

Health and Safety Authority

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CODE OF PRACTICE FOR INLAND DIVING AND INSHORE DIVING (Safety, Health and Welfare at Work (Diving) Regulations 2010)

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FOREWORD

The Health and Safety Authority with the consent of, Minister of State at the Department of Enterprise, Trade and Employment, 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 2010 (S.I. No. ??? of 2010).

This Code of Practice comes into operation on2010.

Notice of the publication of this Code of Practice was published in the Iris Oifigiúil of 2010.

R Roe
Assistant Chief Executive and Secretary to the Board

1 Introduction

1.1 Background

Diving for work purposes can be a dangerous activity if the proper safety precautions are not taken. Divers are exposed not only to the possibility of drowning but also to other risks such as respiratory and circulatory risks, hypothermia, low visibility and physical injury from the operation of various types of equipment.

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 and 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 task.

This Code of Practice is aimed at improving the level of safety, health and welfare in occupational diving and provides assistance on compliance with the Safety, Health and Welfare at Work (Diving) Regulations 2010, which set the minimum standards for safe diving whilst working. This Code of Practice specifically relates to inland and inshore diving projects.

1.2 Status and Scope of Code of Practice

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 , Minister of State at the Department of Enterprise, Trade and Employment.

The Code is intended to provide practical guidance to clients, diving contractors, supervisors, divers and other people who may be involved in occupational inland and inshore diving operations. The Code gives practical guidance on safe work in inland and inshore diving projects and on the observance of the requirements of the Safety, Health and Welfare at Work (Diving) Regulations 2010 (referred to in the Code as the “Diving Regulations”). It is not the intention that this Code of Practice will repeat technical or operational standards in detail.

Occupational diving is covered by a wide range of legislation. In addition to the Safety, Health and Welfare at Work (Diving) Regulations 2010 and the Safety, Health and Welfare at Work Act 2005, other health and safety legislation such as the Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007) as amended by the Safety, Health and Welfare at Work (General Application)(Amendment) Regulations 2007 (S.I. No. 732 of 2007), the Safety, Health and Welfare at Work (Biological Agents) Regulations 1994 and 1998 (S.I. No. 146 of 1994 and S.I. No. 248 of 1998) and the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001 (S.I. No. 619 of 2001) may also apply to occupational diving operations.

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, and the Diving Regulations need to be read in the general context of the Safety, Health and Welfare at Work Act 2005 and associated Regulations and any other relevant statutory provisions. It is essential to place the safe management of occupational diving projects in the context of the overall safe management of work as detailed in the Safety Statement required under Section 20 of the 2005 Act.

Failure to observe any part of this Code will not in itself render a person liable to civil or criminal proceedings. However, where the Code gives practical guidance on observing any of the relevant statutory provisions, compliance or non-compliance with those provisions may be admissible as evidence in criminal proceedings.

2 Definitions

2.1 The definitions given 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. Definitions that are defined in the Safety, Health and Welfare at Work Act 2005 are not redefined in the Diving Regulations.

2.2 “occupational diving” is defined as diving that is carried out at work.

2.3 “at work” means 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” is defined, taking account of paragraph 2.6, as diving in the internal or inland waters of the State, including in docks, harbours, rivers, culverts, canals, lakes, ponds, reservoirs and tanks. It also includes diving in a tank or pool artificially constructed for the purpose of swimming, diving, helicopter underwater emergency training or use as an aquarium.

2.5 “inshore diving” is defined, taking account of paragraph 2.6, as diving within the territorial seas of the State (generally twelve nautical miles (22 Kilometres) from the low water mark).

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

- (i) deeper than 50 metres;
- (ii) at sea off, or in connection with, offshore installations, pipeline and cable works within the 12 nautical mile limit;
- (iii) where closed bell or saturation diving techniques are used;
- (iv) from vessels maintaining station by use of dynamic positioning;

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

2.7 For the Diving Regulations, a person is deemed to be a “competent” person where, 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, the method of diving to be undertaken.

2.8 “Diving operations” can be made up of either a number of dives or even a single dive. A diving operation is the portion of a diving project identified in the diving project plan which

can be safely supervised by one supervisor. 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.

2.9 “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.

2.10 The term “person” used to identify the diving contractor under the Diving Regulations means a person with legal identity such as an individual, partnership or a company and includes a body of people corporate or incorporate.

2.11 Where the term “compression chamber” is used, it can be inferred to cover as appropriate, recompression chambers, decompression chambers, hyperbaric chambers and hyperbaric oxygen therapy chambers, all of which are terms that reflect the different purposes for which chambers are designed.

3 Application

3.1 The Diving Regulations apply to all premises and activities where occupational diving projects are carried out and to which the Safety, Health and Welfare at Work Act 2005 applies.

3.2. The Diving Regulations and this Code of Practice apply to inland and inshore diving projects in support of:

- (a) Archaeology;
- (b) Vessel maintenance or repair;
- (c) Salvage operations;
- (d) Inspection of any building, edifice or structure;
- (e) Construction work;
- (f) Aquaculture;
- (g) Scientific research or scientific educational instruction;
- (h) Underwater work by media divers;
- (i) Investigations carried out by members and civilian employees of An Garda Síochána under its statutory powers;
- (j) Investigations carried out by members and employees of any other State Agency under its statutory powers;
- (k) Any other occupational 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 or submersible craft subject to an internal pressure of less than 100 millibars above local ambient atmospheric pressure;
- (b) Work on an aircraft which may necessitate working in the body of the plane while pressurised;
- (c) Construction activities that are subject to the Safety, Health and Welfare at Work (Construction) Regulations 2006 (S.I. No. 504 of 2006) as amended, 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.

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. The Regulations 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.

3.5 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. Where the student is at postgraduate level and diving is a significant part of a research project and/or the student receives a bursary or postgraduate award, the diving regulations may directly apply. Where the dive team consists of a mixed dive team the Regulations will apply (see paragraph 3.9).

3.6 Recreational diving does not come under the scope of the Diving Regulations, except where the diver is at work such as with paid instructors or dive guide leaders. In such cases, only Regulations 6(5), 15(1) and 16 of the 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 I.S. EN Standards namely I.S. EN14153-3, I.S. EN14413-1, I.S. EN14413-2 and I.S. EN14467. Other related persons, for example boat crew or cylinder suppliers who are engaged in work activities associated with recreational diving will fall within the scope of the Regulations. Divers who dive for purely recreational purposes and are not at work may however find parts of the Code useful.

3.7 Members of the Defence Forces are exempt from the Diving Regulations 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. This exemption does not extend to work undertaken by members of the Defence Forces under a civilian contract or civilian members of the Defence Forces. In these cases the Regulations will apply.

3.8 Search and rescue / recovery (SAR) activities will come under the scope of the Diving Regulations where one or more divers are at work (see paragraph 3.9).

3.9 Mixed dive teams, which consist of divers who are at work and divers who are not at work, are covered by the Regulations (see paragraph 3.4). In such cases, the general duties and requirements of the Regulations will apply to the divers who are not 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. Dive teams which consist solely of divers who do not dive for work purposes are not covered by the Diving Regulations.

3.10 Technical diving, whereby divers use advanced equipment to reach extreme depths or extend their bottom time, is regarded as a subset of recreational diving (see paragraph 3.6). Due to the inherent risks associated with this method of diving it is not considered a safe occupational diving technique under the Diving Regulations and this Code of Practice.

3.11 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.

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

4 General Duties of Persons

4.1 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 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, he or she should be satisfied that that person is competent for the task;
- (b) the principal contractor or 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 actions or activities may affect the safety of the diving project.

4.2 The people listed above should consider carefully the actions required of them to comply with the Diving Regulations. 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 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, and ship propellers. 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 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 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.

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

4.4 The duties under Regulation 4 of the Diving Regulations extends to clients, diving contractors, 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.

4.5. Where occupational dive teams and non-occupational dive teams are working in close vicinity to one another, there must be adequate co-operation and consultation between the teams to ensure that the safety, health and welfare of all is not endangered.

5 Duties of Clients

5.1 The client has a general duty to take reasonable measures to ensure compliance with the Regulations.

5.2 The client must appoint, in writing, a competent diving contractor for every dive project. For example, a company may decide to appoint a single diving contractor to be responsible for all the company's dive projects and this would result in one single appointment in writing. The client must receive written confirmation from the diving contractor that they accept the position. No diving work should go ahead without a diving contractor being appointed.

5.3 Where there are two diving contractors employed on a diving project, the client must ensure that it is established and recorded in writing who has overall control of the project.

5.4 Where the client and the diving contractor are 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.

5.5 The client must be satisfied that the diving contractor appointed has adequate training, knowledge, experience and resources for the work to be performed. The extent of these 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 about the following:

- Membership of professional bodies
- Knowledge of diving particularly in relation to the nature of the project
- Safety and health qualifications and training
- Sufficient staff with qualifications, training and experience in the method of diving and work task being carried out
- Evidence of a functioning safety management system
- Evidence of regulatory compliance.

The client should be able to make reasonable enquiries about competence but would not be expected to evaluate and monitor the diving skills of contractors.

5.6 The client must ensure so far as is reasonably practicable that the site is safe to use and that any plant or equipment provided is in good working order, safe and well maintained. 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.

5.7 The client must co-operate with the diving contractor and supply necessary information so that the diving contractor can ensure that their obligations under the Regulations are met. For example, the client must inform the diving contractor of any known hazards, such as underwater obstructions or possible health hazards from contaminated water of which they may reasonably be expected to be aware.

5.8 The client must ensure that the work of the divers and any of the client's employees is co-ordinated, 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.

5.9 So far as reasonably practicable, the client should support the supervisor and diving contractor in the event of an emergency.

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, although other people, for example clients, may also have responsibilities under the Regulations.

6.2. 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 supervisor to supervise each operation. 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.

6.3 The Diving Regulations require that one person (see paragraph 2.10) is identified as the diving contractor for each diving project. The main duties under the Diving Regulations are placed on the diving contractor. The diving contractor will normally be the employer of the divers engaged in the diving project.

6.4 Where the client engages more than one employer of divers or self-employed divers for a diving project, in consultation with the client, it must be established and recorded in writing who will be the diving contractor for that project.

6. 5 The diving contractor's responsibilities are to ensure that:

- (a) the diving project is properly and safely planned, conducted and managed;
- (b) risk assessments have been carried out as required under Section 19 of the Safety, Health and Welfare at Work Act 2005 (see Section 7 "Diving Project Plan and Risk Assessment");
- (c) the place from which the diving is to be carried out is suitable and safe;
- (d) a suitable diving project plan is prepared which includes emergency and contingency plans (see Section 7 "Diving Project Plan and Risk Assessment", Section 12 "Emergency and First Aid Arrangements" and Appendix 2);
- (e) the 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) the personnel are competent and/or qualified with regard to the diving method and the actual work to be undertaken (see Sections 15 "Supervisors" and 16 "Divers");

(h) supervisors are appointed in writing and the extent of their control documented (see Section 15 “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 Section 7 “Diving Project Plan and Risk Assessment”);

(j) adequate arrangements and equipment exist for first aid and medical treatment (see Section 12 “Emergency and First Aid Arrangements”);

(k) suitable and sufficient plant and equipment is provided and that it is correctly certified and maintained (see Sections 13 “Plant and Equipment” and 14 “Maintenance of Plant and Equipment”);

(l) so far as is reasonably practicable, the team is medically fit to dive (see Section 17 “Medical checks”);

(m) diving operation records are kept containing the required details of the diving project (see Appendix 3);

(n) all roles, responsibilities and reporting structures are clearly documented; and

(o) all other relevant legislation is complied with.

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 and organised.

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 supervisor. The 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 experience, qualifications and the number of personnel required to conduct the operation safely, 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 most appropriate for the diving operation taking into account:

- the type of work to be carried out by the diver;
- the equipment required;
- the conditions under which the diver will work; and
- the 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 to the 2005 Act). Table 2 outlines the possible applications of the principles of prevention to diving.

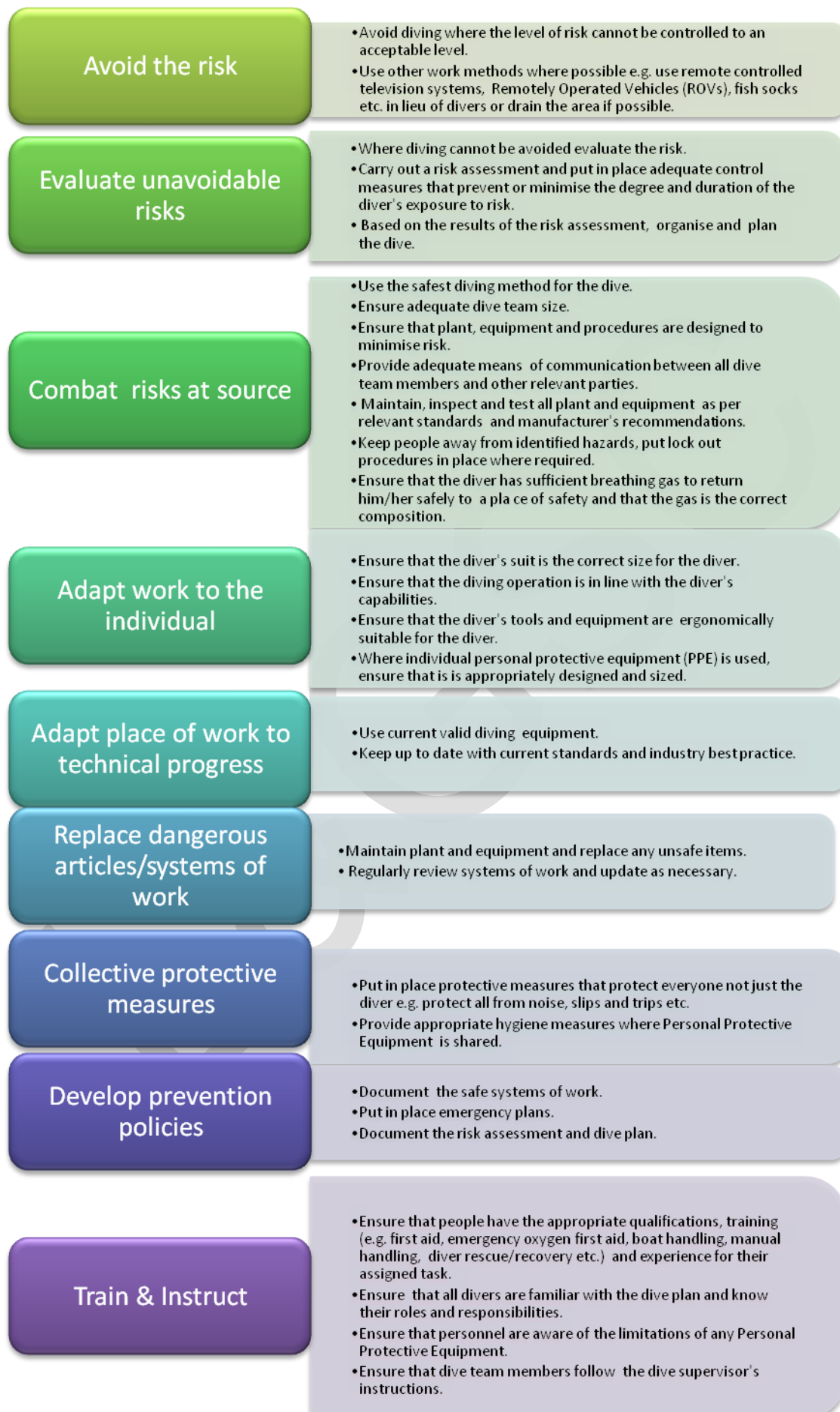


Table 2: The Principles of Prevention and Possible Application to Diving Activities.

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 Safety, Health and Welfare at Work Act 2005 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. 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 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 supervisor(s) and taking account of the task, site conditions and diving method, the plan should identify how many supervisors will be needed.

7.12 All documents should show the date upon which they were prepared. The diving project plan should record the outcome of the planning carried out in preparing the risk assessment including all information and instructions which, so far as is reasonably practicable, are necessary to protect the health and safety of all those taking part in the diving project. It should also explain when and how reviews of the plan, the dive site and the specific risk assessments should be conducted.

7.13 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.

7.14 Each supervisor must be given a copy of that part of the diving project plan relevant to the diving operation that he or she will be supervising.

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

Familiarisation

7.16 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.

7.17 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.

7.18 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

7.19 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. The safety reasons for the choice of method should be clearly stated in the risk assessment.

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 occupational dives of less 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 Irrespective of the diving method selected, three critical requirements must be met:

- (i) The diver must have sufficient breathing gas to return him/her 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:

8.5 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;
- (b) the diver carries an independent secondary source of breathing gas (for example, a bail-out cylinder (see paragraph 8.14)) 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:

8.6 The diving contractor should ensure as a minimum that:

- (a) the diver has available to them an independent secondary source of breathing gas, 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):

8.7 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 8.14) 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

8.8 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 mixtures of compressed air or oxygen and nitrogen is 50 metres of water. The recommended maximum partial pressures for oxygen are 1.4 atmospheres for SCUBA and 1.5 atmospheres for surface-supplied diving plant. This does not apply to therapeutic recompression.

Exposure Limits for Surface-Orientated Diving

8.9 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.

8.10 For diving operations requiring decompression, as a minimum, decompression must be planned in accordance with recognised decompression tables such as U.S Navy (www.ndc.noaa.gov) 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 paragraph 8.12).

8.11 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.

8.12 Decompression procedures (including the use of a decompression computer) should be appropriate for the type of diving technique 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, fitness, exertion, obesity and injuries, which may all significantly affect susceptibility to decompression illness and conservative diving practices, should be followed where possible.

8.13 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

8.14 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. 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.

9.2 Environmental Hazards

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

Air Temperature and Humidity

9.2.1 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.

Biological Hazards

9.2.2 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 rescue diving 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 available, appropriate protective inoculations should be provided.

Marine/Aquatic Life

9.2.3 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. Kelp beds may cause entanglement if incorrect equipment is used or the diver is inappropriately trained and unable to manoeuvre through thick aquatic plants.

Obstructions

9.2.4 Underwater vegetation, nets, lines, enclosures, aquaculture gear and debris may all cause diver entanglement and entrapment. Floating or accumulated drift material or debris

may all obstruct the diver.

Restricted Visibility

9.2.5 Restricted surface visibility may affect the safety of the operation, for example when diving 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.

9.2.6 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.

9.2.7 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.

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

Shipping / Vessel Movements

9.2.9 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 9.3.9).

9.2.10 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.

Water Currents

9.2.11 Currents (river and tidal) may impose limitations on a diver's operational ability and safety and apparently calm surface water may hide strong undercurrents. 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 Flow, Intakes and Discharges

9.2.12 Divers are vulnerable to water flow, suction or turbulence whether natural or caused

by water intakes, discharges or water pressure differentials. Examples include work in docks, locks, near weirs or pipelines. A sudden flow of water may result for example, in the diver being swept off the job or their decompression stops. A dive must not be conducted in hazardous flow conditions. Storm drains must 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 system.

Water Temperature

9.2.13 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.

9.2.14 Appropriate well fitting personal protective equipment 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

9.2.15 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 suitable decontamination/disinfection procedures should be in place and where available, appropriate protective inoculations should be provided.

Weather

9.2.16 Adverse weather conditions may affect the safety of a diving operation and 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. Diving should be suspended if weather or water conditions are hazardous or likely to become hazardous.

Activities of Others

9.2.17 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.

Other Environmental Factors

9.2.18 Other environmental factors that should be considered include the sea depth, entrapment hazards, time of day, tides, underwater terrain, the state of the sea, high altitude and the isolation of the dive site.

9.3 Work/Task Related Hazards

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

9.3.1 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

9.3.2 The skipper 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. The boat must be well equipped, maintained, seaworthy and suitable 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 Collision Regulations. Advice on dive boat maintenance can be found at www.safetyonthewater.ie

9.3.3 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. Boats can be registered with the Irish Coastguard Boat Safety Scheme at www.coastguard.ie. This will aid recognition in the event of a search and rescue operation.

9.3.4 Liveboating should not take place.

Chemicals

9.3.5 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.

Confined Spaces

9.3.6 The hazards which arise by virtue of the enclosed nature of the dive site must be

considered. The enclosed nature of a confined space may also increase the risk of heat stroke or collapse from heat stress as well as causing entrapment.

Diver Propulsion Vehicles (DPV)

9.3.7 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

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

9.3.9 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.

Electricity

9.3.10 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.

Falling Objects

9.3.11 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.

Flat-Bottomed Vessels

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

High-Pressure Water Jetting

9.3.13 Even an apparently minor accident with this equipment has the potential to cause a serious internal injury to the diver. When using such equipment safe operating procedures should be followed.

Lift Bags

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

Manual Handling

9.3.15 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. 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

9.3.16 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)

9.3.17 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

9.3.18 Certain work activities may involve the use of explosives or radiation (non-ionising or ionising).

9. 4 Medical and Physiological Considerations

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

9.4.1 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 generic risk assessment. If these factors are relevant to a particular project they should be identified in the diving project plan.

Decompression Illness

9.4.2 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. The diving contractor should identify the arrangements in place for the treatment of any cases of DCI.

Fatigue

9.4.3 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.

Noise

9.4.4 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. 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 requirements of the provisions of Chapter 1 of Part 5 of the Safety, Health and Welfare at Work (General Application) Regulations 2007.

9.4.5 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.

Psychological / Physiological

9.4.6 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

9.4.7 Excessive heat and cold can affect the health, safety and efficiency of divers and the dive team. Appropriate 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

9.4.8 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.

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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). Sufficient personnel should be available to carry out the diving operation safely and to operate plant and equipment. 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. There must be a sufficient number of competent personnel to operate all the diving plant and equipment and to provide support functions to the dive team.

10.3 The diving contractor and the supervisor must satisfy themselves that a diver is competent for the specific tasks required during a particular diving operation. On-the-job or other training may be necessary for individuals to gain competence.

10.4. The diving contractor must ensure that the divers are competent to dive to the required depth. Where an inexperienced diver is gaining experience in a dive team, the other team members and the supervisor will need to be aware of this and provide support.

Overall Management

10.5 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 supervisors, have specific responsibilities that cannot be changed.

Team Size

10.6 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 and the appropriate number required for safety.

10.7 Outlined below are the **minimum** team sizes for benign conditions where there is clear water, no excessive tide or current, no trapping hazard, easy entry and exit from the water and where the task to be performed is not arduous. 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.

10.8 The **minimum** team size required to conduct a dive safely in benign conditions with surface-supplied diving equipment is 4 – a supervisor, a working diver, a standby diver and a tender for the working diver (see paragraphs 10.13 and 10.14). Additional people may be

required to operate or maintain specialised plant and equipment, such as winches, and to assist in an emergency.

10.9 However, when using surface-supplied diving equipment, a dive team of 3 – a 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 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 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 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 supervisor to summon emergency assistance. The third person should be competent to perform such duties.

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

10.11 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 supervisor who also acts as a diver's tender, a working diver and an in-water standby diver.

10.12 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.

Tenders

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

10.14 For umbilicals or lifelines that are tended from the surface, at least one tender is required for each diver in the water. For umbilicals tended from a basket or stage, one tender is required for each diver in the water.

Standby Diver

10.15 A standby diver should be in immediate readiness to provide any necessary assistance to a diver in the water.

10.16 For surface-supplied diving, the standby diver will normally be 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.

10.17 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).

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

Overlapping Functions

10.19 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

10.20 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 is to be used.

10.21 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

10.22 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.

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.

11.2 Audio communication systems are always preferred as they allow divers in the water direct voice contact with the 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.

11.3 Practical testing of the selected communications equipment in the operational location is recommended 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 Supervisors should monitor surface-supplied divers’ breathing patterns and receive oral reports from divers of their condition.

11.7 With SCUBA 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 supervisor must be able to recall individual divers if required.

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12 Emergency and First Aid Arrangements

12.1 The diving contactor must ensure that there are adequate emergency, contingency plans and first aid arrangements in place.

Emergency Arrangements

12.2 Prior to any diving work taking place, a documented emergency plan must be prepared and must be kept available at the dive site until all diving activity has ceased.

12.3 Emergency arrangements should cover the actions required of each member of the diving team in the event of an emergency. The members of the team must have received adequate instruction, training and information in order to carry out the actions required of them.

12.4 The emergency plan should cover for instance, contingency plans for dealing with missing persons, an ill, injured or unconscious diver or team member, rescue of personnel, 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 Suitable equipment should be available for rescuing an incapacitated diver from the water such as proprietary rescues devices or if the diver wears a diving harness it should be of sufficient design to assist in rescuing the diver.

12.6. The plan 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. Procedures should include calling for assistance from the emergency services, including advance liaison with the services where appropriate (see Appendix 4).

12.7 The diving contractor has specific responsibility to locate the nearest available compression chamber to the diving operation and to 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 12.20 – 12.24).

12.8 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) (see paragraph 12.22). 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.

12.9 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.

12.10 The emergency plan should be readily available to all relevant workers and members of the dive team. All relevant people should be familiar with the plan.

First Aid Arrangements

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

12.12 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 and the distance of the dive site from emergency services.

12.13 But in general, for diving under the Diving Regulations and this Code, the supervisor and at least one other member in each dive team should be qualified in first aid to the standard prescribed in paragraph 12.14. The supervisor should be responsible for arranging their 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.

12.14 For all diving projects under the Diving Regulations, the minimum required standard of first aid is specified in Chapter 2 of Part 7 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 and associated guidance. This first aid qualification is valid for 2 years.

12.15 The diving contractor should provide first aid equipment to the standard set down in the Safety, Health and Welfare at Work (General Application) Regulations 2007 and associated guidance (see also paragraph 12.17).

12.16 The Health and Safety Authority may have mutual recognition agreements of first aid qualifications with other Member States of the European Union. Details of any such agreements are available at www.hsa.ie. Where a person has a first aid qualification from a Member State that has no mutual agreement with the Health and Safety Authority, they must receive an appropriate first aid qualification within the State or from a Member State which has a mutual agreement with the Authority.

Oxygen Administration & Availability

12.17 Oxygen must be immediately available at all locations covered by the Diving Regulations and this Code, including those where there is a compression chamber. 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.

12.18 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.

12.19 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

12.20 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. The provision of a compression chamber should be in accordance with the decompression procedures selected as part of the diving project plan.

12.21 In addition, the following recommended minimum standards should also be applied:

(a) for dives with no planned in-water decompression and that are **less than 10 metres** the diving contractor should identify the nearest suitable operational two-person, two-compartment chamber. Under no circumstances should this be 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,

a suitable two-person, two-compartment chamber should be no more than **2 hours** travelling distance from the dive site.

Times specified for the travelling distances to the compression chamber are independent of helicopter usage.

(c) for dives with planned in-water decompression greater than 20 minutes a suitable, operational, two-person, two-compartment chamber should be provided 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 surface 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.

12.22 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, his or her safety.

Suitability of Compression Chambers

12.23 Two-person, two-compartment compression chambers should be suitable for the purpose intended.

Transporting an Injured Diver under Hyperbaric Pressure

12.24 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 supervisor accompanies that diver.

13 Plant and Equipment

13.1 Diving plant and equipment can be a hazard if it is inappropriate for the work that is being carried out or it is poorly maintained. The incorrect selection of equipment, incorrect use of equipment and poor design can have detrimental effects on the diver's health and safety. 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.

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

13.3 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.

13.4 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 supervisor.

13.5 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.

13.6 Where applicable, appropriate plant and equipment must be available for divers to safely enter and leave the water. 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.

High-Pressure Cylinders and Low-Pressure Vessels

13.7 Gas cylinders should comply with all relevant statutory provisions.

Marking and Colour Coding of Gas Storage

13.8 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.

Divers' Breathing Gas Supply Systems

13.9 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.

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

13.11 Where breathing gas is supplied to a diver via an air compressor, adequate precautions must be taken to avoid contamination of the air supply. 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. Incorrectly set up or poorly maintained compressors can result in carbon monoxide being pumped to the diver.

13.12 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.

13.13 Irrespective of the type of breathing apparatus in use, each diver should have available to him or her an independent secondary source of breathing gas, for immediate use in the event of failure of the primary supply (see Section 8 "Diving Methods"). 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.

Emergency Breathing Gas Cylinders

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

Oxygen

13.15 Pressurised oxygen can fuel a serious fire or cause an explosion; it should therefore be stored and handled correctly. Any gas mixtures containing more than 25% oxygen by volume should be handled as if it were pure oxygen. Gases should be stored in a well ventilated area, be protected from excessive heat and prevented from falling.

Lifting Plant to Carry Personnel

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

13.17 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

13.18 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.

13.19 Winches should not be fitted with a pawl and ratchet gear where the pawl has to be disengaged before lowering.

Diving Baskets and Open-Bottom Bells

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

13.21 Provision of a secondary means of recovering the divers should be provided.

Diving Basket and Wet Bell Lift Wires

13.22 Lift wires may be rigged incorrectly or fail due to stress of 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.

Transporting Diving Cylinders

13.23 Diving cylinders being transported for work purposes must be securely stowed during transport.

13.24 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 not fall under the Carriage of Dangerous Goods by Road legislation (ADR).

13.25 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.

13.26 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 1000L nominal capacity – the vehicle must carry at least 1 x 2kg fire extinguisher; and
- If the total quantity of gas is over 1000L then the full requirements of ADR apply and the services of a Dangerous Good Safety Advisor (DGSA) should be sought.

14 Maintenance of Plant and Equipment

14.1 Diving plant and equipment is used under extreme conditions, including frequent immersion in salt water. 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, plant and equipment should, therefore, be maintained, examined and tested regularly.

14.2 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.

Planned Maintenance System

14.3 The diving contractor should establish a system of planned maintenance for plant and equipment. Maintenance arrangements should take into account both passage of time, usage and the manufacturer's specifications and periodicity. Details of the maintenance arrangements should be entered in the diving project plan. The arrangements should identify the item of plant, the date of the check, any limitations as to use, any repairs or modifications carried out and the signature of the competent person.

Periodic Examination, Testing and Certification

14.4 The frequency and extent of 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.

Dive Equipment Hygiene

14.5 An appropriate method of cleaning and disinfecting dive equipment must be in place where dive equipment has shared users, in order to reduce the potential for disease transmission.

Cylinders Used Underwater

14.6 Divers' emergency gas supply cylinders and other cylinders used underwater can suffer from accelerated corrosion and must be regularly examined and maintained.

14.7. Diving cylinders used at work or filled by a person who is at work must be inspected and tested by a competent person in accordance with national, European or international standards. Recreational divers should be aware that if they hand a cylinder over to a person at work for filling that they will fall under health and safety legislation and the cylinder must be fit for purpose, inspected and tested.

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

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

14.10 All cylinders manufactured to the standards of the European Communities (Pressure Equipment) Regulations 1999 (S.I. No. 400 of 1999) which transposes Directive 97/23/EC of the European Parliament and of the Council concerning pressure equipment 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.

Record Keeping

14.11 Records of all examinations, tests or inspections should be maintained for five years from the date of inspection, as required under the Safety, Health and Welfare at Work (General Application) Regulations 2007.

14.12 Records should be made available to an Inspector and upon request, to users of the work equipment.

Personal Dive Equipment

14.13 Where a diver possesses their own dive equipment for use at work, they should ensure that the equipment is maintained, examined, tested and inspected (see paragraph 14.4). The diving contractor and diving supervisor should be provided with appropriate authenticated copies of any relevant records.

15 Supervisors

15.1 A 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 supervisor, then further supervisors should be appointed. Written appointments should clearly define the times and areas of control. The supervisor should have immediate overriding control of all safety aspects of the diving operation for which he or she is appointed. The supervisor must accept the appointment in writing. Where the diving contractor and 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

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

15.3 The supervisor has a duty to direct the diving operation safely and must be on site, in direct control of the operation and available to deal with emergencies. If a supervisor does not agree with the size or complexity of the portion of the diving project allocated to him or her as an operation to supervise, the supervisor should raise the matter with the diving contractor. A supervisor should not participate in a diving operation that he or she considers to be unsafe because, for example, in the supervisor's opinion, it is too large for one person to supervise safely or for example, the supervisor knows that he or she is not competent to supervise.

15.4 Supervisors, in general, do not have to have a certificate of medical fitness to dive but should be qualified in first aid (see Section 12 "Emergency and First Aid Arrangements") and should be competent to manage a medical emergency.

15.5 The diving contractor must consider the competence of a person to act as a supervisor before appointing him or her as a 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.

15.6 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.

Knowledge and Experience

15.7 The 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 supervisor if he or she has:

- (a) sufficient experience;
- (b) passed an approved diver competence assessment (see paragraph 2.7). A 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 supervisor who is only competent in SCUBA diving; the 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.

Responsibility of the Supervisor

15.8 Supervisors are responsible for the operation that they have been appointed to supervise and they should only hand over control to another suitably qualified supervisor appointed for that diving project by the diving contractor. Such a handover must be entered in the diving operation record (Appendix 3). 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.

15.9 The 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 supervisor to terminate a dive for safety or operational reasons. The supervisor must suspend diving operations:

- if conditions become unsafe;
- the diver requests termination;
- the 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
- the diver begins to use the secondary source of breathing gas.

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

15.11 During diving operations from a vessel, the supervisor should liaise with other personnel, such as the vessel master. In such circumstances the supervisor should recognise that the master of the vessel has responsibility for the overall safety of the vessel and its occupants.

15.12 To ensure that a diving operation is carried out safely, 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;
- (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 if competent to do so 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 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 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 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.

15.13 The 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 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 or instructing personnel to operate plant or equipment.

15.14 Supervisors in charge of divers using rebreathing apparatus must ensure that all relevant equipment checks have been carried out.

15.15 The 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 dive supervisor immediately.

16 Divers

Qualifications

16.1 Lack of or insufficient diving qualifications, lack of competence and lack of familiarisation training can all affect the safety of the diving operation. Under the Diving Regulations, all divers at work must be competent to dive (see paragraph 2.7). A diver who takes part in a dive must be qualified to use the diving equipment concerned and be qualified in the diving method being used.

16.2 The Health and Safety Authority recognises qualifications which are on the Health and Safety Executive (HSE) (United Kingdom) approved list of qualifications. These can be viewed at www.hse.gov.uk/diving/qualifications/approved.htm. For equivalency purposes, a diver diving in support of vessel maintenance or repair, salvage operations, inspection of any building, edifice or structure, construction work and aquaculture should have diving qualifications in line with those defined by the HSE for inland/inshore diving.

16.3 In any particular situation the absolute legal obligation is to match the training and competence of the diver to the method and type of dive involved.

Competence

16.4 Divers must be competent to do the work allocated to them within the diving project plan. A basic level of diving competence may be assumed from a diver who has an approved diving qualification. Divers should have a good understanding of diving physics, physiology and decompression. They should be able to recognise the signs and symptoms of diving-related illnesses in themselves and others and initiate appropriate treatment. They should be able to carry out a diver rescue, including the performance of resuscitation techniques. They should be able to initiate appropriate actions in the event of an emergency.

16.5 The diving contractor and supervisor will need to satisfy themselves that the person has the competence to carry out specific tasks during the diving operation such as the assigned underwater work and the use of tools and equipment relevant to the assigned task.

Duties

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

16.7 All divers must maintain a diver's personal log book. On every day that a diver takes part in a diving project he or she must record in their personal diver's logbook the particulars set out in Appendix 5. This book should be hard bound with numbered pages and signed by the supervisor. The dives should be sequentially numbered and include a running total of dive time. The log book should be retained for at least two years after the last entry.

16.8 Where the diver maintains an electronic diver's log book, a backup personal log book as detailed in paragraph 16.7 should also be maintained.

Safe Pass

16.9 Where diving is carried out in support of construction work as defined by the Safety, Health and Welfare at Work (Construction) Regulations 2006, as amended, a Safe Pass Registration Card will be required.

16.10 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 2006, in general a Safe Pass Registration Card will not be required.

17 Medical Checks

17.1 Occupational Diving requires a high degree of physical and mental fitness. 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.

17.2 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.

17.3 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.

17.4. 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 competent to undertake any particular work task that may be carried out during the dive.

17.5 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.

17.6 Trainee divers who train 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.

17.7 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.

17.8 Divers must not dive if they are in any way unfit (physically or mentally) to do so. People who dive in a diving project and who consider themselves unfit for any reason, for example, fatigue, minor injury, recent medical treatment, recent illness, must inform their supervisor. 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 supervisor before the start of a dive. 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. A diver must not be forced to dive or be penalized for not diving, if for valid reasons, they do not enter the water.

17.9 If a diver is pregnant, a risk assessment must be carried by the employer under Chapter 2 of Part 6 (Protection of Pregnant, Post Natal and Breast Feeding Employees) of the Safety, Health and Welfare at Work (General Application) Regulations 2007. 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.

17.10 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 logbook. They should show this to the 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. 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.

17.10 The Health and Safety Authority approves doctors to carry out diving medical examinations and assessments. These medical examiners are selected for approval based on their training in diving physiology and their knowledge of diving. This approval is for a limited period of 5 years.

17.11 The Health and Safety Authority may have mutual recognition agreements of doctors approved to carry out diving medical examinations and diving medical testing with other Member States of the European Union. Where a person has a certificate of medical fitness from a Member State that has no mutual agreement with the Health and Safety Authority, they must undergo a medical examination within the state.

17.12 If a medical certificate of fitness is lost or destroyed, the diver must undergo another medical examination.

17.13 Further details of approved doctors, mutual recognition agreements and guidance on medical checks are available at www.hsa.ie.

Appendix 1

Glossary of Terms and Abbreviations

Terms

Bell

A compartment either at ambient pressure (open 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/Breathing Mixture

The mixed gas, oxygen or air, as appropriate, supplied to the diver for breathing.

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 mixtures 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 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 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.

Liveboating

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

Media Divers

Include stunt people, journalists, presenters, photographers, camera operators, sound and lighting technicians and the unit crew required to dive in support of underwater media work.

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 technique where the diver reaches the full saturation state for the pressure and breathing mixture 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.

SCUBA

Self-Contained Underwater Breathing Apparatus in which the supply of breathing mixture carried by the diver is independent of any other source.

Standby Diver

A diver who is appropriately positioned and dressed to render immediate assistance to a 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.

Submersible Compression Chamber

A chamber that is intended to be submerged and is designed to transport a person at atmospheric pressure, or divers at pressures greater than atmospheric pressure, from the surface to an underwater work site and back.

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 basket with a closed top section which can contain a dry gaseous atmosphere which can be used as a refuge for divers. It is not a pressurised vessel and contains a supply of spare gas. It is also known as an open bottom 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

IRSRR

Irish Search and Rescue Region

MRCC

Marine Rescue Coordination Centre

ROV

Remotely Operated Vehicle

SCUBA

Self-Contained Underwater Breathing Apparatus

SD

Surface Decompression

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 boat 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

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 mixtures 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 supervisor, dive team and others

- (b) Use of all types of personal diver's equipment and plant
- (c) Supply of gases and gas mixtures, 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 logbooks
- (l) Distance and transport method to nearest compression chamber

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, telephone and fax numbers of the client.
2. Name, business address, e-mail address, telephone and fax number of the diving contractor.
3. Date to which the entry relates or dates on which, and the period during which, the diving operation was carried on.
4. Name of the diving supervisor or supervisors and the period for which he or she is acting in that capacity in respect of that diving operation (an entry must be completed daily by each 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 dive team including names of personnel operating any diving plant or equipment.
7. Purpose or nature of the diving operation.
8. Breathing apparatus and breathing gas or mixture used by each diver in the diving operation.
9. Time at which each diver leaves atmospheric pressure and returns to atmospheric pressure plus his or her 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 of special note 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 class of diving operation.
19. Name and signature of the supervisor completing the record.
20. Affix company stamp (if appropriate).

Appendix 4



Irish Coast Guard Protocol

When planning to go diving on lakes or sea:

- Log a Trade Route (TR) call to the nearest Coast Guard Marine Rescue Centre by VHF or by phone:
 - MRCC Dublin: 01 – 6620922
 - MRCC Malin Head: 074 - 9370103
 - MRCC Valentia: 066- 9476109
- Give details of your trip:
 - Location of dive.
 - Call sign.
 - Number of persons onboard.
 - Estimated time of return.
 - Return port.
- On your safe return, notify the Coast Guard.

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 below.

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 below.
- 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 Coast Radio Station via: VHF Channel 16: use normal MAYDAY procedures DSC radio: Send a DSC Distress Alert Mobile Phone may also be possible if close to shore but Do Not depend on it as your only means of communication.
If on shore	Call 112 / 999 and ask for Coast Guard

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

Question	Answer
<ul style="list-style-type: none"> What is the nature of the distress? 	
<ul style="list-style-type: none"> 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. 	
<ul style="list-style-type: none"> For Missing Divers: <ul style="list-style-type: none"> 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 gas do you believe the diver has remaining? Can you mark the diver's last known position? What colour suit and equipment is the diver wearing? What location aids has the diver got? What are the current weather/sea conditions/temperature/tidal direction and rate? 	

<ul style="list-style-type: none"> • For Injured or Sick Divers: <ul style="list-style-type: none"> ○ 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? <p>This information should be written down and accompany the diver.</p>	
<ul style="list-style-type: none"> • Describe your vessel? 	
<ul style="list-style-type: none"> • What are the current weather/sea conditions? 	

Preparing for a Helicopter Evacuation

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.

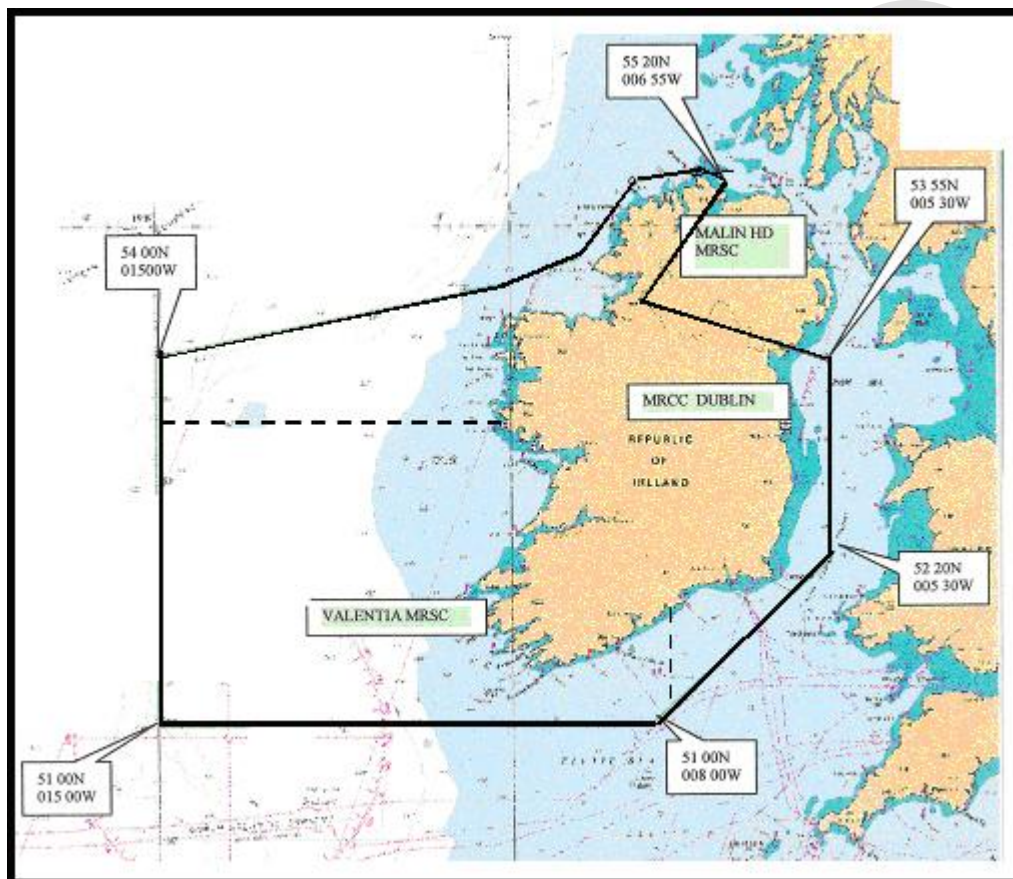
The Boat:

- Ensure that the boat is in open water, clear of cliffs or obstructions and if possible anchored. 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 onboard 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.
- 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.
- 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:

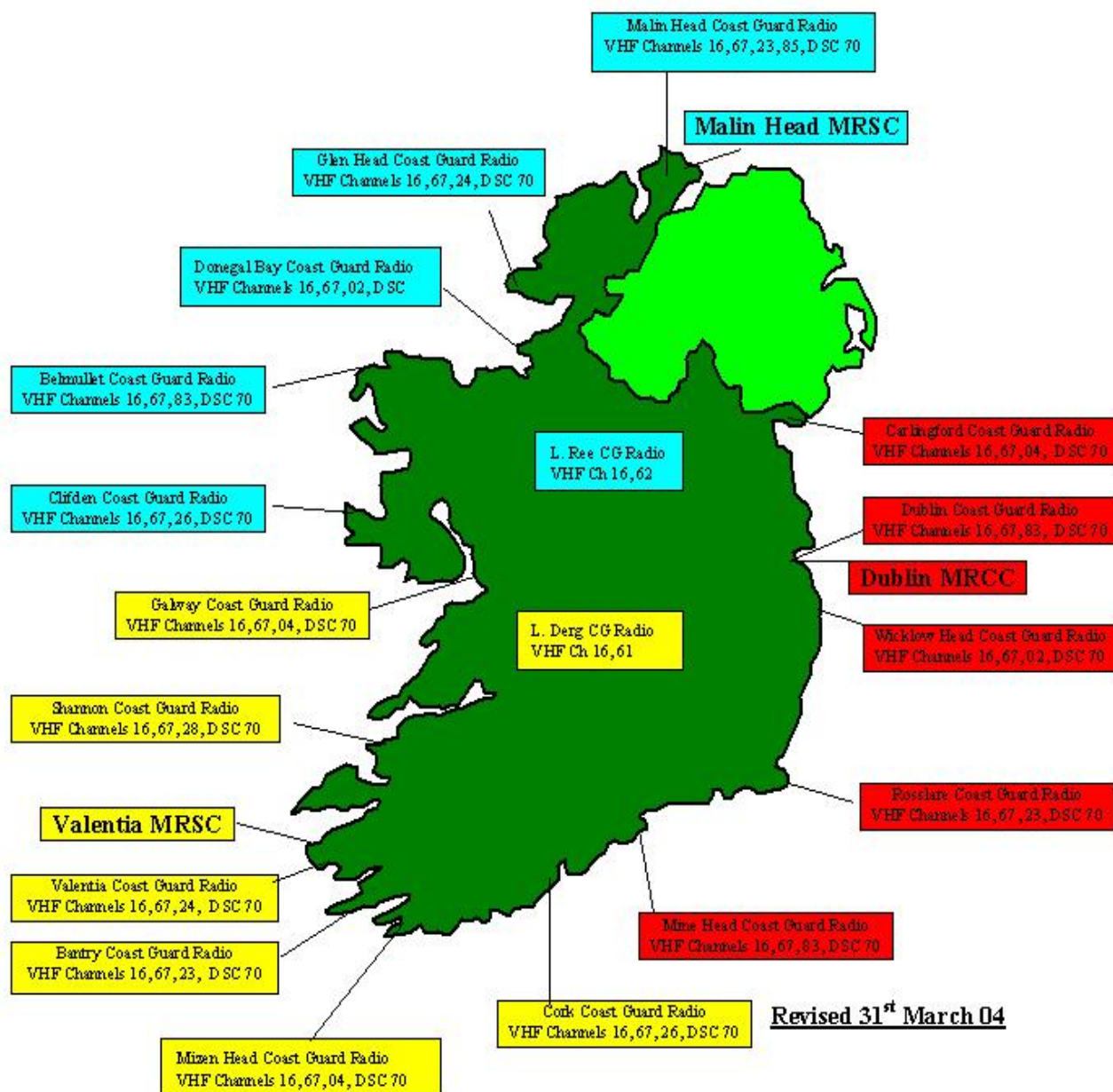
- Wear eye protection to protect eyes from spray created by the helicopter downdraught.
- Follow the pilot's and winchman's instructions at all times.

- **Do not** touch the winchman, winch wire or weight unless instructed to by the winchman, as static electricity can cause severe shocks.
- 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 Coast Guard Helicopter will take the diver to the nearest available compression chamber within the Irish Search and Rescue Region (IRSRR) (see below).



IRISH COAST GUARD

MARINE VHF COMMUNICATIONS NETWORK



Revised 31st March 04

Weather Forecasts at 0103, 0403, 0703, 1003, 1303, 1603, 1903 & 2203 on working channels.



DUBLIN MRCC CONTROLLED RADIO STATIONS



MALIN HEAD MRSC CONTROLLED RADIO STATIONS



VALENTIA MRSC CONTROLLED RADIO STATIONS

Appendix 5

Non–Exhaustive List of Particulars to be Included in the Diver’s Personal Log Book

Names and addresses should be printed and in block capitals.

1. Name and signature of the diver and a verified photograph of the diver.
2. Date to which entry relates.
3. Name and address of the diving contractor.
4. Name and signature of the supervisor(s) for that dive.
5. Location of the diving project, including the name of any vessel from which diving is taking place.
6. Dive number and running total of dive time.
7. The maximum depth reached on each occasion.
8. The time the diver left the surface, the bottom time, and the time the diver reached the surface on each occasion.
9. Where the dive includes time spent in a compression chamber, details of any time spent outside the chamber at a different pressure.
10. Breathing apparatus and breathing mixture used by the diver.
11. Any decompression schedules followed by the diver on each occasion.
12. Any work done by the diver on each occasion, and the plant (including any tools) used in that work.