

# Using Commercial Divers: What you need to know

*Presented by the Canadian Association of Diving Contractors  
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## **Abstract**

Diving operations are becoming an important part of Civil Works. Divers are used for the initial inspections as part of a safety review, for minor maintenance and repairs to structures, and for major work where draining the reservoir is not practical. Making the right choices in hiring a diving contractor directly affects your bottom line. Hire a qualified, competent diving contractor and you can be confident that the underwater task will be accomplished successful-

ly – effectively, on time, within budget and without incident. Hire a diving contractor who is not qualified for the assignment and you should be prepared for a greater risk of incorrect assessments, having to repeat the work, and increased safety incidents.

Planning a safe and effective underwater diving operation involves a chain of events that starts with the need to accomplish a task below water. It is a common misconception that competency in con-

tract diving is someone claiming proficiency in the ability to dive. This is often accepted as the only qualification needed to perform work underwater. The aim of this reference document is to inform the reader of the levels of competency required for various underwater tasks and how those competencies are achieved. We will also address the certification process that can provide employers with the tools they need to be assured that bidders for underwater work will provide



those levels of competency. Finally, we will examine the hazards that divers are exposed to and the hazards that divers can create, both to themselves and to the structures on which they are working.

This article will reveal important tips for becoming a knowledgeable employer including updates on current applicable CSA standards for diver competency, the roll of the Diver Certification Board of Canada and methodologies currently employed by members of the Canadian Association of Diving Contractors. Decompression issues, lock out and rescue requirements etc. – all responsibilities of the Prime Employers – will be discussed in terms of how adopting a team approach will enable all players to identify and mitigate potential conflicts prior to their occurrence. Knowing who to ask when seeking expert opinions and considering all the costs will combine to reveal a safer workplace and improved *bottom line*.

### **Introduction** **Divers are becoming an important part of civil works.**

Dams, bridges, wharves, oil rigs, municipal water and wastewater utilities are just a few of the places

you may find divers working in Canada and around the world. The nature of the work they do is as varied as the locations. Technology and innovation has enabled divers to go deeper, stay longer, and be more productive than ever before and, as a result, more work is being done underwater. For example, diamond wire sawing underwater is widely used to relieve stress in structures suffering from alkali-aggregate reactivity. Pipeline and penstock diver penetrations are cutting downtime by negating the need for de-watering and environmental considerations are sometimes better served by selective diver intervention rather than traditional de-watering methods.

Members of the Canadian Association of Diving Contractors (CADC) are participating in these and other activities daily. Some challenges they meet include diving in contaminated water, diving inside potable

water tanks high above ground elevation and penetrating pipes and conduits. Flooded galleries and penstocks are inspected, cathodic protection systems are installed and repaired, structural elements are drilled, sawed, burned, measured, tapped, photographed, lifted and lowered. If it can be done above the water, chances are it can be done below.

Tooling for underwater work has improved significantly in recent years. Some specialized underwater tools are proprietary and offered only by a select few companies. Photogrammetry Dimensional Inspection, Sonar Imaging, and Laser scaling are included in today's technological tool box for underwater work.

Additionally, the ambient pressure diver is no longer the only alternative for manned intervention. Some atmosphere suits that protect the diver/pilot from exposure to

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ambient pressures developed by Canadians for work around the world are gaining acceptance in civil infrastructure maintenance, inspection and repair where long bottom times at deeper depths are specified.

The growth rate of diving technologies continues unabated. Consequently, the workforce is growing and the training standards and options are expanding.

## Training the workforce

CSA Z275.4 is a diver and dive crew competency standard. It provides designations for various levels of competency in the occupational diving field. A diver working on a dam with underwater torches, for example, shall meet the designation of *Unrestricted Surface Supplied Diver*. The training to meet this designation involves approximately 1,000 hours of training. A large part of the underwater practical training must be done in open water and deep dives to 165 feet in real world conditions are mandatory.

Hazards and legislation training is also a must, and for good reason. Some hazards in this field are a constant. Put your head underwater and if you run out of air, you can die! This hazard can be managed quite easily by providing the diver with a continuous supply of air through a hose from the surface. Other hazards may appear one day but not another. An example is a differential pressure (Delta P) that did not exist until a heavy rainfall overnight. An *unrestricted surface supplied diver* is trained to watch for these things and will conduct a written hazard analysis before entering the water.

Divers can also create hazards when welding or cutting underwater. The *unrestricted surface supplied diver* is trained according to industry-accepted safe diving practices. He is taught that the 10,000 degree F. temperatures split the elements and that water becomes hydrogen and oxygen and if not vented properly can explode, caus-

ing serious injury or death. In some cases, physical damage to the structure being worked on has also resulted. Hazards and legislation training informs the *unrestricted surface supply diver* that sacrificial zinc anodes, commonly used to protect steel elements in salt water, give off hydrogen when dissipating. If this gas collects in an underwater pocket an untrained diver could strike an arc – that would end his life in a second!

It's about managing the risks through education.

## Making the right choices

We need to remind ourselves that each one of us has a responsibility to ensure the safety of others. *Safety is an attitude*. There has been an increased awareness in recent years of the need to be diligent in our planning and execution of our objectives. For some, this may be simply mean ensuring that tailboard meetings are conducted. For others it will be far more involved. The responsibility, however, is not diminished by the perceived extent of apparent risk. There are few near misses in this business. When things go wrong in a dive, the consequences can be swift and severe.

Making the right choices when employing diving services is the responsibility of the employer. In fact, the recently introduced bill C-45 of the Criminal Code of Canada

ensures that employers are held fully accountable for safe work environments. Making the right choices may require managers to reassess their current occupational health & safety programs to ensure compliance with regulatory requirements.

## Regulatory Requirements

Regulatory compliance for occupational safety is the responsibility of each province and territory in Canada. There are some jurisdictional overlaps – such as Labor Canada having jurisdiction over federal government employees and the National Energy Board of Canada being responsible for the offshore. Not all provinces enforce the same regulations. This can be a bit confusing, but if we keep in mind that those jurisdictions that do not call up the CSA standards for diving directly, emulate them in their own regulations. If we meet the CSA standards, we are meeting the minimum requirements for most provinces. You must know the applicable regulatory requirements in your area!

The Canadian Standards Association (CSA) is a not-for-profit, non-governmental, member-driven Association. Diving standards are developed by an expert Technical Committee comprised of volunteers from the occupational diving sector, representatives of regulatory bodies, and safety consultants.

CSA standards are recognized as

- CSA Z 275.2 Refers to:	<b>Occupational Safety Code for Diving Operations.</b> - Minimum Crew Size - Restrictions on Scuba - Equipment Requirements - Supervision - Paperwork - Etc.
- CSA Z 275.4 Refers to:	<b>Diver and Dive Crew Competency</b> - The Competency required for all diving personnel
- CSA Z 275.1 Refers to:	<b>Chamber Standards</b> - the requirements of Hyperbaric Facilities or Decompression Chambers
- CSA Z 180.1 Refers to:	<b>Compressed Breathing Air Systems</b> - minimum allowable limits of contaminants in breathing air - minimum compressor requirements
- CSA 275.5	<b>Occupational Diver Training Programs and Facilities</b> (currently in draft form) - facility requirements and methods of proving competency

preferred industry practice by the Federal Government's Human Resources & Development Canada, National Energy Board of Canada, and by all ten provincial labour regulators.

The standard in itself is not law; however, if a province, territory or the federal government refers to the standard in legislation, the standard then becomes law. Even if the standard is not law, it can be used in a court of law to prosecute clients, operators or supervisors if the standards are not met.

Also available on the CSA website at [www.shopcsa.ca](http://www.shopcsa.ca) or by telephone at 1 800 463-6727, the following are CSA standards related to diving:

### **Who Certifies to the CSA Standards?**

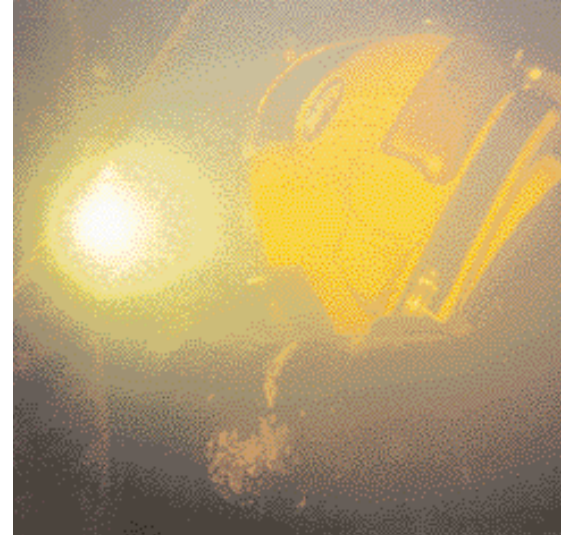
Certification to the standards can be provided by the regulatory authority or an *authorized representative* of the authority. In British Columbia, the Workers Compensation Board of B.C. provides certifica-

tion to the CSA standards. (These certifications are generally recognized only in B.C.).

An example of an *authorized representative* is the Diver Certification Board of Canada. The DCBC is a federally incorporated not-for-profit body. Originally set up to replace the diver certification regime of the National Energy Board of Canada and the offshore petroleum boards, the DCBC is now the only national body that certifies offshore and inshore commercial divers throughout Canada.

The DCBC offers certification to commercial diving personnel who can demonstrate that they have sufficient training and experience to enable them to meet the competency requirements of the appropriate section of the Canadian Standards Association (CSA) Competency Standard for Diving Operations (CSA standard Z 275.4).

The Board also accredits commercial diver training organizations



which train to the competency levels described in the CSA Standard Z275.4. Such accredited organizations can also assess the competency of commercial divers who have experience but little or no formal training. The assessing organization can provide training if and where necessary, and recommend the diver for certification.

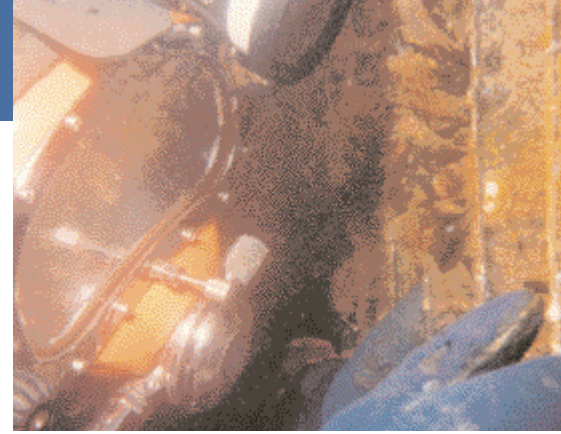
Seven provinces and two territories now cite the CSA Z 275.4 standard in their regulations respecting the safety of commercial diving operations. Those provinces also recognize DCBC certificates as reliable evidence that the holder is competent to the levels described in the standard.

### **Who are the educators?**

Diving competence is performance-based and represents a consensus in the field of commercial diving about what constitutes quality professional education. National accreditation holds colleges and schools accountable to industry, to students and to the general public. The standards address five major areas – curriculum, quality of candidates, quality of instructors, facilities, and educational policies.

The accreditation process involves a self-study by the college, a lengthy written report, a site visit by experts from the National Defense Research and Development Agency and a final review of all reports by the Divers Certification Board of Canada. The DCBC currently certifies graduates from five educational institutions:





- Holland College, Underwater Welding Program, Georgetown, Prince Edward Island, Canada, [www.hollandcollege.com](http://www.hollandcollege.com);
- Seneca College, Underwater Skills Program, King City, Ontario, Canada, [www.senecacollege.com](http://www.senecacollege.com);
- Divers Institute of Technology, Seattle, Washington, USA, [www.diversinstitute.com](http://www.diversinstitute.com);
- Institut Maritime du Quebec, Cen-

tre de formation en plongee professionnelle, Rimouski, Quebec, Canada, [www.imq.qc.ca](http://www.imq.qc.ca);

- Canadian Working Diver Institute Buckhorn, Ontario, Canada, [www.canadianworkingdivers.com](http://www.canadianworkingdivers.com).

Graduating from a nationally accredited program adds value to a student's credentials and enhances his or her employment opportunities in Canada and throughout the world.

## Responsibilities

A quick look at the responsibility list below can assist when planning a diving operation.

Additional information can be obtained from any member of the Canadian Association of Diving Contractors. A membership list is available at [www.cadc.ca](http://www.cadc.ca) or contact any of the groups mentioned in this article at the following addresses.

Canadian Association of Diving Contractors, [www.cadc.ca](http://www.cadc.ca); Canadian Standards Association, [www.csa.ca](http://www.csa.ca); Divers Certification Board of Canada, [www.divercertification.com](http://www.divercertification.com); National Energy Board of Canada, [www.neb-one.gc.ca](http://www.neb-one.gc.ca).

*Making the right choices in hiring a diving contractor directly affects your bottom line. When divers are on the bottom, their life is on the line. Make the right choice and your bottom line can be our industry's life-line!* ■

### Diving Contractor

- Ensure that risk assessments have been performed.
- The area in which work is being carried out is safe and suitable.
- All personnel representing the diving contractor are appropriately qualified and certified.
- All equipment used by the diving contractor is in good working order and, where applicable, is certified.
- The actual work has been assessed and a suitable plan of action has been prepared (including lock-outs) for the work to be carried out safely, effectively and efficiently.
- Any *site specific* safety and familiarization training is provided to all personnel on the dive crew.
- Project records, including dive logs, hazard analysis, and all relevant details of the project are recorded properly.
- Adequate arrangements exist for first aid and medical treatment of personnel.
- All relevant regulations are complied with.

### Client

- The scope of work has been clearly defined and agreed to by the diving contractor.
- Agreement has been made to provide facilities and all reasonable support in the event of an emergency.
- Consider all potential hazards that are under their control and inform the diving contractor of these. Take steps to remove or reduce potential hazards as is feasible.
- Ensure that sufficient time and facilities are made available to the diving contractor to carry out hazard analysis and lock out procedures where applicable.