

Health and Safety Authority

**CODE OF PRACTICE FOR INLAND DIVING AND INSHORE DIVING
(Safety, Health and Welfare at Work (Diving) Regulations 2018)**

22nd October 2018

Acknowledgments

This Code of Practice is based in part on the Health and Safety Executive (United Kingdom) Approved Codes of Practice and Guidance for Diving. The Authority would like to thank the Health and Safety Executive (UK) and the Department of Transport, Tourism and Sport (the Irish Coast Guard and the Irish Maritime Administration) for their assistance in the development of this Code of Practice.

PUBLIC CONSULTATION

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FOREWORD

The Health and Safety Authority with the consent of Pat Breen, Minister of State at the Department of Business, Enterprise and Innovation, publishes this Code of Practice entitled “Code of Practice for Inland Diving and Inshore Diving”, in accordance with section 60 of the Safety, Health and Welfare at Work Act 2005.

The 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 1 May 2019.

Notice of the publication of this Code of Practice was published in the Iris Oifigiuil of 2018.

As regard 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

1. Introduction

1.1 Background

1.1.1 Diving for work purposes can be a dangerous activity. Divers are exposed not only to the possibility of drowning but also to hazards associated with pressure, environmental conditions, the dive location, the work task being carried out and the equipment being used. However, with proper planning and appropriate safety precautions in place, diving can be carried out safely.

1.1.2 In general, divers who work are not employed to dive, but to carry out work tasks underwater. These tasks can range from civil engineering work to scientific research work. Diving can be considered as the means of getting the worker to and from the underwater worksite in order to carry out the work task. The working diver will require both diving skills and appropriate skills in order to carry out the work task.

1.1.3 This Code of Practice specifically relates to inland diving and inshore diving projects as described in Section 2 of this Code.

1.2 Status and Scope of the Code of Practice

1.2.1 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) - the “2005 Act” - and with the consent of Pat Breen, Minister of State at the Department of Business, Enterprise and Innovation.

1.2.2 The aim of this Code of Practice is to provide practical guidance on the safe management of diving at work. The Code of Practice provides assistance on the observance of the requirements of the Safety, Health and Welfare at Work (Diving) Regulations 2018 (referred to in this Code of Practice as the “Diving Regulations”). It is targeted at clients, diving contractors, diving supervisors, divers and other people who may be involved in inland and inshore diving operations as defined in Section 2.

1.2.3 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 such as the:

- Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (S.I. No. 299 of 2007 as amended);
- Safety, Health and Welfare at Work (Biological Agents) Regulations 2013 (S.I. No. 572 of 2013);
- Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001 and 2015 (S.I. No. 619 of 2001 as amended); and
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013), may also apply.

1.2.4 It should not be assumed that compliance with the Diving Regulations means that all aspects of the law are complied with. 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.

1.2.5 In addition, the requirements of the Merchant Shipping Acts and associated regulations apply to all vessels used in connection with diving at work and compliance with this Code of Practice in no way removes the obligation to comply with the applicable Merchant Shipping legislation.

1.3 References to Legislation and Standards

1.3.1 As legislation is always under regular review, where reference is made in this Code of Practice to legislation other than the Diving Regulations, the status of this legislation should be checked on the Attorney General's website at www.irishstatutebook.ie.

1.3.2 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 www.nsai.ie.

2. Definitions

2.1 The definitions given here are for the Diving Regulations and this Code of Practice only and selected terms are explained in their context. Other 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 their 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 a self-employed person. The phrase covers divers who dive as part of their duties as an employee. 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 “Inland diving” means, taking account of paragraph 2.6, diving in the internal or inland waters of the State, including in docks, harbours, bays, marinas, jetties, piers, rivers, culverts, canals, lakes, ponds, reservoirs, quarries, aquariums and tanks. It also includes diving in a tank or pool artificially constructed for the purpose of swimming, diving, or helicopter underwater escape training.

2.5 “Inshore diving” means, taking account of paragraph 2.6, diving within the territorial seas of the State (generally 12 nautical miles from the low water mark).

2.6 Inland diving and inshore diving does not include diving projects-

- (i) deeper than 50 metres;
- (ii) where closed bell or saturation diving techniques are used;
- (iii) from vessels maintaining station by use of dynamic positioning;
- (iv) in connection with:
 - gas, oil or offshore installations and floating structures;
 - pipeline and cable works;
 - alternative energy resources such as structures generating power from wind, waves, tide or currents;

which are provided for in the Code of Practice for Offshore Diving.

2.7 “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, the person possesses sufficient training, qualifications, experience and knowledge appropriate to the nature of the work and as appropriate, diving method to be undertaken.

- 2.8 “Person” is as defined in the Interpretation Act 2005.
- 2.9 “Diving operation” is the portion of a diving project identified in the diving project plan which can be safely supervised by one diving supervisor. An operation can be made up of either a number of dives or even a single dive. It will normally be clear what this portion of work is, but factors such as the task, site conditions and the diving methods and techniques to be used, all 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 that they start preparing plant, equipment or personnel for diving until any associated routine decompression is completed.
- 2.10 “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. The diving project does not necessarily finish once the last diver has returned to atmospheric pressure. Many decompression procedures require the diver to remain in 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.
- 2.11 “Compression chamber” means as appropriate, recompression chambers, decompressions chambers, hyperbaric chambers and hyperbaric oxygen therapy chambers, all of which are terms that reflect the different purposes for which chambers are designed.
- 2.12 “Water” means, as appropriate, any other liquid in which diving may take place, for example, sewage or chemicals.

3. Application

3.1 The Diving Regulations apply to any diving project in which a person who dives is at work. This includes all places of work where diving projects are carried out and to which the Safety, Health and Welfare at Work Act 2005 applies.

3.2 This Code of Practice applies to inland and inshore diving projects, subject to paragraph 2.6, in support of:

- (a) Archaeology;
- (b) Vessel maintenance or repair;
- (c) Salvage operations;
- (d) Inspection of any building, edifice or structure;
- (e) Construction or engineering work;
- (f) Aquaculture;
- (g) Scientific research and/or scientific educational instruction;
- (h) Underwater media work;
- (i) Underwater work carried out by employees of Government Departments, State Agencies and bodies including An Garda Síochána;
- (j) Any other work-related inland and inshore diving project, as defined in paragraphs 2.4 and 2.5.

3.3 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 which 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 which is covered by the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013);

- (d) The use of emergency breathing systems in helicopter underwater escape and escape training (HUET). It should be noted that this exclusion does not extend to divers who provide rescue support during such training; and
- (e) Submersible craft including the use of atmospheric diving suits.

3.4 The Diving Regulations cover all dives where one or more divers are at work (either as an employee or as a self-employed diver) and underwater breathing apparatus is being used. They apply equally to the employed and self-employed diver.

3.5 The Regulations, specifically Regulation 5, also cover people whose actions may affect the safety of the diving project, even though they are not part of a dive team. Such people include the client, for whom the diving project is being carried out, the site owner or manager, equipment suppliers and vessel operators.

Application to Students

3.6 In accordance with Section 2(5) of the 2005 Act, the Diving Regulations do not directly apply to third level undergraduate students who dive as part of their study course as they are not deemed to be employees under health and safety legislation. However, the college or university's safety management system and safe systems of work in relation to diving should cover the health and safety of students who dive as part of their study course.

3.7 People who are deemed to be employees of third level institutes will fall under the Diving Regulations. Where the dive team consists of a mixed dive team the Regulations will apply to those at work, for example where a lecturer is diving with undergraduates (see paragraphs 3.14 – 3.16).

Application to Recreational Diving

3.8 Recreational diving does not come under the scope of the Diving Regulations except where the diver is employed or self-employed as a diving instructor or dive guide leader. In such cases the Diving Regulations will apply. However, only Regulations 4(4) and 17(1) of the Diving Regulations will apply to the teaching and guiding of divers where the sole purpose is the teaching and guiding of recreational diving and the teaching and guiding is in accordance with relevant standards adopted by the National Standards Authority of Ireland (see paragraph 3.10).

3.9 Regulations 4(4) and 17(1) require that the employer of the diver or the diver (where the diver is self-employed) ensures that the diver is competent in the method of diving that is safe to be used on the dive and also competent in any activity that they may reasonably be expected to carry out on the dive. The diver must be fit to dive and possess a certificate of medical fitness to dive (see Section 16 "Fitness to Dive").

3.10 Currently the standards that relate to recreational diving are EN ISO 11121, EN ISO 24801-1, EN ISO 24801-2, EN ISO 24801-3, EN ISO 24802-1, EN ISO 24802-2 and EN ISO 24803.

3.11 Divers who dive for purely recreational purposes and are not at work do not fall under the Diving Regulations, but such divers may find parts of this Code of Practice useful. In addition, the Department of Transport, Tourism and Sport's Code of Practice for the Safe Operation of Recreational Craft may also be of use, especially Chapter 1 and Section 2.7 of Chapter 2. The Recreational Code of Practice is available to view or download at www.dttas.ie and www.safetyonthewater.ie.

Application to the Defence Forces

3.12 Members of the Defence Forces are exempt from the Diving Regulations under Section 6(2) of the 2005 Act, when they are on active service, engaged in action in the course of operational duties at sea, engaged in operations in aid to civil power or engaged in training directly associated with any of these activities. Outside of these activities, the Diving Regulations will apply.

Application to Search and Rescue/Recovery (SAR) Diving Activities

3.13 Search and rescue/recovery (SAR) diving activities will come under the scope of the Diving Regulations where one or more divers are at work (see also paragraphs 2.2, 2.3, 3.4, 3.14 -3.16).

Application to Mixed Diving Teams

3.14 With mixed dive teams, where the team consists of divers who are at work and divers who are not at work, the Diving Regulations will apply to those divers who are at work (see paragraph 3.4). By extension, the general duties and safety management requirements of the Regulations will cover divers who are not at work, for example, the dive plan will apply to all because there is a diver at work. Individual requirements for divers, such as the requirement to have a medical assessment by an approved medical examiner of divers, will not apply to divers who are not at work.

3.15 The divers who are not at work will have a general duty under Regulation 5, taking account of their position, to take reasonable measures to ensure that the Diving Regulations and any relevant Code of Practice are complied with (See also paragraphs 10.21 – 10.22).

3.16 Dive teams which consist solely of divers who do not dive for work purposes are not covered by the Diving Regulations (see paragraph 4.6).

Application to Use of Compression Chambers and Hyperbaric Treatment

3.17 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 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.

3.18 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 (see Section 7 “Diving Project Plan and Risk Assessment”). The Diving Regulations do not apply to the hyperbaric treatment provided by that other person.

PUBLIC CONSULTATION

4. Duties of Persons

4.1 The main duties under the Diving Regulations are placed on the diving contractor but other people, for example clients, divers, people in control of the dive site, diving vessel operators, 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 other than the dive team may affect the safety of the dive team and therefore they 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 may be the owner of a site where diving work is going to take place, or the owner's agent, or a contractor acting on behalf of the owner or agent. If the owner or agent appoints an on-site representative, they should be satisfied that that person is competent 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, owner, contractor or agent;
- (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) any other person whose acts or omissions may affect the safety of the diving project.

4.3 The people listed above 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, 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. Such items may include locks, weirs, water intakes or discharge points causing suction or turbulence, ship propellers, equipment liable to start operating automatically, chemical hazards, debris or scaffolding. The diving contractor should be informed of the location and nature of such hazards. They should also provide the diving contractor, in good time, with details of any changes to this information occurring before or during the course of the diving project;
- (e) consider whether other activities in the vicinity may affect the safety of the diving project; for example, they may need to arrange for the suspension of fishing, loading or unloading of vessels, piling work, seismic or demolition activities;
- (f) 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;
- (g) provide the diving contractor with details of any possible substance or biological agent likely to be encountered by the dive team that would be a hazard to their health, for example sewage or chemicals. 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;
- (h) keep the diving supervisor informed of any changes that may affect the supervisor's diving operation in so far as he or she has control over or knowledge of such changes, for example, vessel movement in a harbour or on a river, so that diving can be suspended if the diving site is, or may be, endangered; and
- (i) 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 Other groups of people, for example harbour masters, may have authority over the dive under legislation other than the Diving Regulations. In addition, port bye laws may require authorisation by the Harbour Master or Port Company before any diving is carried out in areas under their control, for example, possession of a permit-to-dive.

4.5 The duties under Regulation 5 of the Diving Regulations extends to clients, diving contractors, diving supervisors, divers and people involved in the diving project whether directly or indirectly, for example, vessel operators, crane operators, lorry drivers, and maintenance personnel. They should ensure that their tasks and how they undertake them do not affect the safety of the dive team. The Master and crew of any vessel used in diving work should ensure that the operation of the vessel complies with relevant Maritime legislation.

4.6 Where dive teams at work are operating in close vicinity of a dive team which is not at work, there must be adequate co-operation and consultation between the teams to ensure that the safety, health and welfare of all are not endangered.

PUBLIC CONSULTATION

5. 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 There are many different clients but some examples of clients may be a:

- Transport company who brings in divers to inspect underwater bridge supports;
- Local authority or management company that brings in divers to repair a moveable floor in a swimming pool;
- Port or shipping company that requires divers to inspect underneath a ship;
- Golf club that brings in divers to retrieve golf balls from a lake;
- Yacht owner, marina or insurance company who brings in divers to retrieve a sunken vessel; or
- Company that brings in divers to carry out an underwater environmental, scientific or archaeological survey or research.

5.3 The client should clearly define the scope of the work including any health and safety specification for the work. The client must appoint, in writing, one competent person (see paragraphs 2.7 and 2.8) to be the diving contractor for every diving project. The diving contractor has overall responsibility and control of the diving project (see Section 6 “Duties of Diving Contractor”).

5.4 The client must receive written confirmation from the diving contractor that they accept the appointment. No diving work must proceed without a diving contractor being appointed.

5.5 A client may appoint themselves to be the diving contractor for the diving project if they are competent to do so.

5.6 Where the client and the diving contractor are one and the same person, for example, a Government Agency or fish farm who carries out its own diving projects using their own employees, the requirement for written appointment and confirmation is not required but the self-appointment must be recorded, for example in the diving project plan.

5.7 The client must be satisfied that the diving contractor they plan to appoint and who 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.

5.8 The extent of the enquiries will depend on the scale, complexity, hazards and any particular risks of the diving project. Such enquiries may include, but are not limited to, enquiring and seeking proof, where applicable, about the following:

- Membership of professional or industry bodies or trade associations, for example, the Association of Diving Contractors UK & Ireland;
- Knowledge of diving and the work task particularly in relation to the nature of the project;
- Safety and health knowledge, qualifications and training e.g. knowledge of the Diving Regulations, formal health and safety training;
- Evidence of a good safety record and regulatory compliance e.g. enquiring about accidents or incidents, notices issued by the Health and Safety Authority, any prosecutions.
- Sufficient staff with qualifications, training and experience in the method of diving and work task being carried out;
- The resources they intend to use on the project, including equipment;
- Evidence of a functioning safety management system e.g. an up to date Safety Statement; and
- References from previous clients.

5.9 The client must co-operate with the diving contractor and supply necessary information, for example, information about depth of the water, environmental conditions, risk assessments etc., so that the diving contractor can ensure that their obligations under the Diving Regulations are met.

5.10 The client must ensure, so far as is reasonably practicable, that the site is safe to use and must provide the diving contractor with information about any known hazards, such as underwater obstructions or possible health hazards like contaminated water, of which they are aware of or could be aware of if they made reasonable enquiries.

5.11 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.

5.12 In line with Regulation 5 of the Diving Regulations, the client must also ensure that any activities under their control do not affect the safety of the divers. A dive must not be conducted if a health and safety hazard may be caused by equipment near the dive site, unless the divers are protected from the hazard, for example, lock out of the hazard.

5.13 The client must ensure that the work of the divers and any of the client's employees is coordinated, for example, ensuring that the diving work is completed and that all divers and equipment are out of the area before resuming operations or removing a lock-out.

5.14 Realistic time frames should be agreed for the diving project, as rushing a project can lead to accidents or incidents. Sufficient time must be allowed to enable the diving contractor to carry out risk assessments and to conduct the work safely.

5.15 The facilities and support that will be provided in the event of an emergency should be agreed in advance between the client and the diving contractor. Notwithstanding this, so far as reasonably practicable and where safe to do so, the client should support the diving supervisor and diving contractor in the event of an emergency.

PUBLIC CONSULTATION

6. Duties of Diving Contractor

6.1 The diving contractor has the main responsibility 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 supplies equipment, labour or both, whether the diving contractor's own labour or that of another's.

6.3 The diving contractor's responsibilities are to ensure that:

- (a) the diving project is properly and safely planned, managed and conducted;
- (b) a diving project plan is prepared which includes emergency plans and procedures (see Section 7 "Diving Project Plan and Risk Assessment", Section 12 "Emergency and First Aid Arrangements" and Appendices 2 and 4) and that the plan is updated as necessary, throughout the course of the diving project;
- (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 "Diving Project Plan and Risk Assessment");
- (d) the place from which the diving is to be carried out is suitable and safe and adequate arrangements for access and recovery of the diver, especially in an emergency, are in place;
- (e) the diving supervisor and dive team are fully briefed on the diving operation that they will be involved in and 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 "Dive Teams and Associated Working Practices");
- (g) competent persons (see paragraph 2.7) are engaged to carry out the diving project taking account of the diving method and the actual work to be undertaken (see Section 10 "Dive Teams and Associated Working Practices", Section 14 "Diving Supervisors" and Section 15 "Divers");
- (h) diving supervisors are appointed in writing and the extent of their control documented (see Section 14 "Diving Supervisors");

- (i) where appropriate, a suitable briefing and/or familiarisation programme is completed by all the members of the dive team. Other personnel involved in the dive project, for example ship's crew, may also need to complete the programme (see paragraphs 7.17 – 7.19);
- (j) adequate arrangements, personnel and equipment exist for first aid and medical treatment (see Section 12 "Emergency and First Aid Arrangements");
- (k) suitable and sufficient breathing gas and plant and equipment is provided and as appropriate it is correctly maintained, inspected, examined and tested (see Section 8 "Diving Methods", Section 11 "Communications" and Section 13 "Plant and Equipment");
- (l) so far as is reasonably practicable, the team is medically fit to dive (see Section 16 "Fitness to Dive");
- (m) diving operation records are kept containing the required details of the diving project (see paragraph 6.7 and Appendix 3);
- (n) suitable and sufficient Personal Flotation Devices or lifejackets are available and worn on board the dive boat when required;
- (o) all roles, responsibilities and reporting structures are clearly documented; and
- (p) so far as is reasonably practicable, the diving project plan and all other relevant legislation is complied with.

6.4 The diving contractor should determine, taking account of the risk assessment, how many diving operations the diving project is to be broken down into and must appoint a competent diving supervisor(s) in writing to supervise each diving operation (see Section 14 "Diving Supervisors").

6.5 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 2.9). 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 and the number of people in the team.

6.6 The diving contractor has responsibility 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 there is more than one diving operation being conducted at the same time, as part of the diving project, the diving contractor has a responsibility to ensure that there is proper co-ordination.

6.7 The diving contractor must keep the diving operation record for a period of 2 years after the date of the last entry in the record.

7. Diving Project Plan and Risk Assessment

7.1 Pre-planning is critical to the safety and success of any diving project. All dive 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 should carry out a risk assessment of the work that is to be carried out and prepare a project plan which 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.

7.3 When assessing and planning the diving project it may be useful to divide the process into the following categories:

- General
- Pre-Dive
- On-Dive
- Post-Dive

Risk Assessment

7.4 Prior to any diving work taking place, a risk assessment must be carried out to identify the hazards related to the proposed activities and also to identify any site-specific hazards and their risks.

The Risk Assessment Process		
1	Identify the Hazard	Look at what could cause harm or injury.
2	Assess the risk	Assess the risk of death, illness or injury that may result because of the hazard. Consider who could be harmed, how and to what extent.
3	Control the risk	Put in place control measures to eliminate or reduce the risk to as low a level as reasonably practicable.

Table 1: The three step risk assessment process

7.5 In conducting the risk assessment consider the:

- Diving method and equipment;
- Dive team: the diver(s) and other team members, their competence (see paragraph 2.7) and the number of personnel required to conduct the operation safely along with medical and physiological considerations;

- Type of dive: the maximum depth and where applicable the maximum depth at the greatest tide during the work period, the time expected to complete the proposed diving task;
- Task to be undertaken; and
- Work equipment and tools.

Some examples of common hazards are given in Section 9. However, 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.

7.6 The risk assessment must determine which diving method (see Section 8 “Diving Methods”) is the most appropriate for the diving operation, taking into account the:

- type of work to be carried out by the diver;
- equipment required;
- maximum depth;
- conditions under which the diver will work; and
- inherent risks and limitations of different breathing apparatus.

In assessing the diving method to be used, account must be taken of the diver’s level of competence in underwater diving. Consideration must also be given to what will happen to the gas supply in the event of an incident. The safety reasons for the choice of method should be clearly stated in the risk assessment.

7.7 When evaluating the risk, consideration must be given to whether existing precautions are adequate or must more be done to prevent accident or injury. Account should be taken of the general principles of prevention (Schedule 3 of the 2005 Act). Table 2 outlines the possible applications of the principles of prevention to diving.

Avoid the risk	<ul style="list-style-type: none"> • Avoid diving where the level of risk cannot be controlled to an acceptable level. • Use other work methods where possible e.g. use remote controlled television systems, Remotely Operated Vehicles (ROVs), fish socks, remove vessel to dry dock etc. in lieu of divers or drain the area if possible.
Evaluate unavoidable risks	<ul style="list-style-type: none"> • Where diving cannot be avoided evaluate the risk. • Carry out a risk assessment and put in place adequate control measures that prevent or minimise the degree and duration of the diver's exposure to risk. • Based on the results of the risk assessment, organise and plan the dive.
Combat risks at source	<ul style="list-style-type: none"> • Use the safest diving method for the dive. • Ensure adequate dive team size. • Ensure that plant, equipment and procedures are designed to minimise risk. • Provide adequate means of communication between all dive team members and other relevant parties. • Maintain, inspect, examine and test all plant and equipment as per regulatory requirements, relevant standards and manufacturer's recommendations. • Keep people away from identified hazards, put lock out procedures in place where required. • Ensure that the diver has sufficient breathing gas to return them safely to a place of safety and that the gas is the correct composition and quality.
Adapt work to the individual	<ul style="list-style-type: none"> • Ensure that the diver's suit is the correct size for the diver. • Confirm that the diving operation is in line with the diver's capabilities. • Ensure that the diver's tools and equipment are ergonomically suitable for the diver. • Where individual Personal Protective Equipment (PPE) is used, ensure that it is appropriately designed and sized.
Adapt place of work to technical progress	<ul style="list-style-type: none"> • Use current valid diving equipment. • Keep up to date with current standards and industry best practice.
Replace dangerous articles/systems of work	<ul style="list-style-type: none"> • Maintain plant and equipment and replace any unsafe items. • Regularly review systems of work and update as necessary.
Collective protective measures	<ul style="list-style-type: none"> • Put in place protective measures that protect everyone not just the diver e.g. protect all from noise, slips and trips etc. • Provide appropriate hygiene measures where Personal Protective Equipment is shared.
Develop prevention policies	<ul style="list-style-type: none"> • Document the safe systems of work. • Put in place documented emergency plans. • Document the risk assessment and dive plan.
Train & Instruct	<ul style="list-style-type: none"> • Confirm that people have the appropriate qualifications, training (e.g. first aid, emergency oxygen first aid, boat handling, manual handling, diver rescue/recovery etc.) and experience for their assigned task. • Ensure that all divers are familiar with the dive plan and know their roles and responsibilities. • Make sure that personnel are aware of the limitations of any Personal Protective Equipment. • Ensure that dive team members follow the dive supervisor's instructions.

Table 2: The Principles of Prevention and Possible Application to Diving Activities.

7.8 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.

7.9 A risk assessment made under the Diving Regulations will cover, in part, the obligation to make an assessment under the Safety, Health and Welfare at Work Act 2005 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 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.

Diving Project Plan

7.10 The aim of the diving project plan is to minimise the degree and duration of the diver's exposure to risk. The plan is used to brief the divers and dive team about the work to be undertaken and the required safety precautions. Based on information from the risk assessment, a diving project plan must state how the hazards identified and risks assessed will be controlled. The detail and size of the plan will depend on the nature and size of the diving project.

7.11 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 for divers and others taking part in or associated with the diving project which are necessary to protect the health and safety of all those taking part in the diving project.

7.12 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 diving project plan should include a description of the work and identify how the diving project is broken down into diving operations. In consultation with the diving supervisor(s) and taking account of the task, site conditions and diving method, the plan should identify how many diving supervisors will be needed.

7.13 All documents should show the date upon which they were prepared. It should also explain when and how reviews of the plan, the dive site and the specific risk assessments should be conducted.

7.14 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, including retrieving injured and/or unconscious divers from the water (See Section 12 "Emergency and First Aid Arrangements"). When devising the project plan consideration should be given to the matters detailed in Appendix 2, as appropriate.

7.15 Each diving supervisor must be given a copy of that part of the diving project plan relevant to the diving operation that they will be supervising.

7.16 In preparing the diving project plan account should be taken of relevant industry standards, industry best practice and any associated technical guidance.

Familiarisation

7.17 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, plant and equipment and any other relevant details. Each member of the diving team must be clear about their assignments and responsibilities both during the dive and in the event of an emergency.

7.18 A familiarisation programme should be included in the diving project plan where it is appropriate for one to be carried out, for example, in a large and/or complex diving project. The personnel for conducting any explanations or training should be identified and their names recorded. Satisfactory completion of the familiarisation programme by each individual in the dive team should be recorded.

7.19 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 or a similar job in another location.

Use of Checklists

7.20 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.

8. Diving Methods

8.1 Diving methods and equipment must be determined as part of the risk assessment process and the safest method of diving must be selected for the dive and the work task (see paragraph 7.6).

8.2 Diving using surface-supplied breathing apparatus is usually the preferred method of carrying out diving operations under the Diving Regulations. This is because with Self Contained Underwater Breathing Apparatus (SCUBA), the breathing gas consumption for the diving operation must be appropriately assessed and the gas consumption rate can vary greatly depending on the diver's physique, the nature of the underwater work and the environment. For diving at greater depths, it becomes difficult to reliably assess the consumption rate under varying conditions. Surface-supplied diving does not require the same extent of breathing gas consumption assessment as there is a continuous supply of breathing gas to the diver.

8.3 As SCUBA diving is generally regarded as involving higher risks than surface-supplied diving, it should only take place in open water, under benign conditions and in general only be used for dives shallower than 30 metres depth. SCUBA diving should **not** be used as a method of diving if the diver could be adversely affected by hazardous underwater or surface work activities or conditions which could be alleviated if the diver were using surface-supply.

8.4 Benign conditions are generally considered as where there is clear water, no excessive tide or strong currents, no trapping, entanglement or overhead hazards, entry and exit to the water is easy, the task is not long and arduous, there are no large or potentially dangerous animals present and the dive team is familiar with the dive site.

8.5 Irrespective of the diving method selected, three critical requirements must be met:

- (i) The diver must have sufficient breathing gas to return them to a place of safety;
- (ii) There must be a suitable communication method in place which can immediately notify the surface if the diver is in trouble; and
- (iii) There must be a means of identifying the diver's position.

For Surface-Supplied Diving:

8.6 The diving contractor should ensure as a minimum that:

- (a) the diver wears a full face mask which should be fitted with either an oral nasal or a mouthpiece assembly;

- (b) the diver carries an independent secondary source of breathing gas (for example, a bail-out cylinder (see paragraphs 8.15 and 8.21) which the diver can automatically switch across to;
- (c) there is a lifeline from the diver to the surface, which should be tended;
- (d) appropriate two-way voice communication with the diver is provided;
- (e) the diver carries a net cutting device; and
- (f) a standby diver is available.

For SCUBA Diving:

8.7 The diving contractor should ensure as a minimum that:

- (a) the diver has available to them an independent secondary source of breathing gas (see paragraphs 8.15 and 8.21), for immediate use in the event of failure of the primary supply;
- (b) appropriate communication with the diver is provided;
- (c) the diver is equipped with a depth gauge and a suitable means of maintaining positive buoyancy on the surface;
- (d) the diver carries a net cutting device;
- (e) where there is a single diver in the water that there is a lifeline from the surface to the diver. The lifeline is tended and surface standby is available;
- (f) where there are two divers in the water, one acting as in water standby diver, the divers are in constant communication with one another;
- (g) where both the diving supervisor and the diver consider the use of a lifeline as hazardous or impracticable at the dive site, this should be identified in the risk assessment and the safety reasons for non-use detailed.

For Diving using Rebreathing Apparatus (Rebreathers):

8.8 The diving contractor should ensure as a minimum that:

- (a) the diver carries an independent secondary source of breathing gas connected and ready for use such as a bail out cylinder (see paragraph 8.15 and 8.21) with an integrated bail out valve;
- (b) an appropriate means of voice communication with the diver is provided;

- (c) the diver is equipped with a suitable means of maintaining positive buoyancy on the surface;
- (d) the diver is equipped with a diver's location device (for example, a personal location beacon or an audio or visual signalling device) appropriate for the type of dive;
- (e) the diver carries a net cutting device;
- (f) a standby diver is available, and
- (g) the rebreather manufacturer's guidelines, especially with respect to packing of the chemical scrubber, are stringently adhered to.

Use of Compressed Air or Gas Mixtures

8.9 Divers breathing a mixture of oxygen and nitrogen under pressure, whether compressed natural air or an artificial mixture, are 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 does not apply to therapeutic recompression.

Divers' Breathing Gas and Gas Supply Systems

8.10 Interruption, inadequate supply (partial or total loss/use) or incorrect set up and use of a diver's breathing gas supply can be fatal. 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 leakage, wastage and contingencies. Diving should be stopped if the quantity of gas acceptable for safety purposes falls below the planned minimum.

8.11 Procedures for checking and maintaining gas purity standards should be provided and documented to ensure that breathing gas is safe to breathe.

8.12 Where breathing gas is supplied to a diver via an air compressor, adequate precautions must be taken to avoid contamination of the air supply by gases, dusts or fumes. The air intake of the compressor must be properly located in order to avoid sucking in contaminated air for example, from exhausts or nearby industries. Intakes should be checked regularly for environmental changes. See also paragraph 14.13(g).

8.13 Incorrectly set up or poorly maintained compressors can result in carbon monoxide being pumped to the diver. Compressors themselves can generate and concentrate a wide range of contaminants. Compressors designed for other industrial purposes should not be used to supply air for diving.

8.14 Each diver's breathing gas should be of the correct composition, temperature and flow for all foreseeable situations. This includes independent primary and secondary

supplies. Gas supplies should be arranged so that interruption of supplies to one diver will not affect other divers' supplies.

8.15 Irrespective of the type of breathing apparatus in use, each diver should have available to them an independent alternative (secondary) source of breathing gas, for immediate use in the event of failure of the primary supply. The secondary source of breathing gas should be capable of being quickly switched to the breathing circuit in an emergency and should have sufficient capacity to allow the diver to reach a place of safety.

Exposure Limits for Surface-Orientated Diving

8.16 Diving carries an inherent risk of decompression illness (DCI). The incidence of DCI drops if the length of time that a diver spends at any particular depth is limited.

8.17 For diving operations requiring decompression, as a minimum, decompression must be planned in accordance with recognised decompression tables such as U.S Navy, Royal Navy or Canadian Diving Tables. Users of decompression tables should be aware that decompression according to recognized tables does not eliminate all risk of decompression illness (see paragraphs 8.19 and 9.6.3). As many dive tables are incompatible, care should be taken not to use more than one set of tables in any 24 hour period.

8.18 The use of decompression computers must be risk assessed within the context of the diving operation and within planned gas consumption limits. Where decompression computers are used, appropriate back up plans must be in place in the event of a computer failure.

8.19 Decompression procedures (including the use of a decompression computer) should be appropriate for the type of diving method and techniques undertaken and their use included in the diving project plan. Users of decompression tables and computers should be aware that they do not take account of factors such as age, work load during the dive, fitness, exertion, obesity and injuries, which may all significantly affect susceptibility to decompression illness and conservative diving practices, should be followed where possible.

8.20 The maximum bottom time of the dive, the decompression schedule and the technique to be used in any diving operation must be made known to and understood by the diving team.

Bail Out Cylinders

8.21 Bail out cylinders must be of sufficient volume to enable a diver complete any required decompression stops. In selecting the cylinder size, account must be taken that in an emergency situation, the diver's breathing rate will usually increase significantly.

9. 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 the equipment. Additional hazards may also be associated with the actual work being carried out. Outlined below are some common hazards which may be encountered by members of the dive team and should be considered during the risk assessment process.

9.2 It should be noted that this is not an exhaustive list of all hazards that may be encountered. Factors such as the type of dive, the frequency of diving (including repetitive diving and multi-day diving), the depth and duration of the dive, the exertion used to reach the dive site or conduct the work task along with the type of work, can all have an effect on the level of risk associated with the diving operation.

9.3 Environmental Hazards

9.3.1 The effect of environmental conditions on diving operations, both on the surface and below the surface, must be examined.

Air Temperature and Humidity

9.3.2 Both can impact on the diver's comfort and temperature. The diving team should be suitably dressed for the work to be undertaken and provided with all possible protection from cold winds.

Marine/Aquatic Life

9.3.3 Although not usually a problem in Irish waters, exposure to certain marine or plant life may result in cuts and stings. Diving in aquariums may expose divers to large and potentially dangerous marine life. The diver may suffer cuts or abrasions when working around and on marine encrusted surfaces. Kelp beds may cause entanglement if incorrect equipment is used or the diver is inappropriately trained and unable to manoeuvre through thick aquatic plants.

Restricted Surface Visibility

9.3.4 Restricted surface visibility may affect the safety of the operation, for example when diving at night or in darkness, heavy rain, glare or fog. Such conditions may make it difficult for another vessel to see the dive boat or for dive team members to see the diver.

9.3.5 Restricted underwater visibility can cause diver disorientation and SCUBA diving in particular becomes more hazardous in reduced visibility. Limited visibility may also occur when sediment is stirred up in the water and underwater visibility can vary with the seasons.

9.3.6 Divers should be provided with lamps or other suitable devices if diving during periods of darkness and if the nature of the dive permits, the dive site or underwater work site should be adequately illuminated.

9.3.7 The diving project plan should identify when an operation should be suspended because of restricted visibility.

Sea State

9.3.8 Working from a dive boat or floating structure in rough seas may affect diver recovery and also the safety of the surface team. Careful consideration of personnel safety is required before and during any dive boat launch and recovery.

Water Currents

9.3.9 Currents (river and tidal) may impose limitations on a diver's operational ability and safety and apparently calm surface water may hide strong undercurrents. The effect of currents varies with the individual, the work being carried out and the diving method being used. Changing currents may separate divers who enter the water together whilst currents can cause drag on umbilicals and result in increased amount of expended diver work energy. As much information as possible, should be obtained about tides and currents in the area of operation. Note that tide tables show only surface movements and the direction and speed of the current may vary with depth, tide and bottom configuration.

Water Temperature

9.3.10 Extreme water temperature can result in the diver becoming too cold (hypothermia) or too warm (hyperthermia). Diving in cold water is generally more hazardous than diving in warm water as the diver wears heavier insulation which restricts their movements and increases the diver's work load. If gloves are worn this will reduce manual dexterity.

9.3.11 Appropriate well-fitting Personal Protective Equipment (PPE) should be provided to maintain thermal balance, both in the water and where applicable, in the boat before and after the dive. Appropriate work procedures, such as limiting dive time, should also be put in place when diving in extreme water temperatures.

Water Quality

9.3.12 Divers may be exposed to chemical or biological contaminated water from exposure to human or animal sewage, industrial wastes, agricultural waste, enteric bacteria and water borne pathogens. Divers in contact with canal or river water may be exposed to Weil's disease which can be transmitted to humans following exposure to infected rat urine. In all such cases, equipment must be compatible with the environment and any disinfectant. Suitable decontamination/disinfection procedures should be in place and where appropriate, vaccinations should be made available.

Weather

9.3.13 Adverse weather conditions may affect the safety of a diving operation. The diving project plan should identify when an operation should be suspended. Windy conditions may cause problems in holding position and prevent the diver from completing in water decompression. Vessel handling may be affected making it more difficult to reach a diver in the water. Wind chill factors may lower the diver's temperature and that of the breathing gas. Electric storms or lightning may be a hazard to exposed personnel or equipment.

9.3.14 Weather operating parameters should be based on the ability of the dive team to start and stop diving operations safely and the ability to see and safely recover a distressed diver. Diving should be suspended if weather or water conditions are hazardous or likely to become hazardous.

Other Environmental Factors

9.3.15 Other environmental factors that should be considered include the sea depth, time of day, tides, underwater terrain, state of the water/river and high altitude.

9.4 Dive Site Hazards

Access and Egress

9.4.1 Access and entry to both the dive site and to and from the water needs to be considered. Access to the water may be easy but egress from the water especially after completing an element of work or weather conditions may impair the diver's exit. For example, the diver may be unable to climb a vertical ladder if tired, unwell, disabled or injured and some other form of controlled recovery may be required.

9.4.2 In selecting arrangements for access and egress, consideration must be given to the Part 4 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (commonly known as the Work at Height Regulations). The selection of the plant and equipment should take account of the difficulties that may occur at the air/water interface, particularly if affected by weather conditions.

9.4.3 A primary method of access and egress and a secondary method of access and egress for emergency recovery should be in place. The means for exiting the water should extend below the water surface.

9.4.4 The diver must be able to access and leave the water in an area which is a suitable distance away from any hazards.

9.4.5 Where ladders are deemed acceptable for primary access and egress, the ladder must have suitable hand supports, rungs and hand holds and be inspected in accordance with the Work at Height Regulations.

Biological Hazards

9.4.6 Potential for infection may exist from the aquatic environment, both fresh and salt water, such as exposure to biohazards from waterborne microorganisms, plants and animals which may be encountered during diving operations. Whilst diving in relation to search and rescue/recovery may expose divers to the risk of blood borne pathogens. There is also potential for infection from blood or body fluids where dive equipment is shared. Poor water quality or polluted water may also result in exposure to enteric and pathogenic bacteria. Suitable decontamination/disinfection procedures should be in place and where appropriate, vaccinations should be made available.

Confined Spaces

9.4.7 The atmosphere within some dive sites, for example tanks, may have insufficient oxygen to support life or may contain toxic gases. If the tanks cannot be drained and diving is required, the internal atmosphere should be tested prior to the diver entering the tank, as the entire dive team will need to know whether the atmosphere is safe to breathe or not. For example, in the event of an emergency it may be required to remove the diver's helmet or external rescue personnel may be required to assist.

Differential Pressure

9.4.8 Differential pressure hazards can occur in almost any water environment and have the potential to seriously injure and even kill a diver. Areas where differential pressure hazards may occur include weirs, dams, flanges, locks, sluice gates, outfall pipes or discharges, sea chests, propellers, pipelines etc. Where there is low pressure on one side and high pressure on the other, the possibility of an accident is increased. Avoid the hazard where possible. If this is not possible, then ensure appropriate procedures are in place to protect the diver, for example, isolate the hazard using formal lock out tag out and permit to work procedures, introduce physical barriers, restrict diver access to the exclusion zone etc. (see also paragraphs 9.4.14 and 9.4.15).

Restricted Space/Overhead Environment

9.4.9 The hazards which arise by virtue of the enclosed nature of the dive site or where there is an overhead environment obstructing the diver's direct access to the surface must be considered and planned for. The enclosed nature of a restricted space may cause diver disorientation and also increase the risk of heat stroke or collapse from heat stress as well as causing entrapment. Examples include ship hull cleaning activities, diving in a cave, sewer line installation, repair and maintenance.

Remote Locations

9.4.10 Remote or isolated dive locations may result in poor communications, increased emergency response times and poor or difficult access. Such issues must be considered when preparing the emergency plans and arrangements.

Shipping/Vessel Movements

9.4.11 The presence of ships or other craft movement in the vicinity of the dive site should be considered. Vessels may hit the diver or the diver may be struck by a turning propeller. Large ships passing through the area may alarm the diver by through water noise. Whilst smaller vessels may become entangled in umbilicals. Appropriate safe systems of work must be in place to separate diving activity from vessels and to ensure that vessels are aware that diving is ongoing (see paragraph 9.5.8).

9.4.12 When diving operations are in progress, the limits of the dive site must be suitably defined and identified especially to any persons not involved in the dive operation. Buoys and markers should be used to separate diving activity from vessels and flags and night lights as appropriate, should be used to indicate that divers are present (see paragraph 9.5.3).

Underwater Obstructions

9.4.13 Underwater vegetation, nets, lines, enclosures, wreckage, natural bottom formations, man-made structures, aquaculture or fishing gear and debris may all cause diver entanglement and entrapment. Floating or accumulated drift material or debris may all obstruct the diver. Such issues should be considered when selecting the diving method and divers should carry suitable net cutting devices.

Water Flow, Intakes and Discharges

9.4.14 Divers are vulnerable to water flow, suction or turbulence whether natural or caused by water intakes, discharges or water pressure differentials (see paragraph 9.4.8). Examples include work in docks, locks, near weirs or pipelines. In addition, divers are vulnerable to the discharge products. A sudden flow of water may result for example, in the diver being swept off the job or their decompression stops. Sudden flows of water may be caused by opening of gates, sluices or valves, flash floods, tidal changes or the starting up of ship's engines.

9.4.15 Subject to risk assessment, dives should not be conducted in hazardous flow conditions. Ideally, storm drains should not be entered during or for at least 24 hours after heavy rainfall. Measures to protect the diver should be part of a safe system of work, for example a permit-to-work and lock out tag out system.

Activities of Others

9.4.16 Where the activities of other persons in the dive area may be hazardous to any proposed diving work, appropriate steps must be taken to ensure that the diving can be carried out without undue risks to the divers. Where this cannot be achieved, the diving operation should be rescheduled to ensure that it can be completed safely.

9.5 Work/Task Related Hazards

9.5.1 The complexity of the diving task, the operation of equipment or even carrying out

non-routine tasks may increase the level of risk associated with the diving operation.

Abrasive Cutting Discs

9.5.2 The adhesive used in cutting discs tends to degrade under water causing the discs to break during use. Only dry discs not previously exposed to water should be used, and only those discs required for use by a diver at any one time should be taken under water.

Boat Handling

9.5.3 The Master and crew of any boat used in diving work must be appropriately qualified and experienced and should ensure that at all times, that the operation of the boat complies with any relevant maritime requirements. Dive boats carrying not more than 12 persons to or from their place of work must have an appropriate passenger boat licence issued by the Marine Survey Office of the Department of Transport, Tourism and Sport. The boat must be well equipped, maintained, seaworthy and fit for the purpose. The engine(s) should be well maintained and regularly serviced and there should be adequate navigation, communication and emergency equipment available. Navigation lights should be in accordance with the International Regulations for Preventing Collisions at Sea (COLREGs).

9.5.4 Any boat used during diving operations must be manned by a competent person at all times and that person must be able to respond immediately to any diving emergency situation that may arise.

Chemical Agents

9.5.5 Exposure to chemicals may cause a variety of health problems. Personnel working or operating diving plant and equipment may be exposed to cleaning agents, fuels, oils, gases and lubricants. 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.

Diver Propulsion Vehicles (DPV)

9.5.6 Whilst holding onto a DPV, the diver may find it difficult to look and properly monitor pressure, depth and other gauges. When using a DPV, all ancillary equipment such as torches etc. must be secured and prevented from falling into the propeller guard.

Diving from Vessels

9.5.7 Safe systems of work should be enforced to prevent divers from suffering injury from vessel propulsion systems/propellers and must include exhibiting appropriate signs and signals.

9.5.8 When diving from a vessel in navigable waters, the International Code Flag A (Alpha) should be displayed when the diver is in the water. The flag should not be flown when travelling to or from the dive site. This flag is a navigational signal which is intended to

protect the vessel from collision and indicates that diving operations are restricting the vessel's ability to manoeuvre. The flag should be as large as possible and be capable of being displayed fully extended preferably in rigid format.

9.5.9 Live boating should not take place.

Electricity

9.5.10 Divers often come into contact with plant, including battery powered equipment operated by or carrying electricity. Care should be taken to ensure that the 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. SCUBA diving should not take place where the diver is required to use electrical equipment (other than battery powered) or other high energy tools or equipment.

9.5.11 Electrical tools and equipment used underwater should be suitable and approved for use under water.

Explosives

9.5.12 If work activities involve the use of explosives, it should be noted that all importation of explosives is regulated and licenced by the Department of Justice and Equality. Information is available at www.justice.ie. Explosives should not be detonated while the diver is in the water.

Falling Objects

9.5.13 If there is a risk of falling objects or a risk of the diver striking their head, then hard hat protection should be worn unless the risk assessment demonstrates that it is not necessary. As far as possible, objects, plant and equipment should be secured so that they cannot fall or slide down on the diver.

Flat-Bottomed Vessels

9.5.14 Precautions to help the diver avoid disorientation when working beneath a flat-bottomed vessel should be considered.

High-Pressure Water Jetting

9.5.15 Even an apparently minor accident with this equipment has the potential to cause a serious internal injury to the diver. Infection can also occur if bacteria are injected into tissues. The equipment should be suitable for the environment, only used for its intended purpose and the operator should be trained. Safe operating procedures must be followed when using such equipment and account taken of any instructions, maintenance procedures and Personal Protective Equipment recommended by the manufacturer.

Lifting Operations

9.5.16 Diving projects will often require the use of lifting equipment including cranes, lift bags etc. 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. Lifting equipment and accessories should be thoroughly examined in line with the requirements of Chapter 2 of Part 2 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (commonly known as the Use of Work Equipment Regulations).

Lift Bags

9.5.17 The use of lift bags underwater can be hazardous, for example the uncontrolled ascent or descent of a load or potential snagging of the diver's umbilical resulting in an uncontrolled rapid ascent. Manufacturers' instructions, maintenance specifications, testing requirements and periodicity of inspection should be followed.

Manual Handling

9.5.18 The manual handling of dive equipment and any associated work equipment should be assessed in accordance with the provisions of Chapter 4 of Part 2 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (commonly known as the Manual Handling Regulations). Besides possibly causing injury to a diver, heavy tools can affect the diver's balance or buoyancy. Mechanical handling aids should be used where possible.

Oxy-Arc Cutting and Burning Operations

9.5.19 There are dangers in the use of oxy-arc cutting and burning underwater, for example explosions from trapped gases, and the trapping of a diver by items after cutting. Safe operating procedures must be in place and must be followed.

Remotely Operated Vehicles (ROVs)

9.5.20 There are a number of safety considerations that should be taken into account when divers are working with, or in the vicinity of, ROVs. These include entanglement of umbilicals, physical contact and electrical hazards. Possible solutions include restricting umbilicals in length and employing guards and electrical trip mechanisms. SCUBA diving should not take place in the vicinity of remotely operated vehicles.

Other Work Related Hazards

9.5.21 Certain work activities may involve the use radiation (non-ionising or ionising). The use of ionising radiation is regulated by the Environmental Protection Agency.

9.6 Medical and Physiological Considerations

9.6.1 Diving by its nature has an inherent risk of drowning. The diver can also be exposed to respiratory and circulatory risks. Pressure related injuries, which will not be dealt with in any detail in this Code of Practice, can occur during the process of descent, at any stage under water but usually at the bottom and also during ascent.

Altitude Changes after Diving

9.6.2 Travelling to altitude following diving is a predisposing factor to the onset of DCI. Guidance on travelling by car through hilly or mountainous terrain and/or flying after diving should be contained in the company's general safety management procedures. If these factors are relevant to a particular project they should be identified in the diving project plan and any restrictions on travelling/flying after diving should be in accordance with the decompression tables being used.

Decompression Illness (DCI)

9.6.3 Certain factors may predispose a diver to developing DCI, such as poor physical fitness or obesity, previous incidences of DCI, dehydration, alcohol or drug intake, physical injury, altitude exposure, cold conditions, rapid or multiple ascents, repetitive or multi day diving or severe exercise during or after decompression. Other factors that should be considered include age, exertion, temperature, sleep patterns and conditions, omitted decompression and the diver's emotional state or stress level. The diving contractor should identify the arrangements in place for the treatment of any cases of DCI.

Fatigue

9.6.4 A tired, physically or emotionally fatigued diver can put both the diver and the dive team at risk and as a result must not be allowed to dive. Any diving project must be planned to allow the diving team sufficient rest and sleep. Consideration should also be taken of divers who may travel long distances prior to diving.

Noise

9.6.5 Divers may be exposed to noise both above and below water. High noise levels, for example from pile driving, concrete breaking or plant and machinery may cause stress, affect concentration, affect communication and disguise sounds of approaching dangers or warnings, besides affecting hearing.

9.6.6 Noise can also arise from the environment (wind and ocean noise) and also as a result of self-generated breathing noise associated with 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).

9.6.7 When selecting voice communications systems, diving helmets, tools, plant and equipment, account should be taken of the Noise Regulations, as certain systems or designs may have increased noise levels.

9.6.8 When siting compressors and plant, consideration should be given to personnel working in the area.

Psychological/Physiological

9.6.9 Not all divers may be suited to carry out all types of dives and this must be taken into consideration when planning the dive. Some divers may experience claustrophobia in totally enclosed suits, whilst diving in polluted water may cause some people undue stress. Physical challenges such as the weight of the equipment, limited movement and build-up of body heat may cause diver discomfort and distress.

Thermal Stress

9.6.10 Excessive heat and cold can affect the health, safety and efficiency of divers and the dive team. Appropriately designed and sized Personal Protective Equipment and clothing must be provided for the type and duration of the diving project. Adequate procedures should also be provided to maintain thermal balance.

Vibration

9.6.11 Hand-arm vibration (HAV) may be caused by the use of work equipment such as hand held power tools and processes which transmit vibration into employee'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 nature of the work, the required diving method and the time spent underwater should all be considered when deciding on the composition of the diving team(s). The diving contractor must ensure that there are sufficient competent personnel (see paragraph 2.7) available to carry out the diving project safely, to operate all plant and equipment, provide first aid and support functions to the dive team. Additional people may also be required to operate any boats and to assist in any emergencies.

10.2 The diving contractor must specify the size of the dive team based on the details of the diving project and the risk assessment and taking account of minimum dive team sizes.

10.3 The diving contractor must ensure that the divers are competent to dive and competent to carry out the work task. This will include ensuring competency in the selected method of diving, in the ability to dive to the required depth, in working in the environmental conditions and also competency in the use of the required tools or equipment.

10.4 The diving supervisor(s) must also satisfy themselves that the diver and other members of the team are competent to carry out the specific tasks required during a particular diving operation.

10.5 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 will need to be aware of this and provide support. Any training must be under the direct supervision of a competent person (see paragraph 10.24).

Overall Management

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

Team Size

10.7 The required size of the dive team will depend on the risk assessment which should take into account the number of hours to be worked each day, the type of diving, the diving plant and equipment, the depth and the techniques to be used, any decompression requirements, the complexity of tools and the appropriate number required for safety. As the complexity in terms of tools, equipment use and the depth of the dive increases, so is the likely need for additional members of the dive team. The team size should not just consider the task but also take into account handling emergencies.

10.8 Outlined below are the **minimum** team sizes for benign conditions (see paragraph 8.4). Only rarely will it be acceptable to use the minimum team size. The acceptability of these numbers should be established from the risk assessment and included in the diving project plan.

10.9 The **minimum** team size required to conduct a dive safely in benign conditions with surface-supplied diving equipment is 4 – a diving supervisor, a working diver, a standby diver (see paragraphs 10.16 - 10.19) and a tender for the working diver (see paragraphs 10.14 and 10.15). Additional people may be required to operate or maintain specialised plant and equipment, such as winches, and to assist in an emergency, for example, a tender for the standby diver when they enter the water.

10.10 However, when using surface-supplied diving equipment, a dive team of 3 – a diving supervisor, working diver and standby diver/tender may be acceptable in controlled conditions in a swimming pool or a tank or other area, where there is no risk of entrapment, no interference from other activities and the management of an emergency has been considered. Controlled conditions in this context means that no aspect of the working environment can change without the specific authorisation of the diving supervisor. In such circumstances, when diving in swimming pools and tanks specifically in clear visibility, the standby diver can be dispensed with. However, a third person is needed on the surface to assist the diving supervisor with an emergency recovery of the diver. The third person is part of the diving team and should not leave the immediate vicinity of the dive site while the diver is in the water unless sent by the diving supervisor to summon emergency assistance. The third person should be competent to perform such duties.

10.11 The **minimum** team size normally required to conduct a dive safely in benign conditions using tethered SCUBA is 4 - a diving supervisor, a working diver, a standby diver and a diver's tender.

10.12 Where the risk assessment has identified free SCUBA as a safer alternative to tethered SCUBA, the **minimum** team size normally required to conduct a dive safely in benign conditions is 3 – a diving supervisor who also acts as a diver's tender, a working diver and an in-water standby diver.

10.13 To act as a standby diver, the diver must be fully qualified in the diving method and trained in in-water rescue. A trainee diver or a diver who has no in-water rescue is not qualified to act as a standby diver (see paragraph 10.24).

Tenders

10.14 The tender's role is to assist the diver. The diving contractor should be satisfied that the tender is competent to provide the level of assistance that the diver requires and understands how their actions can affect the diver. The tender should be familiar with the diving method and procedures to be used and the emergency plans for the project.

10.15 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 each diver in the water.

Standby Diver

10.16 A standby diver should be in immediate readiness to provide any necessary assistance to a diver in the water, with all diving equipment checked and tested.

10.17 For surface-supplied diving, the standby diver should remain on the surface and should be dressed to enter the water, but need not be wearing a mask or a helmet. The equipment should, however, be immediately to hand. The standby diver's umbilical must be at least 5 metres longer than the diver's umbilical.

10.18 When surface-supplied breathing apparatus is being used for carrying out diving operations under the Diving Regulations it should also be used by the standby diver(s).

10.19 When using SCUBA and an in-water standby diver, the standby diver must be in constant communication with the working diver.

Overlapping Functions

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

Personnel Not Employed by the Diving Contractor

10.21 Personnel who are not employed by the diving contractor but who are considered for inclusion in the dive team must be competent for the work that they are going to do. They should be familiar with the diving contractor's procedures, rules and the diving plant that are to be used.

10.22 Arrangements for their involvement should be set out in the diving project plan together with details of their responsibilities and reporting line.

Mixed Dive Teams

10.23 Where a dive team consists of both people who are at work and people who are not at work, the management of such a team must be planned and assessed. If a person is allocated duties under the Diving Regulations, they must be competent to perform such duties. Possession of qualifications may not demonstrate fitness or ability to carry out the dive and the work and in some cases competence may need to be verified and/or demonstrated.

Trainees

10.24 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. However, they may during that training be considered for another role in the dive team provided that they are competent and qualified for that task. For example, a diver may form part of the dive team while training as a diving supervisor. The trainee should not be allowed to take on the functions of the person training unless the trainer remains in control, is present to oversee their actions and the safety of the diving operation is not affected (see also paragraphs 10.13 and 14.8).

PUBLIC CONSULTATION

11. Communications

11.1 Effective communication is crucial to the safety of the dive operation. There must be appropriate, efficient and reliable communication systems in place between:

- (a) The diver and the surface;
- (b) The surface and the diver;
- (c) Divers;
- (d) Members of the dive team on the surface;
- (e) The dive team on the surface and the shore (such as port control, the people in control of the dive location and the emergency services);
- (f) The dive team and other vessel traffic that may be in the vicinity of the dive site; and
- (g) The dive team and any other dive team that may be operating in close proximity.

The type and method of communication that is in place will be dependent on the diving method and the risk assessment. See Appendix 5 for information on communication with the Coast Guard and emergency procedures.

11.2 Audio communication systems are always preferred as they allow divers in the water direct voice contact with the diving supervisor on the surface and vice versa. A hard-wired audio communication system is preferential to a through-water communication system because the effectiveness of the through-water system can be degraded for instance by acoustic shadow, sediment, differences in water temperature, air bubbles or turbulence. The audio communication system used should be permanently “live” for diver to surface communication and “press-to-talk” from the surface to the diver i.e. biased to the diver.

11.3 Practical testing of the selected communications equipment in the operational location, both in and out of the water, should be carried out in order to ensure its effectiveness. There are benefits to recording communications between team members on the surface and the diver and keeping the recording until the dive is successfully completed. For example, if an incident occurs during the dive the recording may help in any subsequent investigation.

11.4 Where rope signals are being used, all members of the dive team must be competent in the technique.

11.5 Where applicable, lookouts for moving vessels should be appointed as part of the communication system.

11.6 Diving supervisors should monitor surface-supplied divers’ breathing patterns and receive oral reports from divers of their condition.

11.7 With SCUBA diving, diving supervisors must monitor the position of the divers and the duration of the dives. The surfacing time for each diver must be known in advance and the diving supervisor must be able to recall individual divers if required.

11.8 All relevant people should be informed that a diving operation is to take place.

PUBLIC CONSULTATION

12. Emergency and First Aid Arrangements

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

12.2 The diving contractor must also ensure that there is suitable and sufficient plant and equipment available, whenever needed, to carry out any action which 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

12.3 Prior to any diving taking place, documented emergency plans and procedures must be prepared and kept available at the dive site until all diving activity has ceased. The plans and associated procedures should identify and address any issues unique to the site that may compromise the ability of the support team and those assisting to gain access and deal with the emergency.

12.4 In planning for emergencies, consideration must be given to the matters detailed in Appendix 2. In addition, procedures should cover for instance, actions for dealing with a missing diver, an ill, injured or unconscious diver or team member, rescue, resuscitation and evacuation of personnel, fouled diver or umbilical, faulty or broken equipment, diving equipment malfunction, loss of gas supply or vital support equipment, diver over rapid ascent to the surface, loss of communication, fire, aborting a dive, difficulties in keeping the dive base stationary, approach of adverse/severe weather or water conditions and evacuation from a sinking vessel.

12.5 The emergency procedures should describe the necessary steps to be taken to bring a nonconforming (unsafe) diving operation back to a safe status or to quickly recover an injured or unconscious diver from depth to a place of safety.

12.6 The actions required of each member of the diving team in the event of an emergency should be detailed in the plans. The members of the team must be familiar with the plans and have received adequate instruction, training and information in order to carry out the actions required of them.

12.7 The plans and procedures should cover the provision of an effective means of emergency communications and contact details for medical personnel and emergency services such as the Coast Guard, ambulance service and lifeboats. Consideration should be given to how such services will access any injured personnel. Procedures should include calling for assistance from the emergency services (a map, directions and a script to follow that includes pertinent details such as the exact location of the diving operation and that it is a diving emergency may be helpful) including advance liaison with the services where appropriate (see Appendix 5).

12.8 The plans should be achievable and not reliant on the intervention of the emergency services as the primary course of action. Whilst the use of the available emergency services may result, the plans should address the immediate actions required by the dive team at the dive site prior to the emergency services taking control. Where the support of emergency services is required, the plans should be continually assessed to take account of any factors which may affect such support such as changing weather conditions.

12.9 The emergency plans and procedures should be readily available to all relevant workers and members of the dive team. All relevant people should be familiar with them. Practical exercises in using emergency procedures should be performed where possible on a routine basis and records kept.

Emergency Arrangements

12.10 The diving contractor must ensure that adequate emergency arrangements are made so that emergency services are readily accessible at the site of the dive. The required medical personnel, equipment and supplies will depend on the risk assessment and factors such as the nature and location of the dive, the type of dive and the work being carried out.

12.11 Suitable equipment should be available for rescuing an incapacitated diver from the water such as proprietary rescues devices. Where a diver wears a diving harness it should be of sufficient design to assist in rescuing the diver. All equipment should be maintained, inspected, examined and tested.

12.12 The diving contractor should locate the nearest available compression chamber to the diving operation and make arrangements and obtain contact details for the use of the chamber in the event of an emergency. The plan should record the suitable chambers which have been identified and the arrangements which have been made for emergency recompression throughout the course of the diving project (see paragraphs 12.27 – 12.32).

12.13 The means of evacuation of the diver to the closest available compression chamber must also be considered taking account that the Irish Coast Guard Helicopter will only take the diver to the nearest available compression chamber within the Irish Search and Rescue Region (IRSRR). If a diver requires deeper treatment in a facility outside the IRSRR for example, in the United Kingdom, the diving contractor must have suitable arrangements for alternative transportation and treatment in place. Account should be taken that a direct route may not be practicable if it involves conveying a diver by flying at high altitude.

12.14 The situation where a member of the dive team is injured or becomes ill but a doctor is not available at the work site should also be considered.

Accidents and Incidents

12.15 In the event of an accident or incident, priority must be given to any injured party and prevention of further accident or injury, over completion of any work task.

12.16 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.

First Aid Arrangements

12.17 The diving contractor is responsible for ensuring that enough people in each dive team have been trained to the required standard of occupational first aid and hold a valid first aid qualification.

12.18 The diving contractor's risk assessment, which should be carried out before the start of the diving project, should determine the number of trained first aiders required on site and whether additional members of the dive team need to be qualified in first aid. The assessment should take into account the type of diving to be undertaken, the nature of the work including the tools and techniques to be used, the size of the dive team including the number of divers, the distance of the dive site from emergency services and the ability of the emergency services to access the location.

12.19 But in general, for diving under the Diving Regulations and this Code of Practice, at least two people in each dive team should be qualified in first aid to the standard prescribed in paragraph 12.20. The diving supervisor should be responsible for arranging the duties so that one of the people on the surface at the dive site is able to administer first aid, should it be needed, to a member of the dive team in an emergency. It should be ensured that the qualified first aider does not have important duties which would conflict with the requirement to provide first aid in an emergency.

12.20 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 to 2016 (commonly known as the First Aid Regulations) and associated guidance. This first aid qualification is valid for 2 years.

12.21 The diving contractor should provide first aid equipment to the standard set down in the First Aid Regulations and associated guidance (see also paragraph 12.23). Additional equipment may be required based on the risk assessment. The first aid equipment must be appropriately positioned at the dive site.

12.22 In line with Section 64(1) of the 2005 Act, an inspector of the Authority may require records, such as first aid training records, to be produced.

Oxygen Administration and Availability

12.23 Oxygen must be immediately available at all dive locations including those where there is a compression chamber.

12.24 Taking account of the location of the dive site and access to medical facilities, sufficient gas should be provided for the duration of a transfer of a diver to a compression

chamber, hospital or other place. The equipment should be sufficient to provide recommended levels of medical oxygen to a breathing or non-breathing patient.

12.25 At a minimum, a qualified first aider must also be qualified in the administration of oxygen and the recognition of diving injury symptoms and must have received appropriate training in the correct use of the oxygen administration system. Such training should be renewed every two years. The diving contractor's risk assessment, should consider whether additional members of the dive team need to be qualified in oxygen administration.

12.26 The person assigned to carry out emergency oxygen first aid must be available on the surface at the dive site to administer oxygen to a member of the dive team in an emergency. In normal circumstances, this person will be a member of the dive team who does not enter the water.

Availability of Compression Chambers

12.27 The diving contractor has a responsibility to ensure the provision of facilities so that a diver can be recompressed in an emergency, should this be necessary. Treatment of DCI in a compression chamber should commence as soon as possible (subject to medical advice). The provision of a compression chamber should be in accordance with the decompression procedures selected as part of the diving project plan.

12.28 In preparing the diving plan and the emergency plan, the time to treatment and the transport arrangements need to be assessed taking account of the availability of compression chambers and the fact that the sooner hyperbaric oxygen treatment is provided the more likely it is to be successful in treating decompression illness.

12.29 The following minimum standards should be applied:

- (a) for dives that are shallower than 10 metres with planned in-water decompression not exceeding 20 minutes, the diving contractor should identify the nearest suitable operational two-person, two-compartment chamber. The chamber should be accessed as soon as possible and be no more than 6 hours travelling distance from the dive site;
- (b) for dives over 10 and up to 50 metres with either:
 - (i) no planned in-water decompression; or
 - (ii) with planned in-water decompression of up to 20 minutes,

the diving contractor should assess the risk of DCI and the likelihood of a diver requiring emergency recompression based on the depth and duration of the planned dives. The assessment should also take account of other factors which may increase the risk of DCI such as the work task etc. (see paragraph 9.6.3).

- Where the risk assessment demonstrates a significant risk of DCI (medium to high risk), the diving contractor must provide a suitable two-person, two-compartment chamber for immediate use at the site of the diving project.

- Where the risk assessment demonstrates a low risk of DCI, the diving contractor must identify the nearest suitable, operational two-person, two-compartment chamber. The chamber should be accessed as soon as possible and be no more than 6 hours travelling distance from the dive site.

Times specified for the travelling distances to the compression chamber are independent of helicopter usage. Travel times should be based on achievable boat and/or road transit times from the actual dive site, not on travel time from the nearest roadside point.

- (c) for dives with planned in-water decompression greater than 20 minutes, the diving contractor must provide a suitable, operational, two-person, two-compartment chamber for immediate use at the site of the diving project. The diver should be able to leave the water quickly and easily and be pressurised within the chamber to the appropriate recompression pressure as defined by the time in the decompression schedule being used. The controls of a compression chamber should only be operated by persons competent to do so. Such competence will be achieved by a combination of training and experience. The degree of supervision provided should reflect the experience of the operator.

12.30 In all cases where the compression chamber is not located on the site, the diving project plan should include arrangements to ensure that in an emergency a diver will be able to be transported and recompressed to ensure, so far as is reasonably practicable, their safety. For example, a fast boat may be required to get the diver to land quickly. Where required, a vehicle should be ready for transport and not designated for other work that may take it off site.

12.31 Where the compression chamber is located on site, its location should be risk assessed, taking account of for example, potential damage from dropped objects, hot works within the area when the chamber is in use, trip hazards, ease of access, presence of flammable materials in the area. Adequate firefighting arrangements should be available.

Suitability of Compression Chambers

12.32 Where compression chambers are required a two-person, two-compartment compression chambers should be available at a minimum. The chamber must be suitable for the intended purpose.

Transporting an Injured Diver under Hyperbaric Pressure

12.33 A diving contractor who is responsible for transporting a diver to a hospital or other place under hyperbaric pressure should ensure that a competent chamber operator or diving supervisor accompanies the diver.

13. Plant and Equipment

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

13.2 Plant and equipment used in diving includes life support systems (for example, SCUBA, surface supplied diving equipment), communication equipment, Personal Protective Equipment (diving suits, masks, helmets etc.), 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.

13.3 Suitability of Plant and Equipment

13.3.1 The diving contractor must ensure that sufficient plant and equipment, which is suitable for the use to which it will be put, is provided for the diving project. The plant and equipment must be available, whenever needed, to carry out the diving project safely and to carry any action which may need to be taken in a reasonably foreseeable emergency.

13.3.2 Suitability can be assessed by the evaluation by 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 the diver should, wherever possible, be to relevant national, European or international standards.

13.3.3 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, not damaged or suffering from deterioration.

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

13.3.5 Faulty or malfunctioning equipment must be removed from use immediately, clearly labelled as faulty and must not be used until it is repaired and tested, if appropriate.

13.3.6 No diver should undertake a dive to a depth greater than that for which the equipment is suitable. Where applicable, all diving plant and equipment must meet the appropriate relevant national, European or international standards

13.4 Gas Cylinders

13.4.1 The main types of gas cylinders associated with diving are high pressure storage cylinders, diving cylinders which are used underwater and medical oxygen cylinders for oxygen administration in an emergency.

Cylinder Manufacture

13.4.2 All cylinders manufactured to the standards of the European Union (Pressure Equipment) Regulations 2017 (S.I. No. 233 of 2017) will carry a CE mark. Cylinders made prior to those Regulations will not bear the CE mark but may continue to be used as long as they have been manufactured in accordance with appropriate national or European standards and are maintained in serviceable condition. Irrespective of this, pressure cylinders should be considered for periodic replacement, rather than waiting for them to fail inspection, examination and testing.

Gas Storage Cylinders

13.4.3 Gas storage cylinders should comply with all relevant statutory provisions. Cylinders should be stored in a well ventilated area, be protected from excessive heat and prevented from falling, rolling or their valves being hit by objects.

Marking and Colour Coding of Gas Storage

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

Oxygen

13.4.5 Oxygen is combustible and can react with most materials. Pressurised oxygen can fuel a serious fire or cause an explosion and should therefore be stored and handled correctly.

13.4.6 Any gas mixtures containing more than 25% oxygen by volume should be handled as if it were pure oxygen and treated with extreme care.

13.4.7 Any materials used in plant intended to carry oxygen e.g. cylinders, valves, whips, should be cleaned of hydrocarbons and contaminants to avoid explosion i.e. oxygen clean.

13.4.8 All equipment and components used for pumping or transferring such mixtures must be oxygen compatible and cylinders must be labelled for oxygen service. Oxygen service means that a system or system component is suitable to use in an oxygen environment (i.e. Oxygen Clean + Oxygen Compatible = Oxygen Service).

13.4.9 Formal cleaning procedures for such plant should be provided by the diving contractor, together with written confirmation that such procedures have been followed.

Cylinders Used Underwater

13.4.10 Divers' emergency gas supply cylinders and other cylinders used underwater can suffer from accelerated corrosion, which can weaken the cylinder wall and result in explosion during filling. As a result such cylinders must be regularly maintained, inspected, examined and tested. All cylinders and fittings must be fit for purpose and valves threads must be compatible with the cylinder.

13.4.11 Diving cylinders used at work or filled by a person who is at work must be inspected, examined and tested by a competent person to ensure that they are safe. The inspection, testing and examination should be carried out in accordance with national, European or international standards. Account should be taken of the more frequent inspection, examination and testing regime for cylinders used underwater.

13.4.12 All cylinders that have been inspected, examined and tested must be stamp marked and a test report provided to the owner. Cylinder owners should retain these reports as proof of inspection, examination and testing in conjunction with the stamp mark.

13.4.13 The history of all diving cylinders, including certification history, should be known. Cylinders that cannot be identified from markings on the cylinder, for example cylinder markings are missing or cannot be read, should be removed from service, the gas safely released, the cylinder rendered incapable of holding pressure and safely disposed of.

13.4.14 All cylinders must be labelled in accordance with national, European or international standards.

13.4.15 In order to reduce the chances of water or moisture entering cylinders, do not leave empty cylinders with their valves open and avoid emptying cylinders underwater. If cylinders are emptied underwater they should be internally examined before refilling.

Cylinder Charging/Filling

13.4.16 Cylinder charging has the potential for serious injury and property damage and so must be planned and carried out in accordance with a documented safe system of work for cylinder charging.

13.4.17 Charging should be carried out in a dedicated safe area which is well ventilated and away from any public or working areas or any flammable storage areas. Any item which has potential to become a projectile in the event of a cylinder rupture should be removed from the area e.g. loose materials, tools etc. Only essential personnel should be in the area during cylinder charging.

13.4.18 Cylinders should be well supported so that they cannot topple and whip checks should be fitted to charging hoses and manifold whips.

13.4.19 Charging should only be carried out by a competent person, wearing appropriate Personal Protective Equipment (PPE), for example eye, hearing, hand and foot protection. Cylinders being charged should not be left unattended.

13.4.20 The filler should refuse to fill any cylinder which they do not believe to be safe, for example due to water ingress, exposure to heat or fire or physical damage or the cylinder does not have appropriate proof of inspection, examination and testing, the markings are falsified or the correct cylinder pressure is not known.

13.4.21 Cylinders should only be charged with breathing gas/air in accordance with relevant national, European or International standards.

13.4.22 The filler should have appropriate air quality monitoring and maintenance records.

Transporting Diving Cylinders

13.4.23 Diving cylinders being transported for work purposes must be appropriately secured and incapable of movement during transport in order to prevent accident or injury from the cylinder(s) for example, in the event of a road traffic collision or to reduce the possibility of dents which may result in cylinders failing inspection, examination and testing.

13.4.24 Cylinders being transported for personal use for work purposes, for example, being transported to a dive site for use and not for storage or delivery purposes will fall under exemptions under the European Communities (Carriage of Dangerous Goods by Road and Use of Transportable Pressure Equipment) Regulations 2011-2018 (commonly known as the ADR regulations), subject to specified limits. Although in such cases, it is not legally mandatory, it is good practice to display the appropriate compressed gas warning pictogram label on the transport vehicle. Measures should be taken to prevent leakage during transport.

13.4.25 Where diving cylinders are being delivered to a premises or being moved from one storage location to another, this activity will fall under ADR provisions.

13.4.26 When transporting gas cylinders under ADR, the requirements are as follows:

- The driver of the transport vehicle must have training in line with their role and responsibility;
- The driver must carry a transport document;
- If the total quantity of gas is under 1000 Litre nominal capacity – the vehicle must carry at least 1 x 2 kilogram fire extinguisher; and
- If the total quantity of gas is over 1000 Litres then the full requirements of ADR apply and the services of a Dangerous Good Safety Advisor (DGSA) should be sought.

For further information see “ADR Carriage of Dangerous Goods by Road a Guide for Business” available at www.hsa.ie.

13.5 Lifting Equipment

13.5.1 All lifting equipment and accessories used for lifting load, goods or people must meet the requirements of Chapter 2 of Part 2 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (commonly known as the Use of Work Equipment Regulations).

Lifting Plant to Carry Personnel

13.5.2 Such equipment should be designed in accordance with any relevant statutory provisions, national, European or international standards.

13.5.3 Particular selection criteria should be used for lift wires to carry personnel, including any wires for secondary or backup lifting. These wires should be non-rotating and have an effective safety factor in accordance with relevant national, European or international standards.

Winches

13.5.4 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.

13.5.5 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

13.5.6 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. It should be fitted with suitable overhead protection and handholds.

13.5.7 A secondary means of recovering the divers should be provided.

13.5.8 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.

13.5.9 Lift wires may be rigged incorrectly or fail due to stress or corrosion. Frequent immersion in water, shock loading, passing over multiple sheaves and so on can cause wear and deterioration to the lift wires if they are not properly maintained. Specialist advice on maintenance should be followed to ensure that the wires remain fit for purpose.

13.6 Maintenance, Inspection, Examination and Testing of Plant and Equipment

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

13.6.2 Notwithstanding the general requirements relating to the use of work equipment in Chapter 2 of Part 2 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (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 is in good working order and maintained in safe working condition.

Planned Maintenance System

13.6.3 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 passage of time, usage, operating conditions and the manufacturer's specifications and periodicity.

13.6.4 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.

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

Inspection, Examination and Testing

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

13.6.7 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.

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

13.6.9 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. In line with this Regulation, records should be made available for inspection and upon request, to users of the work equipment.

Modifications to Plant and Equipment

13.6.10 Plant and equipment should not be modified without the prior approval or authorisation from the manufacturer.

Dive Equipment Hygiene

13.6.11 An appropriate method of cleaning, drying and as appropriate disinfecting dive equipment must be in place, especially where dive equipment has shared users, in order to reduce the potential for biological agent growth e.g. bacteria, fungi, viruses, and possible allergic reactions or disease transmission. Equipment should be cleaned and disinfected in line with the equipment manufacturer's recommendations and in house documented work procedures. Care should be taken when selecting disinfectants to ensure they are compatible with the materials being cleaned.

Personal Dive Equipment

13.6.12 Where a diver possesses their own dive equipment for use at work, they should ensure that the equipment is maintained, inspected, examined and tested (see paragraph 13.6.7). The diving contractor and diving supervisor must be satisfied that such equipment is safe to use and should be provided with appropriate authenticated copies of any relevant records.

14. Diving Supervisors

14.1 The diving supervisor is responsible for the safety of the diving operation that they are supervising, and should be on site and in direct control of the diving operation.

Appointment of Diving Supervisor(s)

14.2 A diving supervisor or where applicable, supervisors must be appointed in writing by the diving contractor. If a diving project is taking place over such an area or time-scale that its operation cannot be controlled by one diving supervisor, then further diving supervisors should be appointed. Written appointments should clearly define the times and areas of control. The diving supervisor should have immediate overriding control of all safety aspects of the diving operation for which he or she is appointed.

14.3 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 plan that relates to the diving operation which the diving supervisor will supervise.

14.4 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 them as an operation to supervise, the diving supervisor should not accept the appointment and raise the matter with the diving contractor.

14.5 Where the diving contractor and the diving supervisor is one and the same person the requirement for written appointment and confirmation is not required but the self-appointment must be recorded in the diving project plan.

14.6 As necessary, several diving supervisors may be appointed to one diving operation but only one diving supervisor can supervise at any one time. 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.

14.7 The diving supervisor should not dive whilst supervising other divers. Where a diving supervisor is required to carry out any other activity other than supervising; a secondary diving supervisor should be appointed.

Competence

14.8 The diving contractor must consider the competence of a person to act as a diving supervisor before appointing them as a diving supervisor. When considering competence, the diving contractor should consider such questions as whether the person is knowledgeable, practical, reliable, capable of conducting the diving operation in a safe manner; capable of managing members of the diving team appropriately, capable of acting sensibly in an emergency, and so on. A trainee diving supervisor should only supervise a diving operation in the presence of an appointed diving supervisor (see paragraph 10.24).

14.9 The diving contractor will be in a good position to decide on a person's competence if the person has worked for the company for some time. 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.

14.10 The diving supervisor must have adequate practical and theoretical knowledge and experience of the diving methods and techniques to be used in the diving operation for which he or she has been appointed. A person should only be appointed as a diving supervisor if he or she has:

- (a) sufficient experience;
- (b) passed an approved diver competence assessment (see paragraph 2.7). A diving supervisor must be suitably competent as a diver for the diving methods to be used in the operation. For example, if a diving contractor is employing surface-supplied and SCUBA divers for a particular diving operation, it would not be acceptable to appoint a diving supervisor who is only competent in SCUBA diving; the diving supervisor has to be competent in both surface-supplied and SCUBA diving; and
- (c) where available, a supervisor's certificate in diving, would be desirable.

14.11 A diving supervisor should not participate in a diving operation that he or she considers to be unsafe because, for example, in the diving supervisor's opinion, it is too large for one person to supervise safely or for example, the diving supervisor knows that he or she is not competent to supervise.

14.12 Diving supervisors, in general, unless they plan to dive, do not have to have a certificate of medical fitness to dive but should be competent to manage a medical emergency.

Duties of the Diving Supervisor

14.13 The diving supervisor has specific duties under the Diving Regulations. They must ensure:

- (a) that the diving operation that they are supervising is carried out safely and without risk to those involved or to those who may be affected by the diving operation and in line with relevant legal requirements and the diving project plan;
- (b) that they do not allow a diver to dive if in their opinion the diver is not fit and competent (see paragraph 16.15);
- (c) the contents of the diving project plan which relate to the diving operation which they are supervising is brought to the attention of those taking part;

- (d) all plant and equipment has undergone the relevant inspections, examinations and tests and is readily available for use;
- (e) all plant and equipment, unless intended to be mobile, is secured;
- (f) there is an adequate quantity of breathing gas (both 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 and diver to safely return to a place of safety in an emergency (see paragraphs 8.10 and 8.15);
- (g) that compressors are safely set up and there is an adequate reserve of breathing gas in the event of failure of the compressor (see paragraphs 8.12, 8.13 and 9.6.8).

Safe Supervision of the Diving Operation

14.14 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, that the diving operation that they are being asked to supervise complies with the requirements of the Diving Regulations and relevant Code of Practice;
- (b) so far as is reasonably practicable, that 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 areas and levels of responsibility and who is responsible for any other relevant areas;
- (e) the personnel that they are to supervise are competent to carry out the work required of them and where appropriate hold a suitable and valid certificate. They should also check, as far as is reasonably practicable, that these personnel are fit, and in possession of all necessary certificates, i.e. where appropriate, medical fitness to dive, diver's certificate, first aid certificate and emergency oxygen first aid certificate;
- (f) the diving project plan and arrangements for dealing with foreseeable emergencies are clearly understood by all those engaged in the diving operation. This would normally be ensured by carrying out a pre-dive briefing session with all those involved and, if appropriate, carrying out rehearsal of the arrangements;

- (g) the plant that they propose to use is adequate, safe, properly certified and maintained. They should ensure that the plant is adequately inspected by themselves or another competent person before its use. 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 that, if required, training or familiarisation is given;
- (i) so far as is reasonably practicable that all relevant people, including the Irish Coast Guard's relevant Rescue Coordination Centre, are aware that a diving operation is to start or continue. They should also obtain any necessary permission before starting or continuing the operation, for example when working in or close to a lock or in a harbour;
- (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 will be able to supervise adequately the raising and lowering of plant if there is a direct audio link with the winch operator, even though the winch may be physically located where the diving supervisor cannot see it or have ready access to it;
- (k) proper records of the diving operation are maintained. This must include the required particulars as detailed in Appendix 3, as appropriate; and
- (l) they maintain the diving operation record throughout the diving operation for which they are appointed.
- (m) any vessel being used is suitable for the number of persons and equipment carried and is not overloaded.

Other Responsibilities of the Diving Supervisor

14.15 Diving supervisors are responsible for the operation that they have been appointed to supervise and they should only hand over control to another competent diving supervisor appointed for that diving project by the diving contractor. Such a handover must be entered in the diving operation record (Appendix 3). Diving supervisors can only supervise that part of a diving project that they can safely and personally control, both during routine operations and in an emergency.

14.16 The diving supervisor with responsibility for the operation is the only person who may order the start of a dive. Other relevant parties, such as a harbour master, may, however, tell the diving supervisor to terminate a dive for safety or operational reasons. The diving supervisor must suspend diving operations if the:

- conditions become unsafe, for example a sudden change in weather renders the diving operation hazardous;
- diver requests termination;
- diver fails to respond correctly to signals from a diving team member;
- communications are lost and cannot be re-established between the diver and the diving team; or
- diver begins to use the secondary source of breathing gas.

14.17 A diving supervisor should be in control when a diver is under pressure in a surface compression chamber at the site of the diving project.

14.18 During diving operations from a vessel, the diving supervisor should liaise with other personnel, such as the vessel master. 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.

14.19 The diving supervisor 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 diving supervisor's duty and will take precedence over any company hierarchy. For instance, these orders could include instructing unnecessary personnel to leave a control area, instructing personnel to operate plant or equipment or to wear a Personal Flotation Device/lifejacket.

14.20 Diving supervisors in charge of divers using rebreathing apparatus must ensure that all relevant equipment checks have been carried out.

14.21 The diving supervisor should remain in charge for up to 24 hours after the dive operation. In the event of late onset of DCI after this period, the diver should notify the diving supervisor immediately.

15. Divers

Duties of Divers

15.1 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 16 “Fitness to Dive”), are competent to undertake the dive and carry out any associated work. They must also maintain a daily record of their dives in a personal log-book (see paragraphs 15.10-15.13)

15.2 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.

Diver Competence

15.3 Lack of or insufficient diving qualifications, lack of competence and lack of familiarisation training can all affect the safety of the diving operation.

15.4 Divers must be competent (see paragraph 2.7) for the diving they plan to do and capable of handling any emergencies they may have to deal with. They must be competent to use the diving equipment concerned and competent in the diving method being used. In addition, divers must be competent to do the work allocated to them within the diving project plan.

15.5 Under the Diving Regulations, the diving contractor must be satisfied that the diver is competent in the method of diving (see paragraph 7.6) to be used and in the type of work that is to be carried out. The diving contractor must satisfy themselves that the diver has the competence to carry out the specific tasks required during the diving operation such as the assigned underwater work and the use of tools and equipment relevant to the assigned task. In any particular situation the absolute legal obligation is to match the competence of the diver to the method and type of dive involved.

15.6 Under the Diving Regulations, if the diving supervisor is not satisfied with the diver’s competence to dive, they must not permit the diver to dive.

15.7 A basic level of diving competence may be assumed from a diver who has a diving qualification in a method of diving. However, possession of qualifications may not demonstrate fitness or ability to carry out the dive and the work and in some cases competence may need to be verified and/or demonstrated.

15.8 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.

15.9 In order to maintain competence in diving, divers need to dive on a regular basis. Divers who have not dived on a regular basis may need to be assessed with regard to their ability and fitness to dive.

Diver's Personal Log-book

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

15.11 The log-book should be hard bound with numbered pages and signed by the diving supervisor. Diving supervisors must never sign/stamp and date blank pages in log-books and leave divers to fill in the details. The dives should be sequentially numbered and include a running total of dive time.

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

15.13 Where the diver maintains an electronic diver's log-book, a backup personal log-book as detailed in paragraph 15.11 should also be maintained.

Safe Pass

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

15.15 Where inspection of any building, edifice or structure is carried out underwater and the work does not fall within the definition of construction work as defined by the Safety, Health and Welfare at Work (Construction) Regulations 2013, in general a Safe Pass Registration Card will not be required.

16. Fitness to Dive

Certificate of Medical Fitness

16.1 Diving at work requires a high degree of physical and mental fitness. The Health and Safety Authority approves doctors to carry out medical examinations and assessments of divers at work (known as Approved Medical Examiners of Divers). These medical examiners are selected for approval based on their training in diving physiology and their knowledge of diving. This approval is for a period of 5 years.

16.2 All divers at work must have a valid certificate of medical fitness to dive issued by an Approved Medical Examiner of Divers. The certificate of medical fitness to dive is a statement of the diver's fitness to perform work underwater, subject to any restrictions or limitations and is valid for as long as the doctor certifies, up to a maximum of 12 months.

16.3 The medical examination and assessment look at the diver's overall fitness to dive. These include the main systems of the body – cardiovascular system, respiratory system and central nervous system – as well as the ears, nose and throat, vision, dentition, and the person's capacity for exercise.

16.4 If a diver who is considered unfit to dive due to a medical condition dives, they may impair the safety of themselves and other members of the dive team. They may also aggravate the existing medical condition and increase the likelihood of developing long term health problems.

16.5 No diver should dive in contravention of any conditions, limitations or restrictions imposed on them. The certificate of medical fitness to dive does not mean that the diver is currently medically fit nor does it mean that the diver is fit to undertake any particular work task that may be carried out during the dive.

16.6 Where an annual medical examination is carried out less than a 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. Divers should be aware of the expiry dates on their certificates, so that they can plan for subsequent examinations.

16.7 Trainee divers who train to dive while at work must hold a certificate of medical fitness to dive before they begin training. This will help potential divers to be aware of any health problems that may affect their employment prospects or long-term health, should they continue to dive. The pre-training medical examination contains the same elements as the annual medical assessment with the addition of investigations such as for instance, blood group.

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

16.9 In line with Section 64(1) of the 2005 Act, an inspector of the 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.

16.10 Further details of approved medical examiners of divers and guidance on medical checks are available at www.hsa.ie.

General Fitness to Dive

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

16.12 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, such as a common cold or 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.

16.13 Divers who consider themselves unfit for any reason, for example, fatigue, minor injury, effects of alcohol or medication, recent medical treatment, recent illness or who become unfit to dive or unwell during the diving project must not go or remain under water and must inform the diving supervisor.

16.14 A diver should not be forced to dive or be penalized for not diving, if for valid reasons, they do not enter the water.

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

16.16 If a diver is pregnant, a risk assessment must be carried by the employer under Chapter 2 of Part 6 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 (commonly known as the Protection of Pregnant, Post Natal and Breast Feeding Employees Regulations). In general, a diver who is pregnant or suspects she may be pregnant should not dive in order to avoid possible harmful effects that exposure to increased pressure may have on the unborn child.

16.17 People who dive in a diving project 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 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. Diving supervisors should seek guidance from the diving contractor or the company's medical adviser if there is doubt about a diver's fitness to dive.

Appendix 1 – Glossary of Terms and Abbreviations

Terms

Bell

A compartment either at ambient pressure (wet bell) or pressurised (closed bell) that allows the diver to be transported to and from the underwater work site, allows the diver access to the surrounding environment and can be used as a refuge during diving operations.

Bottom Time

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

Breathing Gas

Any gas or mixture of gases (including air) which is both fit for breathing by humans and free from contamination.

Decompression

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

Decompression Chamber

A compression chamber used by surface-supplied divers to make their decompression stops.

Decompression Table

A profile or set of profiles of ascent rates and breathing gases designed to reduce the pressure on a diver safely to atmospheric pressure after the diver has been exposed to a specific depth and bottom time.

Dive Base

The surface location from which diving is carried out such as the shore, a boat or a platform.

Diving Basket

A diver deployment device normally designed with an open cage. May also be known as a stage.

Diving Method

A type of diving requiring specific equipment, procedures and techniques. Most diving methods can be categorized according to the breathing apparatus being used.

Dive Site

The area where the dive is conducted and includes the surface dive base, the underwater work site and any area in between.

Dive Team

A team of personnel comprising divers, a diving supervisor and supporting personnel involved in a diving operation.

Dynamic Positioning

Where a vessel is held in position by use of its propulsion system.

Hazard

A hazard is anything with the potential to cause harm such as work materials, equipment, work methods/practices, poor work design or exposure to harmful agents such as chemicals, noise or vibration. This may include water, environmental factors, plant, methods of diving and other aspects of work organisation.

Hyperbaric Chamber

A compression chamber that is used for decompression and recompression of divers and used to medically care or treat patients in a hospital or other setting.

Lifeline

A rope, gas hose, communication cable or any combination of these which is both suitable and of adequate strength for lifting a diver and his or her equipment from the water.

Live Boating

A dive conducted while a diver is tethered directly to a vessel underway.

Media Work

Diving in support of underwater media work which may include stunt people, journalists, presenters, photographers, camera operators, sound and lighting technicians and the unit crew.

Permit-to-Work System

A formal written system used to control certain types of work which are identified as involving significant risk.

Rebreather/Rebreathing Apparatus

A breathing apparatus that recycles the useable components of the a diver's exhaled breath for the diver to breathe.

Recreational Diving

Diving carried out by a person for recreational purposes and an "at work" situation does not apply.

Recompression Chamber

A compression chamber used to treat or prevent decompression sickness.

Risk

A risk is 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 risk assessment is a careful examination of what may cause harm and an evaluation of precautions that can be taken to prevent harm.

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.

Self-Contained Underwater Breathing Apparatus

Breathing Apparatus in which the supply of breathing gas carried by the diver is independent of any other source.

Standby Diver

A diver, other than the working diver(s), who is appropriately positioned and dressed to render immediate assistance to the working diver in an underwater emergency. The standby diver must be trained and equipped to operate at the depths and in the circumstances in which the submerged diver is operating.

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 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.

Surface-Supplied Breathing Apparatus (SSBA)

Diving equipment that supplies breathing gas at the required pressure for the depth, through a diver's hose (umbilical) to a diver, from equipment at the surface.

Tender

A person who is competent and knowledgeable in the diving equipment, the diving operation in progress, emergency diving procedures and communications between the diver and tender. The tender assists the diver by monitoring the diver's equipment, communicating with the diver and otherwise monitoring the diver's health and safety.

Transport Document

A document that specifies the consignor, carrier and the consignee of dangerous goods. It must also include details of the load namely the UN number, proper shipping name, class, packing group, tunnel code, the size, number and total quantity of dangerous goods.

Tethered SCUBA

Diving method whereby a single SCUBA diver is tended from the surface by means of a lifeline.

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. Note: a diving basket with just a dome is not a wet bell.

Abbreviations**ADR**

European Agreement Concerning the International Carriage of Dangerous Goods by Road

DCI

Decompression illness

DGSA

Dangerous Goods Safety Advisor

DPV

Diver Propulsion Vehicle

HUET

Helicopter Underwater Escape Training

IRSRR

Irish Search and Rescue Region

MRCC

Marine Rescue Coordination Centre

ROV

Remotely Operated Vehicle

SCUBA

Self-Contained Underwater Breathing Apparatus

TTT

Talk to Transmit

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 including:
 - Meteorological conditions including forecasted and prevailing conditions.
 - Tidal information (including local tide tables and indications of the anticipated speed of tidal current) and water currents in inland waterways.
 - Potential vessel traffic and proposed shipping movements.
 - Underwater hazards of the diving 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.
- (f) Availability of suitable personal flotation devices/lifejackets for use when travelling to and from the dive site or in emergency situations.

2. Preparations

- (a) Consultation with the client and master of any vessel from which diving operations are to be carried on and with any other person who has control of the site of the project 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) Personal fitness of divers for underwater operations.
- (f) Precautions against cold in and out of the water.
- (g) Means of communication (lifeline system, signalling procedures etc.).
- (h) Precautions against underwater hazards of the diving site.

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) Working in different locations and varying altitudes.
- (e) Operations and use of equipment under water.
- (f) Limits on depth and time under water.
- (g) Descent of divers.
- (h) Ascent and recovery of divers.
- (i) Compression and decompression.
- (j) Control in relation to changing environmental conditions.
- (k) Maintenance of log-books.
- (l) Distance and transport method to nearest compression chamber.
- (m) Display of correct flags and signals.
- (n) Awareness of and avoidance of obstruction to other vessels or water users in the vicinity.

4. Emergency Procedures

- (a) Emergency communications and signalling.
- (b) Emergency assistance under water and on the surface.
- (c) Therapeutic recompression and the availability of a compression chamber for that purpose.
- (d) First aid equipment, personnel and arrangements.
- (e) Medical assistance.
- (f) Calling in assistance of 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.

Appendix 3 – Required Particulars for Diving Operation Records

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 leaves 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).

PUBLIC CONSULTATION

Appendix 4 – 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).

Supplementary information – Irish Coast Guard Protocol

Note: *This protocol does not form part of the official Code of Practice but is provided for information purposes only.*



When planning to go diving on lakes or sea:

- Log a Traffic Report (TR) call to the nearest Coast Guard Marine Rescue Coordination Centre (MRCC) by VHF or by phone:
 - MRCC Dublin: 01 - 6620922
 - MRCC Malin Head: 074 - 9370103
 - MRCC Valentia: 066 - 9476109
 - All MRCCs keep a listening watch on VHF Channel 16
- Give details of your trip:
 - Location of dive.
 - Call sign.
 - Number of persons on-board.
 - Number of persons diving.
 - Estimated dive time.
 - Planned max depth.
 - Breathing gas e.g. Air or mixed gas
 - Method of diving e.g. SCUBA (open or closed circuit), surface supplied diving.
- Report divers safely back on board.
- Close TR when vessel returns ashore.

In the event of a diver going missing:

- Establish the last known position of the lost diver and mark it with a substantial weight and buoy.
- Recall all divers.
- Take a GPS reading if possible.
- Follow the “In the event of an emergency” procedures outlined overleaf.

In the event of a dive boat engine failure:

- Anchor the boat to prevent drift.
- Call for assistance. Follow the “In the event of an emergency” procedures outlined overleaf.
- Stay with the dive boat, as it will be easier for the lifeboat or helicopter to spot.

In the event of an emergency

Call for help as soon as possible.

If at Sea	Call the nearest Marine Rescue Coordination Centre (MRCC) via: DSC radio: Send a DSC Distress Alert. VHF Channel 16: Send a MAYDAY call. Mobile Phone may also be possible if close to shore but <u>DO NOT</u> depend on it as your only means of communication.
If on shore	Call 112/999 and ask for the Coast Guard.

Be ready to answer the following questions from the emergency services:

Question	Answer
What is the nature of the distress?	
What is your exact location? (Give a clear latitude and longitude GPS position or a range and bearing from a prominent position e.g. lighthouse. Do not use local names).	
For Missing Divers	
How many divers are missing?	
What is the age, sex and physical condition of the diver?	
How experienced is the diver?	
When was the diver last seen/in contact?	
How long overdue is the diver?	
What type of dive was being carried out (depth, method, type)?	
Do you believe them to be on the surface or underwater?	
How much breathing gas do you believe the diver has remaining?	
Can you mark the diver's last known position?	
What colour diving suit and equipment is the diver wearing?	
Has the dive a Surface Marker Buoy (SMB)?	
What location aids has the diver got?	
What are the current conditions: weather/sea/temperature/tidal direction and rate?	

For Injured or Sick Divers	
This information should be written down and accompany the diver.	
Question	Answer
How many divers are injured/sick?	
Is the diver: <ul style="list-style-type: none"> ○ Conscious? ○ Unconscious? ○ Coherent? ○ Showing any neurological symptoms? ○ Showing any breathing difficulties? ○ In pain? If so, where? 	
When did the symptoms first appear?	
What is the dive profile of the distressed diver?	
Has oxygen been administered and for how long?	
<ul style="list-style-type: none"> • The MRCC will provide a link call to Medico Cork to assist with assessing the diver's condition and requirement for helicopter evacuation. • The dive buddy/fellow working diver and dive computer should also travel with the injured/sick diver. 	
Describe your vessel.	
What are the current weather/sea conditions?	

Preparing for a Helicopter Evacuation

Prior to diving, ensure you are familiar with this procedure and the contents of Marine Notice No. 3 of 2017. Marine Notices can be viewed and signed up for at: www.dttas.ie/maritime/maritimesafetydirector/marinenotices/currentmn/current-marine-notices.

Be aware that helicopters may generate downdraught, noise and static electricity as they hover.

Before the Helicopter arrives:

The Diver(s):

- Where possible, recover the diver into the boat.
- Advise the distressed diver what is about to happen and provide reassurance.
- Write down the diver's profile and treatment log in order to give it to the winchman. Where possible, keep a copy for your own records.
- Collect the diver's dive computer (where applicable) and have it ready to pass to the winchman.
- Continually monitor the diver's condition. If oxygen is being given, continue administration up until the moment the winchman takes over care of the patient
- Prepare other members of the dive team who were diving alongside the diver as they may also need to be evacuated.
- De-kit divers of any weights and equipment prior to any lift.

The Boat:

- Ensure that the boat is in open water, clear of cliffs or obstructions. If not use the sea anchor, if available. Keep the boat as steady as possible.
- If your boat is a large dive boat such as a half-decker or converted fishing boat you are likely to be required to steam on a course provided by the helicopter crew.
- Secure all aerals on board and lower if possible.
- Secure or stow any loose objects or gear that may be affected by the downdraught or could be sucked into the helicopter's engine intakes e.g. blankets or heat foils.
- Identify a large clear area for winching. Winching usually takes place from the stern of the vessel. Clear the area of all non-essential personnel and provide eye protection for those on deck. Lifejackets or Personal Flotation Devices (PFDs) should be worn by all crew involved in the winching operation.
- Be ready to communicate with the helicopter on VHF Channel 16. Keep communications with the helicopter brief, precise and clear. Have what you want to say decided before you press the talk to transmit (TTT) switch. Do not leave communications too late for once the helicopter is overhead it will be too noisy to communicate.
- Identify the boat clearly to the helicopter. Use a red hand-held or orange smoke flare as a signal to the helicopter if requested. **Do not** fire parachute flares or mini flares when the helicopter is close by.

On arrival of the Helicopter:

- Wear eye protection to protect eyes from spray created by the helicopter downdraught. All crew must wear lifejackets or PFDs.
- Follow the pilot's and winchman's instructions at all times.
- The helicopter may use a hi-line to assist the winchman safely on board the vessel. The hi-line is a weighted line dropped from the helicopter to the vessel.
- Let the hi-line touch the water or the vessel first, then haul in the line and coil it into a bucket or box. **NEVER TIE THIS LINE TO THE VESSEL.**
- Keep the line tight as the winchman descends from the helicopter and as they approach the vessel assist them on-board.
- Pass the patient's vital signs and dive computer (where applicable) to the winchman. Inform the winchman what treatment has been given and for how long. Emergency oxygen first aid will recommence once the patient is inside the helicopter.

The Marine Rescue Coordination Centre will be able to provide details on the destination of the rescued diver.