can also occur if bacteria are injected

into tissues. Such equipment should be suitable for the environment and only used for its intended purpose. The operator should be trained. Safe operating procedures must be followed when using such equipment and account must be taken of any instructions, maintenance procedures and PPE recommended by the manufacturer.

Hours of Work

9.28 As part of the risk assessment, the effects of working time on the level of risk to which workers may be exposed should be evaluated (including fatigue, see paragraphs 9.42 and 9.43). Diving contractors should ensure that they have adequately assessed and provided for any health or safety problems that may arise.

9.29 Diving personnel should be allowed to develop a regular work and sleep pattern and have a minimum rest period of twelve hours involving no work (no diving or carrying out pre-dive or post-dive checks). Appropriate refreshment breaks should be allowed to reduce diver dehydration and fatigue.

Lifting Operations

9.30 Diving projects often require the use of lifting equipment (for example, cranes, lift bags). The diving project plan should address the risks associated with lifting operations and specify how they will be planned, supervised and carried out in a safe manner by competent people. As a general rule, divers should not stand or pass under a suspended load. Consideration should be given to the potential for a diver's umbilical to become trapped, tangled or squeezed during lifting operations. All workers involved in the lifting operation (for example, crane operators on all shifts) must be briefed on the plan.

9.31 The use of lift bags underwater can be hazardous (for example, the uncontrolled ascent or descent of a load). The manufacturer's instructions, maintenance specifications, testing requirements and periodicity of inspection should be followed.

Medical and Equipment Locks and Diving Bell Trunkings

9.32 The inadvertent release of any clamping mechanism holding together two units under internal pressure may cause fatal injury to personnel inside and outside the units. Suitable safety devices (for example, pressure indicators, interlocks) should be provided to ensure that clamps cannot be released under pressure or the system pressurised before such clamps are fully secured.

Oxy-Arc Cutting and Burning Operations

9.33 As there are dangers in the use of oxy-arc cutting and burning underwater (for example, explosions from trapped gases, the trapping of a diver by items after cutting), safe operating procedures must be in place and must be followed.

Piling Operations

9.34 If there is any possibility of piling operations in the vicinity of a diving project, guidelines for diver safety should be in place.

Pipelines

9.35 Pipeline systems may be under a pressure test or have a pressure lower than the pressure at a diver's work location. Divers should not be permitted to work on pipeline systems that are under test. Where it is suspected that lines are damaged or defective, divers should not approach the lines until safe to do so. A permit-to-work system must be in place when working on pipelines in order to ensure that any risk is isolated or immobilised.

Radiation

9.36 Divers must be protected from health and safety risks caused by any device emitting electromagnetic or ionising radiation.

Remotely Operated Vehicles (ROVs)

9.37 There are a number of safety considerations that should be taken into account when divers are working with, or in the vicinity of, ROVs (for example, entanglement of umbilicals, physical contact and electrical hazards). Possible solutions include restricting umbilicals in length and employing guards and electrical trip mechanisms. All ROV thrusters should be fitted with thruster guards.

Seismic Operations and Sonar Transmissions

9.38 If there is any possibility of sonar or seismic activity in the vicinity of a diving project, guidelines for diver safety should be in place.

Medical and Physiological Considerations

9.39 Working in remote and often harsh or extreme environments can be physiologically and mentally demanding. Consideration must be given to such issues in relevant risk assessments.

Altitude Changes

9.40 Restrictions on travelling and/or flying after diving should be contained in the diving contractor's generic risk assessment. If these factors are relevant to a particular project, they should be identified in the diving project plan and be in accordance with the decompression tables being used and/or industry guidance.

Decompression Illness (DCI)

9.41 Divers are at risk of DCI. It is difficult to treat DCI if recompression facilities are not immediately available (see paragraph 11.18). The diving contractor should identify the arrangements in place for the treatment of DCI. Divers should remain close to suitable recompression facilities after completion of their dive in accordance with the decompression tables being used.

Fatigue

9.42 Fatigue is a result of prolonged mental or physical exertion. It can affect performance and impair mental alertness, which could in turn endanger the safety of the dive team. Factors to be taken into account include: working patterns (for example, availability of rest and refreshment breaks), the nature and demands of the job, the working environment and sleep deprivation. A review of the risk assessment should be carried out when planning increases to the existing limits on hours of work, or before making any significant changes to working arrangements.

9.43 Measures that can control or mitigate the undesirable effects on health and safety caused by fatigue include:

- (a) providing adequate staffing levels and relief systems to avoid regular working to excessive hours;
- (b) designing shift systems to minimise the potential for health and safety problems;
- (c) ensuring that all personnel receive adequate rest periods, particularly at busy times;
- (d) allowing regular short breaks during shifts; and
- (e) having contingency plans for unforeseen events.

Infections

9.44 With saturation diving, the closed environment, temperature, humidity, helium environment and so on, contribute to enhanced microbial growth. Sources of microbial contamination can be introduced into the saturation chamber via equipment, food, materials, the fresh water supply, seawater and even the divers themselves. The diver should be free from infection before entering the chamber. In addition, good personal hygiene, cleaning and disinfection of the chamber and equipment, control of humidity and prompt removal of used clothes and towelling from the chamber can reduce the risk of infection.

Noise

9.45 Divers may be exposed to noise both above and below water. Besides affecting hearing, high noise levels (from, for example, pile driving, concrete breaking, plant and machinery) may cause stress, affect concentration, interfere with communication and disguise the sounds of approaching dangers or warnings. Noise can also arise from the environment (for example, wind and ocean noise) or be self-generated breathing noise associated with the diver's breathing apparatus and helmets. Where applicable, noise levels should be assessed in accordance with the provisions of Chapter 1 of Part 5 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (commonly known as the Noise Regulations) and the risks should be managed.

9.46 Account should be taken of the Noise Regulations when selecting voice communication systems, diving helmets, tools, plant and equipment, as certain systems or designs may have increased noise levels.

Thermal Stress

9.47 Excessive heat and cold can affect the health, safety and efficiency of divers and the dive team. Appropriate PPE and work procedures should be provided to maintain thermal balance. For example, divers may be provided with suitable passive or active heating such as thermal undergarments and a well-fitting 'dry' diving suit, or hot-water suit. 'Wet' suits have limited application for diving under this code of practice.

9.48 External body heating must be provided for divers diving at depths exceeding 50 metres. In addition, divers who breathe oxygen-helium mixtures require active heating. Their inspired breathing gas will require active heating for dives greater than 150 metres. Means of respiratory gas heating and external body heating must be provided for diving at depths exceeding 150 metres.

Vibration

9.49 Hand-arm vibration (HAV) may be caused by the use of work equipment such as hand-held power tools and processes that transmit vibration into the user's hands and arms. Where mechanical vibrations may occur, the level of exposure should be assessed in accordance with the provisions of Chapter 2 of Part 5 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (commonly known as the Vibration Regulations).

10

Dive Teams and Associated Working Practices

Dive Teams

10.1 The diving contractor must specify the size and composition of the dive team based on the details of the diving project, including the diving depth, duration and continuity of the project and the risk assessment. There must be a sufficient number of competent and, where appropriate, qualified personnel to operate all the diving plant and equipment and to provide support functions to the dive team. This may require additional deck support personnel and other management or associated technical support personnel (for example, project engineers and vessel maintenance technicians).

10.2 The diving contractor and the diving supervisor must satisfy themselves that each diver is a competent person (see paragraph 2.5) in relation to the specific tasks required during a particular diving operation. Previous experience of a similar task may demonstrate competence. Reliable evidence should be sought to establish a diver's experience.

10.3 On-the-job or other training may be necessary for individuals to gain competence. Where an inexperienced diver is gaining experience in a dive team, the other team members and the diving supervisor need to be aware of this in order to provide advice and support. Any training must be under the direct supervision of a competent person (see paragraph 10.27).

10.4 All people in the dive team have a responsibility to co-operate with the diving supervisor and to follow any reasonable directions and instructions that the diving supervisor gives.

Overall Management

10.5 The diving contractor should provide a clear reporting and responsibility structure in the diving project plan that takes into account the fact that certain individuals (for example, diving supervisors) have specific responsibilities that cannot be changed.

10.6 On projects where more than one diving supervisor is required, dedicated personnel may be needed to provide safe management control. These personnel may be called senior supervisors or superintendents, and may or may not perform 'hands-on' duties as part of the dive team.

Team Size

10.7 The required size of the dive team will depend on the risk assessment and should take into account the number of hours to be worked each day, the type of diving, the diving method, the diving apparatus and techniques to be used, any decompression requirements, the surface and underwater plant, the safe systems of work being used and the appropriate number of personnel required for safety.

For Surface-Supplied Diving

10.8 The **minimum** team size normally required to conduct a surface-supplied dive safely within the scope of this code of practice is five: a diving supervisor, a working diver, a standby diver (see paragraphs 10.15–10.17), a tender (see paragraphs 10.13 and 10.14) for the working diver and a tender for the standby diver. Additional personnel may be required to operate or maintain specialised plant or equipment, for example winches, and to assist in an emergency.

For Closed Bell Diving

10.9 A closed bell diving project normally requires at least two operations: one when the divers are in the bell or in the water under the control of a diving supervisor and another when the divers are in the saturation chambers under the control of a life-support supervisor. The **minimum** team size normally required is nine: a diving supervisor, a relief diving supervisor, a life-support supervisor, a life-support technician, two divers inside the bell, a diver on the surface, a tender for the surface diver and an equipment technician.

10.10 During closed bell diving operations two members of the on-shift team should be competent to supervise. One of these persons should be the diving supervisor for the operation and the other should be in, or in the vicinity of, the dive control area and able to provide assistance or relief as required. In agreement with the diving supervisor, the relief supervisor may take short (30 minutes) meal/comfort breaks. Any changeover of diving supervisor should be noted in the diving operation record and the relevant people notified (for example, divers, deck crew).

10.11 Divers in saturation should be given at least twelve continuous hours of rest in each 24-hour period. To prevent 'ratcheting', divers should only take part in one bell run routine of no more than eight hours in any 24-hour period.

10.12 Bell runs should not exceed eight hours from lock-off to lock-on. This is taken to be from when the clamp is first taken off until the clamp is reconnected ready for equalisation at the end of the bell run:

- (a) In a two-person bell, each diver should spend no more than four hours out of the bell in the water;
- (b) In a three-person bell, two divers may lock-out together. The third person will undertake the duties of bellman and should remain dry unless called upon to lock-out in an emergency. Each diver may spend up to a total of six hours out of the bell in the water so long as an adequate refreshment break is taken within four hours of the start of the lock-out. The intention of the refreshment break is to ensure adequate hydration of a diver and to reduce fatigue.

Tenders

10.13 The diving contractor must be satisfied that the tender is competent. The tender should be familiar with the diving method, procedures and techniques to be used and the emergency plans and procedures for the project.

10.14 For umbilicals or lifelines that are tended from the surface, at least one tender is required for each diver in the water. For umbilicals tended from a basket or stage, one tender is required for every two divers in the water. In depths of less than 50 metres, a tender may not be required if an effective mechanical handling system for the umbilical is fitted to the bell or basket.

Standby Divers

10.15 A standby diver should be in immediate readiness to provide any necessary assistance to the diver whenever the diver is in the water. There should be one standby diver for every two divers in the water.

10.16 The standby diver should be dressed to enter the water but need not be wearing a mask or a helmet – this equipment should, however, be immediately to hand.

10.17 For surface-supplied diving, the standby diver should remain on the surface.

10.18 For closed bell diving, the standby diver should remain inside the bell.

10.19 All closed bell diving operations must have the capability of deploying a surface standby diver in an emergency unless effective alternative means are available to ensure that assistance can be rapidly provided at all depths within the working range of a surface diver.

Life-Support Personnel

10.20 Competent and qualified life-support personnel are needed to look after divers living in saturation. When divers are living in saturation, at least one life-support person should be present at, and at least one other life-support person in the vicinity of, the life-support control point at all times.

10.21 A separate life-support supervisor must be appointed in writing by the diving contractor if the life-support control point is remote from the diving control point. Saturation diving supervisors may act as life-support supervisors provided they are qualified and competent to do so.

Overlapping Functions

10.22 Individuals in a dive team may carry out more than one duty, provided that they are competent to do so and that their different duties do not interfere with each other or affect the safety of the dive team. For example, divers may carry out other associated duties while waiting to dive (for example, acting as tenders or standby divers, or operating and attending to plant).

Surface Compression Chambers

10.23 The controls of a compression chamber should be operated only by people competent to do so. Such competence will be achieved by a combination of training and experience. The training of divers and life-support technicians for the offshore sector will have covered the operation of such chambers. The degree of supervision provided should reflect the experience of the operator.

10.24 Diving supervisors may exercise full control over the operation of a surface compression chamber provided that they are able to clearly see and hear what is happening either directly or by video and audio links. If the diving supervisor cannot exert this level of control, responsibility for that part of the diving project must be given to another diving supervisor.

Personnel Not Employed by the Diving Contractor

10.25 Personnel who are not employed by the diving contractor must be carefully considered for competence and suitability before being included in the dive team. Such personnel can create a hazard if they are unfamiliar with the diving contractor's procedures, rules and diving plant and equipment.

10.26 As an example, when a diving system forms an integral part of a vessel and the maintenance technicians are employed by the vessel owner, these personnel, whose principal duties will be associated with the diving project, may form part of the dive team. Such an arrangement should be confirmed in writing, together with the responsibilities of these individuals.

Trainees

10.27 While being trained for a particular role within a dive team, a trainee is not competent for that role and must be under the direct supervision of a competent person. During the training, however, the trainee may be considered for another role in the dive team provided that he or she is competent for that task. For example, a diver may form part of a dive team while training as a diving supervisor. A trainee should not be allowed to take on the functions of the person training them unless the trainer remains in control and is present to oversee their actions, and the safety of the diving operation is not affected.

Familiarisation

10.28 When arriving at a dive site before the start of a diving project, all members of the dive team should familiarise themselves with the diving project plan, plant and equipment and any other relevant details (for example, the deck layout of a ship). Each member of the dive team must be clear about their assignments and responsibilities both during the dive and in the event of an emergency.

10.29 A familiarisation programme should be included in the diving project plan. The personnel carrying out any explanations or training should be identified and their names recorded in the diving project plan. Satisfactory completion of the training by each individual in the dive team should be recorded.

10.30 The time required for familiarisation will depend on the experience of each individual and whether that individual has previously carried out the same job in that location. For example, a diver returning to the same offshore worksite after a period of leave may only require a few minutes to become acquainted with any changes that occurred during his or her absence; whereas a diving supervisor arriving at an unfamiliar saturation diving worksite may require many hours or even days to become familiar with the site.

Communications

10.31 All divers in the water require a communication system that allows direct voice contact with the diving supervisor on the surface and vice versa. A speech processing system is required for divers who are breathing gas mixtures containing helium because it distorts speech.

10.32 All communications should be recorded, and the recording kept until 48 hours after the diver has returned to the surface or the saturation living chamber. If an incident occurs during the dive, the communication record should be retained for any subsequent investigation.

10.33 The communication system must be tested to ensure it is functioning correctly. A malfunctioning communication system may impact on the rescue of a distressed diver.

10.34 An appropriate communication system must be in place between personnel on the surface and equipment operators (for example, personnel on the vessel bridge or platform, crane drivers, winch operators, ROV supervisors).

10.35 The diving supervisor should not pass over responsibility for communication with the diver to anyone other than another appointed diving supervisor.

10.36 If other personnel require to speak to the diver, the diving supervisor must still be able to hear the diver's voice communication and breathing pattern when the other person is joined in the communication link. The communication system must allow the diving supervisor to disconnect the other person immediately if the direct link between the diver and diving supervisor is interrupted or in the event of an emergency.

10.37 Diving supervisors must be able to see the divers inside the bell or compression chamber during saturation or closed bell diving operations (via, for example, viewing ports or underwater cameras).

Use of Checklists

10.38 A diving project will involve sequences of different steps, some of which may be complex. There is a risk that steps may be omitted or taken out of sequence. A suitable way to ensure the thoroughness of such sequences is the use of prepared checklists that require relevant personnel to tick a box to demonstrate correct completion. Diving contractors will need to prepare and authorise the use of such checklists.

Emergency and First Aid Arrangements

11.1 The diving contractor must ensure that emergencies are planned for and that documented emergency procedures are in place. These will form part of the diving project plan. In addition, before any diving takes place, the diving contractor must ensure that there are adequate emergency and first aid arrangements in place.

11.2 The diving contractor must ensure that there is suitable and sufficient plant and equipment available, whenever needed, to carry out any action that may be necessary in the event of an emergency that occurs during the course of, or is connected with, the diving project.

Emergency Plans and Procedures

11.3 Emergency plans and procedures should cover the actions required of each member of the diving team in the event of an emergency. Documented plans and procedures should take account of Appendix 2. Where appropriate, plans and procedures should be available for dealing with an injured or unconscious diver, breakage or failure of equipment such as hot-water supply failure, communication failure, loss of pressure in a chamber or bell, dropped diving bell, sudden decompression of a saturation system, fire in a chamber or around the dive system, approach of adverse/severe weather, loss of main power source, damage to an installation or pipeline, evacuation from a sinking vessel or fixed/floating structure and the hyperbaric evacuation of divers.

11.4 Particular problems exist if a diver becomes seriously ill or is badly injured while under pressure. Medical care in such circumstances is difficult and the diving contractor, in conjunction with the company's medical adviser, should prepare plans and procedures for such situations.

11.5 All team members should be able to communicate clearly with each other at all times, particularly during emergencies. People tend to revert to their native language in an emergency and if team members are not speaking the same language, this can cause an obvious risk. Therefore, the diving project plan and the emergency plan should state the language that is to be used during the diving project.

Closed Bell Emergency Plans

11.6 An emergency plan and procedures should exist for the location and recovery of a lost or severed closed bell. This plan should identify the role of the diving contractor and other personnel, and the provision of specific equipment such as locators.

11.7 Plant and equipment and documented procedures should be provided to enable the diving bell to be rescued if the bell is accidentally severed from its lifting wires and supply umbilical.

11.8 The bell should be equipped with a relocation device using the International Maritime Organization (IMO) agreed recognised frequency to enable rapid location if the bell is lost.

11.9 In line with the Diving Regulations, the diving supervisor must ensure that the emergency supply of appropriate breathing gas held on the bell is capable of supporting the lives of at least three divers for at least 24 hours.

11.10 The bell will require an alternative method for returning to the surface if the main lifting gear fails. If weight shedding is employed, the weights should be designed so that the divers inside the bell can shed them. This design should ensure that the weights cannot be shed accidentally.

Hyperbaric Evacuation

11.11 In an emergency, divers in saturation cannot be evacuated by the same methods as vessel crew and other dive team members. Special arrangements and procedures should be made to evacuate divers safely while keeping them under pressure (for example, in a chamber or lifeboat capable of being removed from the worksite to a safe location while maintaining life support for a minimum of 72 hours). The exact design of such equipment and its method of deployment will depend on a number of factors, including the facilities available, the number of divers to be evacuated and the location of the worksite. Such equipment should be maintained, tested and serviced regularly.

11.12 Additional safety requirements may be necessary for those personnel conducting the evacuation.

11.13 Emergency situations should be identified that take account of the geographical area of operation, the environmental conditions, the proximity of other vessels and the availability and suitability of any onshore or offshore facilities.

11.14 Periodic training exercises should be carried out to test the operation of the hyperbaric evacuation system and the efficiency of the personnel responsible for the hyperbaric evacuation of divers. Such exercises should not be carried out with divers under pressure in the hyperbaric chamber.

11.15 Hyperbaric evacuation systems should comply with the requirements of the IMO's *Guidelines and Specifications for Hyperbaric Evacuation Systems*.

Emergency Markings on Hyperbaric Rescue Systems

11.16 In an emergency it is possible that personnel with no specialised diving knowledge will be the first to reach a hyperbaric rescue system. To ensure that rescuers provide suitable assistance and do not accidentally compromise the safety of the occupants, the IMO instructions should be followed and the IMO standard set of markings should be clearly visible when the system is afloat. All diving team members should be familiar with the emergency arrangements.

Liaison with a Doctor

11.17 Consideration should be given to the possibility that a member of the dive team will be injured or become ill when a doctor is not available at the work site. Plans for such a situation should include, for example, an arrangement to allow the personnel at the site to communicate by radio or telephone with the diving contractor's medical adviser and the pre-agreement of a suitable method of transferring information from the site to a doctor.

Therapeutic Recompression

11.18 A two-person, two-compartment chamber should be available at the worksite to provide suitable therapeutic recompression treatment for all diving projects within the scope of this code of practice.

Treatment of Patients in a Compression Chamber

11.19 A seriously ill or injured diver in a hyperbaric chamber cannot be treated in the same way as someone at atmospheric pressure. If the required treatment cannot be administered by the

personnel at the worksite, trained medical staff and specialised equipment should be transported to the casualty. Treatment should be given to the injured diver inside the compression chamber. The diver should not be decompressed or transferred to any other location until he or she is in a stable condition.

First Aid Arrangements

11.20 Because emergency medical services are not immediately available, all divers should have an in-date first aid qualification for diving within the scope of this code of practice.

11.21 For all diving projects under the Diving Regulations, the minimum required standard for provision of first aid is as specified in Chapter 2 of Part 7 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 (commonly known as the First Aid Regulations) and associated guidance.

11.22 The diver training programme includes training in diving physiology and medicine. The ability to use those skills and knowledge forms an integral part of the diver competence assessment. During diver training, trainees will also be taught and assessed for a separate first aid qualification to the standard required by the First Aid Regulations and associated guidance. Trainees will also be trained in oxygen administration.

11.23 The first aid qualification is valid for two years. Divers should satisfactorily complete a refresher course in the first aid qualification before their certificate has run out.

11.24 At least one person in the dive team, other than the diver in the water, should be qualified to a higher standard of first aid (diver medic standard). This person should not be the diving supervisor because of the supervisor's need to be in direct control of the operation at all times. There are situations where additional members of the dive team should be qualified to diver medic standard; for example, where the diver requiring first aid is inside a compression chamber and emergency medical assistance cannot be provided by normal emergency medical services. The diving contractor's risk assessment should consider the numbers required to be qualified to this higher standard.

Medical Equipment

11.25 A minimum amount of medical equipment is required at a dive site to provide first aid and medical treatment to the dive team. This minimum will depend on the method and type of diving and what is agreed with the diving contractor's medical adviser.

Accidents and Dangerous Occurrences

11.26 Notifiable accidents and prescribed dangerous occurrences should be reported to the Health and Safety Authority in accordance with Part 14 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (commonly known as the Reporting of Accidents and Dangerous Occurrences Regulations) and associated guidance.

11.27 Certain accidents or incidents that occur at sea must also be reported to the Department of Transport, Tourism and Sport under maritime safety legislation.

12

Plant and Equipment

12.1 Plant and equipment can be a hazard if they are inappropriate for the work that is being carried out, poorly/not maintained or generally unsafe to use. The incorrect selection, incorrect use and poor design of equipment can also have detrimental effects on the dive team's health and safety.

12.2 Plant and equipment used in diving include: life-support systems (for example, surface-orientated air diving systems, surface-supplied mixed diving equipment, hyperbaric evacuation systems, saturation diving systems), communication equipment, PPE (for example, diving suits, masks, helmets), general purpose tools, gas storage cylinders, compression chambers, compressors and so on. In addition, there may be other plant and equipment associated with the diving project such as lifting equipment.

12.3 The diving contractor must ensure that sufficient plant and equipment, suitable for the use to which they will be put, are provided for the diving project. All plant and equipment must be suitable for the environment that they will be used in (for example, operating in a potentially flammable area).

12.4 The plant and equipment must be available, whenever needed, to carry out the diving project safely and to carry out any action that may need to be taken in a reasonably foreseeable emergency.

12.5 Suitability can be assessed by, for example, the evaluation of a competent person, clear instructions or statements from the manufacturer or supplier, physical testing or previous use in similar circumstances. All items of equipment worn by divers should, wherever possible, comply with relevant national, European or international standards.

Gas Storage and Marking

12.6 Gases stored in high-pressure cylinders are hazardous. Gas storage areas should be adequately protected (for example, by the provision of fire deluge systems). Gases used for diving within the scope of this code of practice should be handled with appropriate care.

12.7 Gas cylinders should be suitable in design, fit for purpose and safe for use. Each cylinder should be inspected, examined and tested by a competent person. Cylinders used for diving within the scope of this code of practice may be subject to special conditions (for example, when being used underwater) and therefore need special care. Cylinders should be checked upon delivery and before use to ensure that they are fit for purpose.

12.8 Accidents have occurred because wrong gases or gas mixtures were used in a diving project. The diving contractor should ensure that all gas storage units comply with relevant national, European or international standards for colour-coding and marking of gas storage cylinders, quads and banks. Where appropriate, pipework should also be colour-coded.

Closed Diving Bells

12.9 Divers should be able to enter and leave the bell without difficulty and it should be possible to recover an unconscious diver in an emergency. Divers should also be able to transfer under pressure from the bell to a surface compression chamber and vice versa.

12.10 The bell requires:

- (a) doors that can be opened from either side and act as pressure seals;
- (b) valves, gauges and other fittings (made of suitable materials) to indicate and control the pressure within the bell – the external pressure will also need to be indicated to both the divers in the bell and the diving supervisor at the surface;
- (c) adequate equipment (including reserve facilities) to supply appropriate breathing gas to divers in and working from the bell;
- (d) equipment to heat and light the bell;
- (e) adequate first aid equipment and lifting plant to enable a person in the bell to lift an unconscious or injured diver into the bell; and
- (f) lifting gear to lower the bell to the depth of the diving project, maintain it at that depth and raise it to the surface, without the occurrence of excessive lateral, vertical or rotational movement.

12.11 The main umbilical system of a diving bell should be fitted with suitable protective devices that will prevent uncontrolled loss of the atmosphere inside the diving bell if any or all of the components in the umbilical are ruptured.

Lifting Plant and Equipment

12.12 Particular safety standards should be applied when using lifting equipment to carry personnel, including any wires used for secondary or back-up lifting. These wires should be non-rotating and have an ultimate breaking strain that is at least eight times that of the normal working load. Different ratios of breaking strain to working load may be necessary in accordance with appropriate national, European or international standards.

Winches

12.13 Winches should be provided with independent primary and secondary braking systems. It is recommended for hydraulic winches that the secondary system operates automatically whenever the operating lever is returned to neutral or on loss of power. Both braking systems should be tested separately by a competent person.

12.14 In line with Regulation 47 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016, winches should not be fitted with a pawl and ratchet gear where the pawl has to be disengaged before lowering.

Diving Baskets and Wet Bells

12.15 A diving basket or wet bell, used in support of surface-supplied diving, should be able to carry at least two divers in an uncramped position. It should be designed to prevent the diver falling out and to prevent spinning and tipping. The basket should be fitted with suitable overhead protection and handholds.

12.16 A secondary means of recovering divers should be provided.

Maintenance, Inspection, Examination and Testing of Plant and Equipment

12.17 Diving plant and equipment are used under extreme conditions, including frequent immersion in salt water. Plant and equipment that are used in water will require more regular maintenance, periodic inspection and, where appropriate, examination, testing and/or replacement.

12.18 Notwithstanding the general requirements relating to work equipment in Chapter 2 of Part 2 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 (commonly known as the Use of Work Equipment Regulations), the Diving Regulations require that the diving contractor ensures that plant and equipment used during the diving operation are in good working order and maintained in safe working condition.

12.19 In certain cases, plant and equipment, used in connection with some of the diving methods under this code of practice will fall under maritime safety legislation and requirements (for example, hyperbaric evacuation systems and saturation diving systems).

Planned Maintenance System

12.20 The diving contractor should establish a written planned maintenance schedule and system for plant and equipment. The maintenance arrangements should be detailed as part of the diving contractor's safety management system. Maintenance arrangements should take into account the passage of time, usage, operating conditions and the manufacturer's specifications and periodicity.

12.21 Under the Diving Regulations, the diving contractor must ensure that records of maintenance of plant and equipment are kept. The records should identify the item of plant or equipment along with any unique identifying numbers, the date of the check, any limitations as to use, any repairs or modifications carried out and the signature of the competent person who carried out the maintenance.

12.22 Any damaged or defective plant or equipment should be immediately removed from use and clearly identified in order to preclude its further use.

Inspection, Examination and Testing

12.23 The diving contractor must ensure that plant and equipment has been inspected, examined and tested.

12.24 The frequency and extent of inspection, examination and testing required for all items of plant and equipment used in a diving project should be in accordance with the relevant statutory provisions and national, European or international standards and should also take account of the manufacturer's specifications and periodicity.

12.25 All inspections, examinations and tests must be carried out by, or under the close supervision of, a competent person.

12.26 Records of any inspections, examinations or tests must be maintained for five years from the date of inspection, in accordance with Regulation 30 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016. These records should be made available for inspection and, upon request, to users of the work equipment.

Pre-Dive Visual Inspection

12.27 All diving plant and equipment should be inspected immediately before use by a competent person to ensure that it is of an acceptable standard for the method of diving and work being undertaken, and that nothing is damaged or suffering from deterioration

12.28 In addition, immediately prior to each dive, every diver must carry out a pre-dive visual inspection and check of his or her equipment. Any defects detected should be immediately reported to the diving supervisor.

Cylinders Used Underwater

12.29 Divers' emergency gas supply cylinders and other cylinders used underwater can suffer from accelerated corrosion and must be regularly maintained, inspected, examined and tested to ensure diver safety. Ingress of water may not only cause corrosion but also affect the quantity of gas in the cylinder.

Diving Bell and Basket Lift Wires

12.30 Frequent immersion in salt water, shock loading from waves and passing over multiple sheaves can cause wear and deterioration to the lift wires of diving bells and baskets if they are not properly maintained. Specialised advice on maintenance must be followed to ensure that wires remain fit for purpose.

Lift Bags

12.31 The inspection, examination and testing should be in accordance with the manufacturer's instructions, maintenance specifications, testing requirements and periodicity of inspection.

13

Diving Supervisors

13.1 The diving supervisor is responsible for and in immediate charge of the diving operation. The diving supervisor has a duty to direct the diving operation safely.

Appointment

13.2 A competent diving supervisor or, where applicable, competent diving supervisors must be appointed in writing by the diving contractor.

13.3 The diving contractor must provide each person whom they propose to appoint as a diving supervisor with a copy of any part of the diving project plan that relates to the diving operation that the diving supervisor will supervise.

13.4 The diving supervisor must accept the appointment in writing. If a diving supervisor does not agree with the size or complexity of the portion of the diving project allocated to him or her as an operation to supervise, the diving supervisor should not accept the appointment and should raise the matter with the diving contractor.

13.5 A diving supervisor should not participate in a diving operation that he or she considers to be unsafe (for example, if the diving supervisor believes it is too large for one person to supervise safely) or where the diving supervisor knows that he or she is not competent to supervise it.

13.6 A diving supervisor should only hand over control of the diving operation to another diving supervisor who has been appointed in writing by the diving contractor. When a diving supervisor hands over supervisory responsibilities to another diving supervisor, this should be recorded in the diving operation record.

13.7 When more than one diving supervisor is on duty at the same time (for example, with simultaneous diving operations), the diving contractor should specify, in the diving project plan, the areas and duration of the project that are controlled by each diving supervisor. Each diving supervisor must have immediate overriding control of all safety aspects for the diving operation for which he or she is appointed. The diving contractor may also need to provide a management structure in the diving project plan.

13.8 During a continuous saturation diving project, two diving supervisors should be on each shift and will, therefore, be able to act as relief for each other. The name of the diving supervisor in control should be recorded in the diving operation record, with handovers for relief or other purposes also recorded.

Competence

13.9 Any person appointed as a diving supervisor under the Diving Regulations and supervising diving operations under this code of practice must be competent to carry out the role (see paragraph 2.5).

13.10 The diving supervisor should be competent in the diving techniques and methods to be used during the diving operation. A diving supervisor qualified to take charge of a surface-supplied diving operation only is not qualified to take charge of a bell operation, whereas a closed bell diving supervisor is qualified to take charge of both types of operation.

13.11 The diving supervisor must have adequate practical and theoretical knowledge and experience of the diving method and techniques to be used in the diving operation for which he or she has been appointed.

13.12 The diving contractor must consider the competence of a person before appointing him or her as a diving supervisor. When determining competence, the diving contractor should consider, for example, whether the person is knowledgeable, practical, reliable, capable of conducting the diving operation in a safe manner, capable of managing members of the dive team appropriately and likely to remain calm and act effectively in an emergency.

13.13 The diving contractor will be in a good position to decide on the competence of a person who has worked for the company for some time. However, if the diving contractor does not know the person, it will be necessary for the diving contractor to make appropriate enquiries concerning the person's knowledge and experience.

13.14 The diving supervisor should possess a certificate of qualification to supervise the type of operation that he or she is appointed to supervise. Such certification schemes are run by the offshore industry.

13.15 Diving supervisors do not have to have a certificate of medical fitness to dive or be qualified in first aid. The diving contractor must assess the first aid capabilities of other personnel in the dive team and clearly outline the role that the diving supervisor would play in an emergency.

Duties

13.16 Diving supervisors have specific duties under the Diving Regulations. They must ensure that:

- (a) the diving operation they are supervising is carried out safely and without risk to those involved or to those who may be affected by it and is in line with the relevant legal requirements and the diving project plan;
- (b) they do not allow a diver to dive if in their opinion the diver is not fit or not competent (see paragraphs 2.5 and 15.15);
- (c) the contents of the diving project plan relating to the diving operation that they are supervising are brought to the attention of those taking part;
- (d) all plant and equipment have undergone the relevant inspections, examinations and tests and are readily available for use;
- (e) all plant and equipment, unless intended to be mobile, are secured;
- (f) there is an adequate quantity of breathing gas (primary, secondary and therapeutic) for the diving operation – the quantity of breathing gas supplied must be sufficient for all the divers engaged in the diving operation and be sufficient for the standby diver(s) and diver(s) to safely return to a place of safety in an emergency (see Section 8);
- (g) compressors are safely set up and there is an adequate reserve of breathing gas in the event of compressor failure (see paragraph 8.8).

Responsibility

13.17 The diving supervisor with responsibility for the operation is the only person who can order the start of a dive. Other relevant parties (for example, a ship's master or the offshore installation manager) can, however, tell the diving supervisor to terminate a dive for safety or operational reasons.

13.18 There will be times, for example, during diving operations from a vessel using dynamic positioning techniques that the diving supervisor must liaise closely with other personnel, such as the vessel master or the officer of the watch. In such circumstances, the diving supervisor should recognise that the master of the vessel has responsibility for the overall safety of the vessel and its occupants.

13.19 To ensure that a diving operation is carried out safely, diving supervisors must conduct the diving operation in accordance with the requirements of the diving project plan and the site-specific risk assessment. They should ensure that:

- (a) so far as is reasonably practicable, the diving operation that they are being asked to supervise complies with the requirements of the Diving Regulations and this code of practice;
- (b) the proposed dive site and the water and weather conditions are suitable;
- (c) the risk assessment is still current for the prevailing circumstances on the day of and during the dive;
- (d) they understand their own area and level of responsibility and know who is responsible for any other relevant areas;
- (e) the personnel they are to supervise are competent to carry out the work required of them – they should also check, so far as is reasonably practicable, that these personnel are fit and in possession of all necessary and appropriate certificates;
- (f) the diving project plan and arrangements for dealing with foreseeable emergencies are clearly understood by all those engaged in the diving operation – this is normally achieved by carrying out a pre-dive briefing session with all those involved and, if appropriate, providing suitable training;
- (g) the plant and equipment they propose to use for any particular operation are adequate, safe, properly certified and maintained – the plant and equipment should be adequately inspected either by themselves, if competent to do so, or by another competent person before its use, and such inspections should be documented (for example, on a prepared checklist) and recorded in the diving operation record;
- (h) the possible hazards from complex or potentially hazardous plant and equipment have been evaluated and are fully understood by all relevant parties and, if required, training or familiarisation is given – this should be carried out as part of the risk assessment during the planning of the operation and should be documented; if the situation changes, the risk assessment should be re-evaluated; diving supervisors should ensure that documentation on the risk assessment of the plant and equipment is available and follow any guidance contained in the documentation, for example manufacturer's instructions;

- (i) all relevant people, including the Irish Coast Guard, are aware that a diving operation is to start or continue – the diving supervisor should also obtain any necessary permission before starting or continuing the operation;
- (j) they have adequate means of communication with any personnel under their supervision – so long as they have such communication they do not need to be able to operate physically every control under their responsibility (for example, a diving supervisor should be able to supervise adequately the raising and lowering of a diving bell if there is a direct audio link with the winch operator, even though the winch may be located where the diving supervisor cannot see it or have ready access to it);
- (k) they are able to see divers in the bell or the compression chamber during saturation operations;
- (l) proper records of the diving operation are maintained, including the required particulars detailed in Appendix 3, as appropriate; and
- (m) they maintain the diving operation record throughout the diving operation for which they are appointed.

13.20 The diving supervisor, being cognisant of paragraph 13.17, is entitled to give reasonable orders in relation to health and safety to any person taking part in the diving operation. These orders, directions or rules must be reasonable in the context of the supervisor's duty and take precedence over any company hierarchy. Such orders could include, for example, instructing unnecessary personnel to leave a control area or instructing personnel to operate plant or equipment.

13.21 The diving supervisor remains in overall control when a diver inside a deck chamber requires medical treatment, whether medical personnel are present or are communicating long distance.

14

Divers

Duties

14.1 Divers have specific duties under the Diving Regulations. They must not dive unless they are fit to do so, hold a valid certificate of medical fitness (see Section 15) and are competent to undertake the dive and to carry out any associated work task (see paragraph 2.5). They must maintain a daily record of their dives in a personal log-book (see paragraphs 14.8 and 14.9).

14.2 Under Regulation 10(3) of the Diving Regulations, all people, including divers, have a general duty to comply with any instructions applicable to them in the diving project plan.

Competence

14.3 Under the Diving Regulations, the diving contractor must be satisfied that each diver is competent in the method of diving that is safe to be used and in the type of work that is to be carried out. In any particular situation the absolute legal obligation is to match the competence of the diver to the method and type of dive involved.

14.4 Under the Diving Regulations, if the diving supervisor is not satisfied with a diver's competence to dive, they must not permit that diver to dive.

14.5 A basic level of diving competence may be assumed from a diver who has an appropriate commercial diving qualification. For some tasks, such as underwater inspection, certificates issued by diver training organisations or independent bodies will confirm a diver's competence.

14.6 Divers can gain knowledge of unfamiliar tasks or plant by, for example, looking at the diving project specifications, the plant to be operated, the area to be worked and any other relevant factors.

14.7 Where a diver is competent in the method of diving but is being trained to carry out a task underwater, such training must be under the direct supervision of a diver who is competent in both the method of diving and the underwater task.

Personal Log-book

14.8 All divers must maintain a diver's personal log-book. On every day that a diver takes part in a diving project that diver must record in his or her personal log-book the particulars set out in Appendix 4.

14.9 The log-book must be retained for at least two years after the last entry.

Safe Pass

14.10 Where diving is carried out in support of construction work, as defined by the Safety, Health and Welfare at Work (Construction) Regulations 2013 and 2019, a Safe Pass registration card will be required.

14.11 Where inspection of any building, edifice or structure is carried out underwater and the work does not fall within the definition of construction work under the Safety, Health and Welfare at Work (Construction) Regulations 2013 and 2019, in general a Safe Pass registration card will not be required.

15

Fitness to Dive

Certificate of Medical Fitness

15.1 Diving at work requires a high degree of physical and mental fitness. The Health and Safety Authority approves doctors (known as approved medical examiners of divers or AMEDs) to carry out medical examinations and assessments of divers at work. AMEDs are selected for approval based on their training in diving physiology and their knowledge of diving. This approval is for a period of five years.

15.2 All divers at work must have a valid certificate of medical fitness to dive issued by an AMED. The certificate of medical fitness to dive is a statement of the diver's fitness to perform work underwater and is valid for as long as the doctor certifies, up to a maximum of twelve months.

15.3 The medical examination assesses the diver's overall fitness to dive. It covers the main systems of the body – cardiovascular system, respiratory system and central nervous system – as well as the ears, nose, throat, vision, dentition and the person's capacity for exercise.

15.4 If a diver who is considered unfit to dive due to a medical condition dives, he or she may impair their own safety and the safety of other members of the dive team, and may also aggravate their existing medical condition and increase their likelihood of developing long-term health problems.

15.5 No diver should dive in contravention of any conditions, limitations or restrictions imposed on them. A certificate of medical fitness to dive does not mean that a diver is currently medically fit, nor does it mean that a diver is competent to undertake any particular diving work task.

15.6 Where an annual medical examination is carried out less than one month before the expiry of the current medical certificate to dive, the start date of the new certificate may begin from the expiry date of the current certificate.

15.7 Every diver or person who is likely to be subject routinely to hyperbaric conditions, rather than in an emergency, must have a valid certificate of medical fitness to dive.

15.8 In line with Section 64(1) of the 2005 Act, an inspector of the Health and Safety Authority may require records, such as a certificate of medical fitness to dive, to be produced. Forging or using a document with the intent to deceive is an offence under the 2005 Act.

15.9 Further details of AMEDs and guidance on medical checks are available at www.hsa.ie.

General Fitness to Dive

15.10 Under the Diving Regulations, divers must not take part in a diving project if they are unfit to do so and must immediately inform the diving supervisor if they are unfit or become unfit to dive during the diving project.

15.11 Divers must not dive if they are not in good health or are in any way unfit (physically or mentally) to do so. Even a minor illness (for example, a common cold, a dental problem) can have serious effects on a diver under pressure and should be reported to the diving supervisor before the start of a dive.

15.12 Divers who consider themselves unfit for any reason (for example, due to fatigue, minor injury, recent medical treatment, recent illness, routine medications) or who become unfit to dive or unwell during the diving project must not go or remain underwater and must inform the diving supervisor.

15.13 Under the Diving Regulations, if the diving supervisor is of the opinion that a diver is not fit to dive; the diving supervisor must not permit that diver to dive.

15.14 Divers who have suffered an incident of DCI should record details of the treatment they received in their diver's personal log-book. They should show this record to the diving supervisor before taking part in their first dive after the treatment in order that a check can be made of their fitness to return to diving.

15.15 The diving supervisor should seek guidance from the diving contractor or the company's medical adviser if there is doubt about a diver's fitness to dive.

Fitness Checks Prior to Diving

15.16 Before saturation exposure, the diving supervisor should ensure that a diver has had a medical check within the previous 24 hours. This medical check will confirm, so far as is reasonably practicable, the diver's fitness to enter saturation. It will be carried out by a nurse, doctor or diver medic. The contents of the medical check and the format of the written record may be decided by the diving contractor and should be specified in the diving contractor's diving project plan.

15.17 Before any dive not involving saturation, the diving supervisor should ask the divers to confirm that they are fit to dive and record this confirmation in the diving operation record.

Appendix 1:

Glossary of Terms and Abbreviations

Terms

Bell Run: The diving bell operation from bell lock-off to bell-lock on.

Bottom time: The duration of a dive from the time of leaving the surface to the commencement of the ascent to the surface.

Continuous saturation diving project: When less than eight hours separate the return to living chambers of one team of divers and the departure from living chambers of another team of divers.

Decompression: The process by which a diver is returned to atmospheric pressure so as to facilitate the safe discharge of dissolved gases in their tissues.

Diving bell: A pressure vessel for human occupancy that is used to transport divers under pressure to or from the underwater worksite. It is also known as a **closed diving bell, closed bell** or **submersible compression chamber**.

Dynamically positioned vessel: A vessel that is held in position through the use of its propulsion system.

Hazard: Anything with the potential to cause harm, including work materials, equipment, work methods/practices, poor work design and exposure to harmful agents such as chemicals, noise or vibration. Hazards may include water, environmental factors, plant, equipment, methods of diving and other aspects of work organisation.

Life-support technician: A person trained and appointed by the diving contractor to supervise life-support functions for a diver(s) in a compression chamber.

Lock-off: When a diving bell under pressure is disconnected from the saturation chamber complex.

Lock-on: When a diving bell under pressure is reconnected to the saturation chamber complex.

Permit-to-work system: A formal written system used to control certain types of work that have been identified as involving significant risk.

Personal diver's equipment: Diving equipment worn by or carried by the diver.

Ratcheting: The practice of cycling the whole dive team in less than 24 hours and then immediately recommencing the cycle to gain work time.

Recompression: The process by which a diver is subjected to pressures equivalent to or greater than those experienced while diving.

Risk: The possibility that someone or something will be harmed by an identified hazard. The level of the risk is determined by the likelihood that harm will occur, the severity of possible injury or damage and the numbers of people who might be affected by the risk.

Risk assessment: A careful examination of what may cause harm and an evaluation of the precautions that can be taken to prevent such harm.

Saturation chamber: A compression chamber that is used for a saturation dive and that is equipped to permit divers to remain at greater than atmospheric pressure for an unlimited period of time.

Saturation dive: A dive performed after a diver's body is fully saturated with nitrogen.

Saturation diving: A diving method where the diver reaches the full saturation state for the pressure and breathing gas being used. The diver's tissues have absorbed all the nitrogen or other inert gas that they can hold at that depth. When this state has been reached, from then on further time spent at the same depth no longer increases the time required for decompression.

Superintendent: A senior supervisor, usually appointed on projects requiring more than one supervisor.

Surface compression chamber: An appropriately equipped chamber on the surface in which routine decompression or therapeutic recompression can be carried out.

Surface-orientated diving: A diving operation (other than closed bell diving) in which the diver enters the water at the surface, descends to the working depth and returns to the surface while fully exposed to variations in water pressure.

Transfer under pressure: A technique by which a diver can be transferred from one compression chamber to another compression chamber in such a way that there is no change in pressure on the diver.

Umbilical: A life support hose or bundle consisting of a breathing gas supply line, a lifeline and as required hoses, cables, lines or ropes that are capable of supplying power, heat, communications and other services as required.

Wet bell: A diving basket with a dome and main supply umbilical from the surface providing, as a minimum, breathing gas to a manifold inside the wet bell and diver excursion umbilicals terminating at the wet bell. It is not a pressurised vessel and may also be known as an **open bottom bell**.

Abbreviations

AMED: approved medical examiner of divers

DCI: decompression illness

DP: dynamically positioned

IMO: International Maritime Organization

PPE: personal protective equipment

ROV: remotely operated vehicle

SCUBA: self-contained underwater breathing apparatus

S.I.: statutory instrument [secondary legislation]

Appendix 2:

Diving Project Plan

The diving project plan must take account of relevant national standards and guidelines on safety and health, where such exist. In their absence, account should be taken of relevant European and international standards and guidelines. In particular, the following non-exhaustive list of matters must be considered.

1. Planning

- (a) Environmental conditions:
 - Meteorological conditions (including forecasted and prevailing conditions)
 - Tidal information (including local tide tables and indications of anticipated speed of tidal current) and water currents in inland waterways
 - Potential vessel traffic and proposed shipping movements
 - Underwater hazards of the dive site (including any culverts, penstocks, sluice valves or areas where differences in hydrostatic pressure or an entrapment risk may endanger the diver)
 - Air and water temperatures and surface waves
 - Bed conditions.
- (b) Depths and type of operation.
- (c) Diving equipment available and suitability of plant and equipment.
- (d) Availability, qualifications and competency of personnel.
- (e) Effects of air transport after diving.

2. Preparations

- (a) Consultation with the client and master of any vessel from which diving operations are to be carried out and with any other person who has control of the site of the project, lifting equipment, shipping movement or information related to the safety of the diving operation.
- (b) Selection of breathing gases and equipment.
- (c) Check of plant and equipment.
- (d) Allocation of personnel.
- (e) Briefing the dive team.
- (f) Personal fitness of divers for underwater operations.
- (g) Precautions against cold in and out of the water.
- (h) Means of communication and signalling.

- (i) Precautions against underwater hazards of the dive site.
- (j) Availability of suitable personal flotation devices/lifejackets for use when travelling to and from the dive site or in emergency situations.

3. Procedures During Diving

- (a) Responsibilities of the diving supervisor, dive team and others.
- (b) Use of all types of personal diver's equipment and plant.
- (c) Supply of breathing gases (including maximum and minimum partial pressures of gases).
- (d) Operations in relation to submersible compression chambers.
- (e) Working in different locations and at varying altitudes.
- (f) Operations and use of equipment underwater.
- (g) Limits on depth and time underwater.
- (h) Descent of divers and descent of submersible compression chambers (as appropriate).
- (i) Ascent and recovery of divers and submersible compression chambers (as appropriate).
- (j) Compression and decompression.
- (k) Control in relation to changing environmental conditions.
- (l) Maintenance of log-books.
- (m) Transfer to compression chamber.
- (n) Display of correct flags and signals.
- (o) Awareness of and avoidance of obstruction to other vessels or water users in the vicinity.

4. Emergency Procedures

- (a) Emergency communication and signalling.
- (b) Emergency assistance underwater and on the surface.
- (c) Therapeutic recompression.
- (d) First aid equipment, personnel and arrangements.
- (e) Medical assistance.
- (f) Calling in the assistance of the emergency services (including advance liaison with those services, where appropriate).
- (g) Precautions in event of evacuation.
- (h) Provision of emergency electrical supplies.
- (i) Suspension of diving.
- (j) Easy access to personal flotation devices/lifejackets.

Appendix 3: Required Particulars for Diving Operation Records

In line with Schedule 1 of the Diving Regulations, the following required particulars are to be included in the diving operation record for all diving projects.

1. Name, business address, e-mail address and telephone number(s) of the client.
2. Name, business address, e-mail address and telephone number(s) of the diving contractor.
3. The date and time to which the entry relates or the dates and times during which the diving operation was carried on.
4. Name of the diving supervisor or supervisors and the times and dates for which he or she is acting in that capacity in respect of that diving operation. (An entry must be completed daily by **each** diving supervisor for **each** diving operation.)
5. Location of the diving operation, including as appropriate the name or other designation of any craft, vessel, work site or installation from which diving is taking place.
6. Names and respective duties of the divers and other persons taking part in the diving operation including names of personnel operating any diving plant or equipment.
7. Purpose or nature of the diving operation.
8. Breathing apparatus and breathing gas used by each diver in the diving operation.
9. The time at which each diver left atmospheric pressure and returns to atmospheric pressure and their bottom time.
10. Maximum depth which each diver reached.
11. Procedures followed in the course of the diving operation including as appropriate, details of the decompression schedule including details of the pressures (or depths) and the duration of time spent by divers at those pressures (or depths) during decompression.
12. Emergency support and first aid arrangements.
13. Particulars of any emergency or incident which occurred during the diving operation, including any action taken and details of any decompression sickness, illness, discomfort or injury suffered by any of the divers and the treatment given.
14. Details of the pre-dive inspection of all plant and equipment being used in the diving operation. Confirmation that all equipment used has been checked immediately prior to the dive and conforms to the maintenance schedule.
15. Any defect discovered or recorded in the functioning of any plant or equipment used in the diving operation.
16. Particulars of any relevant environmental conditions or factors affecting the diving operation.
17. Any other factors likely to affect the safety or health of any persons engaged in the operation.
18. Any relevant code of practice that applies to the diving operation.
19. Name and signature of the diving supervisor completing the record.
20. Affix company stamp (if appropriate).

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Appendix 4: Required Particulars for the Diver's Personal Log-Book

In line with Schedule 2 of the Diving Regulations, the following are the required particulars for the diver's personal log-book.

1. Name and address of the diver. (Names and addresses should be printed and in block capitals.)
2. Signature of the diver and a verified photograph of the diver.
3. Date to which entry relates.
4. Name and address of the diving contractor.
5. Name and signature of the diving supervisor(s) for that dive.
6. Location of the diving project, including the name of any vessel or installation from which diving is taking place.
7. Dive number and running total of dive time.
8. The maximum depth reached on each occasion.
9. The time on each occasion that the diver leaves the surface, the bottom time, and the time the diver reached the surface.
10. Where the dive includes time spent in a compression chamber, details of any time spent outside the chamber at a different pressure.
11. Breathing apparatus and breathing gas used by the diver.
12. Any decompression schedules followed by the diver on each occasion.
13. Any work done by the diver on each occasion, and the plant (including any tools) used in that work.
14. Any episode of barotrauma, discomfort or injury suffered by the diver including details of any decompression illness and the treatment given.
15. Any emergency or incident which occurred during the diving operation.
16. Any other factor relevant to the diver's health or safety.
17. Affix company stamp (where appropriate) after the record has been signed by the diver and diving supervisor(s).

Further Information and Guidance:

Visit our website at www.hsa.ie, telephone our contact centre on **1890 289 389** or email wcu@hsa.ie

Use BeSMART, our free online risk assessment tool at www.besmart.ie

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