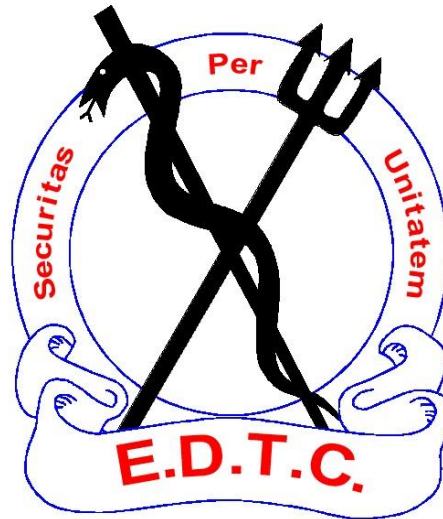


EUROPEAN DIVING TECHNOLOGY COMMITTEE

EDTC

GUIDANCE ON SAFE WORKING PRACTICES IN COMMERCIAL DIVING



The Professional Qualifications Directive (2005/36/EC) applies to all countries within Europe. This directive was updated in 2016 and underlines the fact that the education of divers should be the same or equal all over Europe and that evaluation has to be performed by authorities.

The aim of the EDTC is to make European professional diving safer. In 2017 the EDTC carried out a comparison of diving regulations in countries across geographic Europe. This highlighted the need to establish an umbrella document to be followed by any countries that might find guidance from the document and for those that have little or no regulation.

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1. EXECUTIVE SUMMARY, INTRODUCTION, PURPOSE OF DOCUMENT

1.1 General

The purpose of this guidance is to prevent accidents, injuries and diving related diseases during diving work and to create a common minimum standard for geographic Europe.

1.2 Application

This guidance applies to any activity in which an employee, on behalf of an employer, performs work underwater and thus inhales breathing gas under elevated pressure (divers). It is intended for “occupational diving” such as civil engineering construction type diving projects (including ship’s husbandry, nuclear, salvage etc.). In addition the majority of the guidance will also apply to other types of diving such as scientific, police, public safety, archaeological or media diving.

Trainees should be regarded as employees for the implementation of this guidance.

The employer has the primary responsibility for ensuring that this guidance is adhered to – however this guidance also sets out where other persons may also have responsibility for ensuring that the guidance is followed. The guidance also applies to self-employed divers.

1.3 Procedure

This is a guidance document. It is not intended to supersede or replace other documents, rules and regulations that may apply (for example in the offshore oil and gas industry).

1.4 Preparation

1.5 References

- EDTC documents;
- National rules and regulations regarding diving work;
- National rules and regulations regarding other health and safety issues (e.g. noise, vibration, health etc.);
- IMCA and DMAC guidance, and
- Other relevant documents



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2. SAFETY MANAGEMENT SYSTEM

2.1 General

Diving work should be planned so that it can be conducted in a safe manner. A written dive plan should be established before any diving work can commence. The dive plan should be based on a risk assessment of the planned diving work and the measures taken to eliminate, reduce or control the risks. Guidance on carrying out a risk assessment can be found in Annex 1.

2.2 Risk Assessment (See Annex 1)

A risk assessment is a careful examination of what may cause harm and an evaluation of the precautions that can be taken to prevent harm. Examples of the items that should be considered include:

- The composition of the diving team: numbers, equipment and competence;
- The division of tasks within the diving team and others participating in the diving work;
- The diving, working and emergency equipment to be used;
- The choice of breathing gas and decompression tables;
- The diving equipment's compatibility with the breathing gas in use;
- The use of surface supplied diving;
- Two-way voice communication between the divers and supervisor;
- Communication between the supervisor and others involved (e.g. marine crew, crane operators, port authorities etc.)
- The response time of standby divers;
- Access and egress to the diving site;
- Additional risks highlighted by the client for the diving work (e.g. known underwater hazards – such as pumps, inlets, gates, entrapment hazards etc.);
- Risks due to pressure changes (“Differential pressure”);
- Weather, water and bottom circumstances at the diving site (e.g. depth, temperature, expected surface and underwater visibility, currents, contamination etc.);
- The coordination of the diving work with any other work tasks at the diving site;
- Planned measures in the event of an emergency;
- Contingency plans;
- The level of health care that will be required in an emergency (or the requirement for continual health surveillance), and the location of the nearest suitable hyperbaric facilities.

The risk assessment should be documented, dated and stored in a suitable format, and the results made clear to all of those involved in the project. The person conducting the risk assessment should understand how to carry out a risk assessment and have a clear understanding of the special risks posed by diving work. The assessment should specify who is responsible for implementing the risk controls.

2.3 Dive Plan



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The dive plan should contain sufficient information for the job to be carried out safely. It should be based on the outcome of the risk assessment. The following are examples of the information that it could contain:

- The type of diving work to be conducted;
- Water depth, temperature, contamination, currents etc.
- The risks from the job and how those risks will be eliminated, reduced or controlled;
- The equipment needed to carry out the work safely (including the type of diving equipment, the communications procedures, decompression chamber etc.);
- Emergency equipment required (diver recovery equipment, first aid and oxygen, recompression facilities etc.);
- The crew and division of tasks within the diving team and among others participating in the diving work;
- The competency of all those involved (including qualifications and medical certificates);
- The breathing gas and decompression table to be used;
- The emergency response plan including retrieving injured and/or unconscious diver(s) from the water; the location and availability of the nearest decompression facility and the availability of a medical advisor and/or appointed hyperbaric emergency doctor.

2.4 Involved

The client, members of the dive crew and management, other contractors who may affect the safety of the diving work.

2.5 Procedure

A dive plan should be prepared based on the outcome of the risk assessment.

2.6 Preparation

A risk assessment should be carried out at an early stage. If necessary then work should be carried out to eliminate or reduce risks. The following are examples of risk reduction methods:

- Increase the number of competent people in the diving team;
- Prevent simultaneous work that could affect the dive team (e.g. lifting loads over divers, operation of boats near the diving etc.);
- Reallocate work tasks within the diving team and among others participating in the diving work
- Consider different diving methods, diving equipment, breathing gas, decompression tables etc.;
- Change the work equipment (e.g. use specialist lifting equipment for difficult loads);
- Consider technical ways to supplement or replace diving (e.g. remotely operated vehicles);
- Provide additional instruction information or training so that the diving and working equipment is used safely; and
- Consider designing out any risks posed by the work methods.

Diving work should not start until measures have been taken to reduce or eliminate risks. If the planned diving work cannot be carried out safely, then it should not go ahead.

2.7 References

- Principles for Harmonized Diving Standards in Europe;



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- EDTC document: Personnel Competence Standards, Chap 3.



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3. HEALTH ISSUES

3.1 General

3.2 Medical supervision

All divers should have a valid medical certificate issued in accordance with the EDTC Fitness to dive standard.

A person who is found unfit to dive should not conduct any kind of diving work.

Divers whose medical fitness may be in doubt for any reason, for example, fatigue, minor injury, recent medical treatment or who are taking any medication should inform their employer. Employers should seek guidance from their diving medical advisor if there is any doubt about a diver's fitness to dive.

If the risk assessment identifies any specific occupational health risks from a diving project, then guidance should be sought from a diving medical advisor.

3.3 Involved

All members of the dive crew and management.

3.4 Procedure

All divers should have a medical certificate issued by a suitable diving medical physician in accordance with the EDTC Fitness to Dive Standard before undertaking any work under pressure.

3.5 Preparation

3.6 References

- Principles for Harmonized Diving Standards in Europe,
- EDTC Fitness to Dive Standard,
- Training Standards for Diving and Hyperbaric Medicine,
- Training Objectives for a Diving Medicine Physician.
- EDTC Competence Standards for Physicians of Occupational Diving and Tunnelling Companies



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4. COMPETENCE

4.1 General

Competence is a combination of training, qualifications, experience and knowledge that a person has and their ability to apply them to perform a task safely. Divers and supervisors must be competent to do the work allocated to them in the dive plan.

The employer 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 employer does not know the person, reliable evidence (such as a reference) should be sought to establish their experience.

For diving medical advisor competence see section 6.5.

4.2 Divers

Divers should have basic theoretical and practical knowledge to enable them to dive safely. They should have a good knowledge and understanding of diving physics and physiology and decompression. They should be able to recognise the signs and symptoms of diving related diseases in themselves and others and initiate appropriate first aid. They should be able to carry out a diver rescue, including the performance of resuscitation techniques.

Divers will normally have a formal record of training in the form of a certificate or qualification. The certificate or qualification should be issued by a national or international authority or organisation and shall clearly specify the scope of the knowledge and level of certification. The requirement for a certificate or qualification does not apply to those undergoing training.

Employers should remember that evidence of a qualification alone does not ensure competence. They must satisfy themselves that a diver has the competences for the specific tasks required during the diving work. On-the-job or other training may be necessary. When 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.

Divers should keep a record of their dives (normally in a log book). Each diving log should be signed by the diver and diving supervisor, and the company stamp applied.

4.3 Supervisors

Diving supervisors should be qualified (or have had significant working experience) as divers for the type of diving that they are supervising. The employer must consider the competence of a person before appointing them as a supervisor. When considering competence, the employer should consider whether the person is knowledgeable, practical, reliable; capable of conducting the diving operation in a safe manner; capable of managing members of the diving crew appropriately and remaining calm and acting effectively in an emergency. A formal supervisor qualification is one way of demonstrating competence.

Diving supervisors should keep a record of their supervising experience (normally in a supervisor's log book – stamped by the company).

4.4 Tenders

Dive tenders should have basic theoretical and practical knowledge to enable them to tend the diver safely. The tender should be familiar with the diving procedures to be used and the contingency and emergency plans for the project.



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4.5 Involved

All members of the dive crew and management.

4.6 Procedure

Employers should ensure that all their employees are competent. Competence consists of a mixture of training, qualifications and experience. Divers must, as a minimum, have a formal certificate of competence issued by an independent authority that is suitable for the type of diving being undertaken.

4.7 Preparation

Before commencing diving operations/works, employers should ensure that their divers have the correct certification, and the relevant experience to carry out the diving task. They should also ensure that the supervisor is competent.

4.8 References

- Principles for Harmonized Diving Standards in Europe,
- EDTC document: Personnel Competence Standards, Chap 4,
- National rules and regulations regarding diver training.



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5. OPERATIONS

5.1 General

5.2 Diving team

Before diving work can commence, a diving team should be appointed. The 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 techniques to be used, any decompression requirements and the appropriate number required for safety.

A diving team should consist of a minimum of:

- a diving supervisor;
- a diver;
- a standby diver, and
- a tender for each diver in the water.

These roles should not be overlapped. At least one member of the team should be qualified in first aid. Additional people may be required to operate or maintain specialised plant (for example lifting machinery), and to assist in an emergency.

Members of the dive team should be able to communicate in the same language.

In benign conditions (for example in clear water, such as a swimming pool, tank or aquarium), where the diver can be seen from the surface at all times, the dive team may be reduced to three, dependent on the risk assessment.

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 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.

If a decompression chamber is required at the diving site (this will depend on the risk assessment) then there should also be suitable competent staff available to run that chamber.

In general SCUBA diving should not be used for commercial diving work – however there may be some exceptional circumstances (for example simple tasks in clear water where there is no risk of entrapment – such as an aquarium or swimming pool) where it may be safe. This should be covered in the risk assessment (see Annex 1).

The employer must ensure that there are enough staff trained to deal with an emergency. This will include recovering an unconscious diver, and administering relevant first aid and oxygen administration. First aid and rescue equipment required should be based on the risk assessment.

5.3 Involved

All members of the dive crew and management.



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5.4 Procedure

The division of dive site roles and responsibilities should be defined before starting diving work.

5.5 Preparation

Before work starts the risk assessment should consider the number of staff required at the dive site required to carry out the work safely and to deal with any emergency. A pre-dive briefing (tool box talk) should be carried out prior to work commencing to ensure that everyone is aware of their roles and responsibilities.

5.6 References

- Principles for Harmonized Diving Standards in Europe,
- EDTC document: Personnel Competence Standards, Chap 1,
- Guidance for Diving on Renewable Energy Projects.



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6. ORGANISATION, DUTIES AND RESPONSIBILITIES

6.1 General

6.2 Client

A client is normally the organisation who has placed a contract with a diving company to deliver diving work. They should take reasonable steps to ensure that the diving contractor is competent to carry out the work. The client should provide the diving employer with an inventory of any known risks to divers (underwater or otherwise). They should co-operate with the employer to reduce or eliminate any risks that are under their control

6.3 Employer

An employer is for the purpose of this guidance equal to those who employ people, to carry out work. The employer should ensure that a risk assessment is carried out prior to diving work. They should ensure that a dive plan is prepared (which includes emergency arrangements) based on the outcomes of the risk assessment. They should ensure that there are sufficient competent people employed to carry out the diving work safely and that all parts of the diving work are managed in such a way as to ensure the safety of the people involved in it.

6.4 Diving supervisor

The diving supervisor should be competent and at the dive site, plans, manages and supervises the diving work in accordance with the dive plan and the risk assessment ensuring that the diving work is carried out safely. The supervisor should not participate in diving work that they consider to be unsafe. The supervisor is the only person who can order the start of a dive.

6.5 Diver

The diver should be a person competent for the type of diving being conducted, who, at the dive site, carries out the diving work in accordance with the dive plan and the risk assessment. The diver should co-operate with the diving supervisor and follow any reasonable directions and instructions that the supervisor gives. The diver should inform the supervisor if he has any concerns regarding the safety of the dive.

6.6 Standby Diver

The standby diver should be competent for the type of diving being conducted, and is the person who is prepared to assist the person undertaking the diving work in an emergency. The standby diver will normally be at the surface unless required for an emergency. His state of readiness will depend on the risk assessment. The standby diver must follow the instructions of the diving supervisor. It is recommended that emergency standby diver drills are conducted prior to diving commencing and at regular intervals throughout a diving project.

6.7 Tender

The tender should be a person competent for this task who, at the dive site, assists the diver from the surface in accordance with the dive plan and the risk assessment. Diving tenders should follow any instructions given by the diving supervisor.



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6.8 Diving Medical Advisor

Diving medical advisors should be physicians with a competence in diving medicine equivalent to the "certificate of competence Level 2" according to the EDTC/DMAC training standards for diving and hyperbaric medicine. Advisors may assist the employer on health and safety matters, approve decompression procedures, assist in setup of the emergency response plan and provide medical advice if necessary.

6.9 Involved

The client and all members of the dive crew and management.

6.10 Procedure

The division of dive site roles and responsibilities should be defined before commencing a dive operation.

6.11 Preparation

The following lists are examples of what should be carried out by each dive team member. The lists are not exhaustive and will depend on the specific risks presented by the job.

The following should be carried out by the supervisor:

- Inform the diving team and others participating in the diving work about the dive plan and the risk assessment including the emergency arrangements;
- Consider carrying out an emergency drill to ensure that the dive team are aware of the procedures and that all of the emergency equipment works as expected;
- Ensure that the risk assessment is still current for the prevailing circumstances on the day and during the dive;
- Satisfy themselves that the people they are to supervise are competent to carry out the work required of them, and hold suitable and valid medical and competence certificates;
- Ensure that all the necessary diving equipment and working equipment is available, in good condition and is ready to be used;
- Check that the diving equipment is suitable for the breathing gas being used and the temperatures at the diving site and in the water;
- Ensure that breathing gas, for both diving and emergencies, is available and has the correct composition;
- Plan the diving based on the decompression tables in use;
- Ensure that there are devices which enable the diver to get into and out of the water safely;
- Ensure that the dive flag A is used when necessary and lit up when dark and establish that all relevant people are aware that a dive is about to start or continue.
- Ensure that permission to dive is obtained from others before starting – for example when working in or close to a lock or in a harbour;
- Ensure there are emergency communications (phone/radio) and that they are tested;
- Estimate the response time for standby divers;
- Ensure that an injured diver can be lifted out of the water; and
- Make sure that there is access to first aid and sufficient oxygen at the diving site, and that a suitable first aid assessment has been carried out.



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The following should be carried out by the diver:

- Inform the supervisor if they do not feel capable of carrying out the diving work for physical or medical reasons;
- Follow any reasonable instructions given by the diving supervisor or tender;
- Check and test the diving equipment prior to entering the water (including communications).
- Test the diving equipment under the surface and inform the supervisor if there are any problems.

The following should be carried out by the standby diver

- Follow any reasonable instructions given by the diving supervisor or tender;
- Be available at all times ready to enter the water to assist the diver in the water in the event of an emergency situation.

The following should be carried out by the tender:

- Follow any reasonable instructions given by the diving supervisor;
- Ensure that the diver gets into and out of the water safely;
- Check that the diving equipment when tested under the surface does not leak or have any other faults which the diver cannot notice themselves,
- Manage the diver's umbilical/lifeline and exchange any agreed signals,
- Communicate with the diver as required by the supervisor;
- Monitor the supply of breathing gas on the surface; and
- Inform the supervisor immediately if there are any issues of concern.

6.12 References

- Principles for Harmonized Diving Standards in Europe,
- EDTC document: Personnel Competence Standards, Chap 2.
- EDTC Training Objectives for a Diving Medicine Physician.
- EDTC Competence Standards for Physicians of Occupational Diving and Tunnelling Companies



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7. DIVING SYSTEMS AND EQUIPMENT

7.1 General

7.2 Diving equipment and working equipment.

Diving methods and equipment should be determined as part of the risk assessment.

Diving equipment is regarded as personal protective equipment (PPE) and should meet the requirements imposed of the PPE Directive (89/686/EEC). This covers the design, manufacture and marketing of PPE.

Diving equipment should be used and maintained in accordance with the manufacturer's instructions and any local rules and regulations.

The diving employer should ensure as a minimum that:

- The diver has a full-face mask
- The diver carries an independent secondary source of breathing gas (a bail out cylinder)
- There is a lifeline from the diver to the surface. This should be tended.
- There is appropriate two-way voice communication with the diver.

The employer should ensure that there is sufficient breathing gas available. Gas supplies should be arranged so that interruption of supplies to one diver will not affect other diver's supplies. There should be procedures to ensure that gas purity standards are checked and maintained.

In addition, there should be a first aid kit (with manual), and sufficient emergency oxygen to enable the diver (or divers) to be transported to the nearest recompression chamber whilst breathing oxygen.

7.3 Other equipment

Other equipment will need to be addressed in the risk assessment. Safe operating and maintenance procedures will need to be considered and prepared for all equipment, for example, but not limited to:

- Electrical tools;
- Lift bags and other lifting equipment;
- High-pressure water jetting equipment;
- Chainsaws;
- Abrasive cutting discs;
- Oxy-arc cutting; and
- Welding equipment.

7.4 Involved

All persons involved in the diving operation.

7.5 Procedure

Before commencing diving operations ensure that suitable and sufficient equipment is provided. All equipment should be maintained in accordance with manufacturer's recommendations and local rules and regulations.



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7.6 Preparation

Maintenance records should be kept for all equipment, and a planned maintenance system put in place.

7.7 References

- Principles for Harmonized Diving Standards in Europe,
- EDTC document: Personnel Competence Standards, Chap 1,
- Guidance for Diving on Renewable Energy Projects.



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8. DEFINITIONS

8.1 General

In this document, the following terms might be used with the meanings given below.

Breathing gas	gas mixture used for diving.
Communication equipment	equipment which at least allows two-way transmission of acoustic information between the surface and the diver in the water.
Decompression	reduction of pressure by ascending in water or the reduction of pressure in the decompression chamber.
Decompression dive	ascent in water with planned stops, using a decompression schedule, in order to avoid decompression sickness.
Decompression table	a collective term for instruments and tables describing and/or showing safe decompression in order to avoid decompression sickness.
Dive profile	diving depth as a function of time.
Diver	a person at work who dives.
Diver tender	the person appointed to maintain direct contact with the diver in the water.
Diving equipment	safe equipment allowing a diver to be in water and perform work.
Diving Medical Advisor (DMA)	a DMP (see below) who also has practical experience in commercial diving and compressed air operations – as described in EDTC Competence Standards for Physicians of Occupational Diving and Tunnelling Companies.
Diving Medical Physician (DMP)	a physician trained in diving physiology and medicine in accordance with DMAC training objectives for DMP (Level 2D).
Diving supervisor	the person appointed to plan, manage and supervise diving.
Hardhat diving	diving with a helmet where the diver is supplied with breathing gas from a free-flow system or a demand valve system.
HBOT	Hyperbaric Oxygen Therapy. Therapy with oxygen in a sealed, pressurized chamber.



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Medical Examiner of Divers (MED)

A physician competent to perform initial and all other assessments of working and recreational divers and compressed air workers (Level 1)

Response time

the time it takes between a diver in distress requiring assistance and the standby diver's assistance arriving.

SCUBA

Self-Contained Underwater Breathing Apparatus. A method used but normally not preferred for commercial diving.

Surface decompression

Decompression which takes place in a decompression chamber above water, in accordance with surface decompression tables.

Surface supplied diving

diving where the diver is supplied with breathing gas from the surface via an umbilical.

Tending line/Lifeline

Line between the diver and the tender on the surface through which contact between them is maintained and signals can be exchanged.

No deco

ascent to the surface, which, in accordance with the decompression table, does not require decompression stops.

8.2 References



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9. ANNEX 1 – CARRYING OUT A RISK ASSESSMENT – GUIDANCE FOR EMPLOYERS.

To carry out a risk assessment, you need to understand what could harm the dive team and decide whether you are doing enough to prevent that harm. Once you have decided that, you need to identify and prioritise putting in place, appropriate and sensible control measures.

9.1 Identifying what can harm people (the hazards)

A good starting point is to think about the type of diving project you are doing and if there are any specific hazards. In other words, what is it about the diving project that could injure you the team or harm their health? Consider other people who could affect the safety of the dive site. Are there any differential pressure hazards, intakes, propellers etc.? Is the water contaminated? Will diving take place at night or during restricted visibility? What is the weather forecast? Are there any underwater currents? Will the work have a high risk of decompression sickness? Do any of the tools pose specific risks (noise, vibration, electricity)?

Ask the client if they have any risk assessments for the dive site or any information on hazards. Don't forget to consider other hazards that may affect the surface team – such as noise, dust, falling objects etc.

9.2 Identifying who might be harmed and how

For each hazard, consider who may be harmed. The surface team, divers, anyone else? This will help identify the best way of controlling the risk. Some workers may have particular requirements, eg new divers, migrant workers, people with disabilities etc.

If you share the dive site with other workers, consider how your work affects others and how their work affects the diving. Talk to each other and make sure controls are in place.

Ask your dive team if there is anyone or anything you may have missed.

9.3 Evaluating the risks and deciding on the appropriate controls

Having identified the hazards, you then have to decide how likely it is that harm will occur, ie the level of risk and what to do about it. Risk is a part of everyday life and you are not expected to eliminate all risks. What you must do is make sure you know about the main risks and the things you need to do to manage them responsibly.

Ask yourself:

- Can I get rid of the hazard altogether? (for example use an ROV for inspection work)
- if not, how can I control the risks so that harm is unlikely? (for example provide a decompression chamber at the dive site)
- if there is an incident, what first aid, evacuation and medical assistance will I need?

Some practical steps you could take include:

- trying a less risky option (for example, diving from a boat or platform, rather than from a high wall,);
- preventing access to the hazards (provide physical barriers);
- organising your work to reduce exposure to the hazard (for example, rotate the dive team for jobs with noise and vibration hazards);
- issuing protective equipment; (for example hard hats, and boots for the surface team);
- providing welfare facilities such as first aid and washing facilities (particularly when diving in contaminated water);



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- involving and consulting with the dive team; and
- ensuring that suitable emergency equipment is provided and medical assistance is available.

If you regularly carry out the same type of diving work, you can produce a model risk assessment reflecting the common hazards and risks associated with this work. It will still need to be updated on the day though if anything has changed (for example the surface and water conditions).

9.4 Recording your risk assessment

Make a record of your significant findings – the hazards, how people might be harmed by them and what you have in place to control the risks. Any record produced should be simple and focused on controls.

Any paperwork you produce should help you to communicate and manage the risks from the diving work. For most jobs this does not need to be a big exercise –just note the main points down about the significant risks and what you concluded.

9.5 Reviewing and updating your assessment

Few dive jobs are the same. They will need different equipment and procedures that could lead to new hazards. Each job will need a new assessment. Some of the risks may be the same, but you need to review what you are doing on an ongoing basis.