

CADC Magazine

Summer 2017

The official
magazine of
the Canadian
Association of
Diving Contractors

Bill C-45 Keeps Your Head Above Water:

Protecting
the Diver
and the
Client in
Underwater
Operations

INSIDE:

Going Nuclear: Remaining
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Published for:

The Canadian Association of Diving Contractors
6382 Coachford Way
Mississauga, Ontario L5N 3V8
Doug Elsey, P.Eng., Executive Director
Phone: (905) 542-7410 | Fax: (905) 567-6703
delsey@cadc.ca
www.cadc.ca

Printed by:

Matrix Group Publishing Inc.
309 Youville Street
Winnipeg, MB R2H 2S9
Toll-free: (866) 999-1299
Toll-free fax: (866) 244-2544
sales@matrixgroupinc.net
www.matrixgroupinc.net

President & CEO

Jack Andress

Operations Manager

Shoshana Weinberg
sweinberg@matrixgroupinc.net

Publishers

Jessica Potter
Peter Schulz

Editor-in-Chief

Shannon Savory
ssavory@matrixgroupinc.net

Senior Editor

Alexandra Walld
awalld@matrixgroupinc.net

Finance/Administration

Pat Andress, Nathan Redekop, Lloyd Weinberg
accounting@matrixgroupinc.net

Director of Circulation & Distribution

Lloyd Weinberg
distribution@matrixgroupinc.net

Sales Manager – Winnipeg

Neil Gottfred

Sales Manager – Hamilton

Jeff Cash

Sales Team Leader

Colleen Bell

Matrix Group Publishing Inc. Account Executives

Andrew Lee, Bonnie Petrovsky, Brian MacIntyre,
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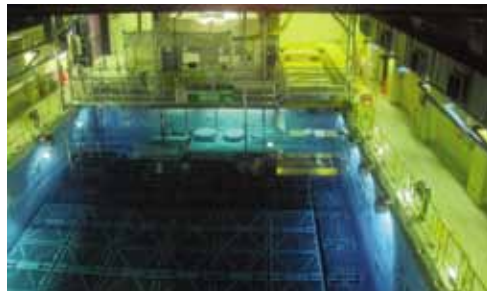
Advertising Design

James Robinson

Layout & Design

Kayti Taylor

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ON THE COVER: This issue's cover features Dave Dalzell floating on the surface at the Naval Base in Victoria, BC, for the Base's new pier installation. PHOTO CREDIT: Ken Babineau / Freelancer at Fraser Burrard Diving Ltd.



Vern Johnston, CADC President
PHOTO CREDIT: Simon Leroy.

All stop! The 2017 diving season, by all reports, promises to be strong in most Canadian regions. The timing for this issue of *CADC Magazine* could not be better, as the focus is all about taking care of the divers at the end of the hose and working topside.

The Canadian Association of Diving Contractors (CADC) has provided to the industry a guideline checklist for compliance to the CSA Z275.2 Diving Standards (available on the website) to assess your diving operation. As a condition of membership, CADC members comply with these standards as a minimum. Anyone—not just members—involved in the industry are encouraged to follow them.

With a humble approach to the process, it would be hard to believe that we all couldn't do something to improve our operations and work further to ensure we are in full compliance with

the standards we work so hard for. They simply make our industry safer.

Having sat as a second-term president for the CADC, I can attest that this position becomes a focal point when health and safety issues arise within our industry. Over the past few weeks, I worked with a BC diver who may well be experiencing the ill effects of decompression illness (DCI). The unfortunate side of the story is that upon surfacing, the diver was manifesting signs and symptoms of DCI and the supervisor on-site made a decision not to attend to the health and safety concerns of the diver. Our divers deserve better than what happened to this young man.

We all need to continue to press for the CSA Standards to be provincially accepted across Canada. Harmonization of the standards will unequivocally make our industry safer—for the diver, for the contractor and for the client! 🍁



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PHOTO CREDIT: D. Geddes.

Doug Elsey, P.Eng.
CADC Executive Director

Commercial diving and the supply

of underwater services is a serious business. Things have come a long way, from “the good ol’ days” hardhat diver, to the introduction of SCUBA in commercial operations, to lightweight gear, to mixed gas, to offshore gear. Lots of changes and evolution. Of course, there was (sometimes, still is) the day of surface supplied diving with a two-man dive crew!

One incident (I’d like to forget, circa the 1970s) was when I received a call from the dive site, where the diver tender, out of breath, reported his diver, whom he was tending from shore, had his hose trapped under a pile he had just finished cutting off. No standby diver. No cell phone (he called from a pay phone!), and I was 45 minutes away, in the office. How was he going to get the diver ashore, as the compressor was low on fuel? Their solution was to move the compressor closer to shore to give the diver more slack. The diver pulled in more hose and surfaced on the far side of the pile pinning his hose, dumped his helmet after removing his harness points, and swam ashore! Doing that was “legal” at the time! In Canada, incidents like this fueled the upgrading of the CSA Dive Standards.

The evolution of these CSA Dive Standards is covered by Ian Rodd, chairperson of the main technical committee for the CSA Z275 *Diving Standards*. We have come a long way—and have further to go.

As far as we have progressed, we continually hear of safety violations in

“There are old divers, and there are bold divers, but there are very few old, bold divers.”

our industry. As educated as the diving industry is about safety, there are still holdouts who cut safety to lower costs to win a bid. Clients—many ignorant of legislated safety standards and guidelines—only see money and hire the lowest bidder, figuring if something happens during a dive operation, it is the contractor’s problem. Nothing could be further from the reality of who is at fault if there is an accident. *Bill C-45* exists.

In Canada, *Bill C-45* is a legal requirement about protecting the worker. No doubt, our industry has its inherent risks, which are mitigated by risk analysis of stakeholders in the project. Everyone from diver to diver supervisor to the client is involved. What happens if it is ignored? In many cases, the client may not know the risks involved and see only the lowest bid. Or they ignore the risks. Dave Geddes enlightens us about the statutes in *Bill C-45* and the implications of ignoring the law. It is about the seriousness of **not** protecting the worker, deliberately or by ignorance. It is a criminal offence with far-reaching implications, including imprisonment, for a client and all involved in the operation.

Protecting the diver in hazardous conditions includes special procedures for diving in contaminated environments such as nuclear plants. Jérôme Dion of the Mistras Group outlines the procedures for diving in these conditions.

Another contaminated environment is the topic of our project spotlight, which focuses on the team at Advanced Subsea Services and its work on the North Surrey Interceptor Sanitary Sewers. Learn about this project, including how they

deal with challenges, like working in a flowing sanitary sewer deemed a Hazmat environment not suitable for human occupancy.

Diver education and training has been conducted at the Canadian Working Divers Institute (CWDI) facility in Chapleau, ON for the last 25 years. Well-known for its approach to training techniques, Gord Hay fills us in on what’s new at CWDI. A tough boot camp for divers comes to mind! This school is unique and puts out damn good people!

This issue also talks about guidelines for hiring the professional diving contractor—all diving contractors are not alike. Doing your homework on who you hire can mitigate serious issues if something goes wrong. *Bill C-45* violations are serious. Compliance to CSA Dive Standards is a good first step.

As of January 1, 2017, CADC initiated the first phase of its Diving Safety Self-Audit Program, which is based on current CSA diving standards recognized as one of the best minimal diving safety standards available nationally and internationally. Read what it is all about.

This issue will be distributed at the annual general meeting of the CSA Standards / Dive Committees in Halifax in June. 🍁

Editor’s note: As we go to press (June 2017), we learn the Nova Scotia Ministry of Labour has laid charges against a diving company involved in the death of diver Luke Seabrook in July 2015. Will there be convictions? How far does Bill C-45 go in determining responsibility of those involved? We will see. Diving is serious business. Be safe. Dive safe. Protect your workers. It’s the law.

Exceeding Expectations

This January, the CADC launched the first phase of its Diving Safety Self-Audit Program. Flip to page 25 to learn more about the program, which is based on current CSA diving standards.



Why You Should Be a Part of the CADC

"CADC is the glue that

binds the diving community across Canada," says Doug Elsey, Executive Director of the CADC.

CADC was formed in 1982 because regulators and government legislators did not and do not want to talk to individuals—they want to talk to organized groups representing the industry. The safety standards that govern your operations today are a result of past CADC members doing their job in "getting it right" so that we have a safe and workable industry today.

Safety, according to Elsey, is one of the most important issues in an industry that can be both dangerous and physically demanding. The CADC acts as a unifying body, able to communicate effectively across Canada and beyond. The CADC acts as a watchdog for the industry and keeps a constant eye on regulations and standards. Because of their diligence in monitoring these

standards and regulations for commercial diving across Canada, the industry has become a much safer place.

As a member, you are adding to the voice that is the CADC, effectively allowing the industry to be heard, especially when it comes to lowering insurance rates.

Some of the benefits CADC membership offers are:

- Constant communications on jobs coming up that you may be interested in bidding on. This is done weekly or biweekly as we send out tender information across Canada.
- Information available on our website (www.CADC.ca) and the CADC-sponsored websites www.UnderwaterINDUSTRY.com and UnderwaterJOB.com.
- The JOBS website (www.UnderwaterJOBS.com), where you can post jobs and look for qualified people.

Check out our members at www.CADC.ca/members

- The members' mail-list server that allows you to instantly contact ALL of the members when you need advice, gear, personnel, etc.
- Diving insurances exclusively for CADC members—backed by Lloyd's Brokers and others who know the diving industry.
- Reduced rates on gear from our associate members.
- This very magazine, with articles on companies, jobs, safety, etc., to keep you informed.

Not everyone can join CADC. Those members who apply have to agree AND demonstrate that they operate in a safe working environment. One cannot join by simply filling in the form—you have to have a demonstrated level of safety and competence in operations to CSA Standards 275.2 (Operations) and CSA 275.4 (Competency).

For more information, please check out our website at www.cadc.ca or e-mail: info@cadc.ca. We look forward to hearing from you!

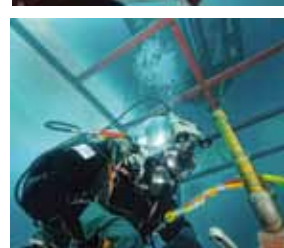
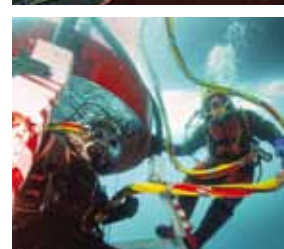


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Phone: (905)-542-7410 ■ Fax: (905) 567-6703

Email: info@cadac.ca ■ Website: www.cadac.ca

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Category	Gross annual revenue of company Sales derived from underwater-related operations only	Dues
☐ Contractor	Under \$1,000,000	\$650
☐ Major contractor	Over \$1,000,000	\$1,000
☐ Associate member (non-voting)	(Sales and services to the industry, including educational, military, public service, etc.)	\$450
☐ Individual professional (non-voting)	Individual industry consultant or professional	\$175
☐ Supporting member (non-voting)	Corporate or government supporting member	\$1,000

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Area code: _____ Phone: _____ Fax: _____ Website: _____

Company contact 1: _____ Title: _____

Email address: _____ Direct line: _____

Company contact 2: _____ Title: _____

Email address: _____ Direct line: _____

Business founded: _____ CADAC member since: _____ Number of employees: _____

General description of the business: _____

Mission statement: "The Canadian Association of Diving Contractors (CADAC) will represent its members' common interests with regards to safety and environmental standards, client satisfaction, and government intervention within our industry. The CADAC will actively promote the use of its members and will supply its members with information and tools to ensure their competence and improve their performance and safety."



PROCESSING INFORMATION FOR APPLICATION (NEW OR RENEWALS)

We hereby apply for membership in the Canadian Association of Diving Contractors as a:

- ☐ Contractor ☐ Major contractor
☐ Associate member ☐ Individual professional ☐ Supporting member

We declare that revenues derived for the preceding 12 months fall into the category of _____
(see membership dues structure on preceding page) and have therefore tendered our
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If approved for membership in the Canadian Association of Diving Contractors, I pledge to foster safety in all areas of activity; to comply with all regulations as set out by the authority having jurisdiction or—in the absence of regulations—to observe minimum standards as identified in current CSA Z275.2 Occupational Safety Code for Diving Operations + CSA Z275.4 Competency Standard for Diving Operations and Safety upgrades to the standards as approved by the Board of Directors, to maintain high standards with regard to business ethics, employee relations, the public image of the underwater industry and further understand that the bylaws of CADC permit investigation of reported violations and, if necessary, termination of membership.

Company: _____

Signature of company officer: _____ Title: _____

For completion by first-time applicants and applicants re-applying after a three-year lapse. If applying for general membership, at least two of the following references should be from current CADC general members. New members may require additional trade information or proof of good standing from their compensation board, if requested by CADC for membership approvals.

Underwater industry references:

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Company: _____ Person: _____ Phone or email: _____

Company: _____ Person: _____ Phone or email: _____

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Date received: _____ Cheque: \$ _____

Application forwarded to: _____ Date: _____

References contacted: _____

Approval:

Executive director: _____ Date: _____

Membership committee: _____ Date: _____

Application notified (date): _____ Certificate mailed/transmitted (date): _____

Mission statement: "The Canadian Association of Diving Contractors (CADC) will represent its members' common interests with regards to safety and environmental standards, client satisfaction, and government intervention within our industry. The CADC will actively promote the use of its members and will supply its members with information and tools to ensure their competence and improve their performance and safety."

Liability on the Job Site: Who's in the Line of Fire?

Canadian Occupational Health & Safety (OHS) laws are based on the Internal Responsibility System. Under this system, all workplace stakeholders, from senior management to the deckhand, are required to play a part in ensuring health and safety at the workplace. Therefore, those—including supervisors—who fail to meet the requirements of OHS laws may be held responsible and are liable to prosecution. It is crucial that owners, employers, supervisors and workers are aware of their responsibilities on the worksite.

As the specific responsibilities of management and supervisors vary from one province or territory to another, it is difficult to come up with a comprehensive list that will directly itemize the responsibilities of the those responsible for the performance of the work. This is made increasingly more difficult in Canada, with each province or territory having its own OHS regulation. However, guidance to the specific duties of the owners, employers, supervisors and workers may be found by referring to the applicable OHS regulation and being aware of the requirements of *Bill C-45*.

The lack of harmonization of OHS laws directly impacts the provincial or territory diving regulations.

This is something the Canadian Association of Diving Contractors is attempting to correct with the introduction of the "One Country, One Standard" initiative.

In seven of Canada's provinces and territories, the duties of supervisory personnel are specifically addressed. These include, but are not limited to:

- Ensuring the health and safety of the workers under supervision;
- Complying with all applicable OHS laws and ensuring workers do the same;
- Ensuring all workers are wearing appropriate personal protective equipment;
- Informing workers of any known or reasonably foreseeable health and safety hazard in the area they are working; and
- When required, giving written directions on measures to be taken to protect their safety.

These duties may be further enhanced by referencing applicable sections in regulations pertaining to diving operations or the Canadian Standards Association (CSA) diving standards. Some of the duties cited in the regulations and CSA standards include:

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- Ensuring operation and contingency plans are developed and in-place;
- Ensuring personnel are competent and fit to work;
- Ensuring all diving equipment is examined by a competent person;
- Appointing in writing a competent diving supervisor; and
- Ensuring all necessary equipment is provided and in good operating condition.

It therefore becomes evident we must determine who is the "supervisor"

for each of these duties. Although many of the duties specified in applicable diving regulations or standards may be focused toward the dive supervisor, it is also plain to see that others, including owners and employers, may also hold a supervisory role.

Listed below are a few examples of the definition of "supervisor" in a number of OHS laws:

- A person who instructs, directs, and controls workers in the performance of their duties;

- A person who has charge of a workplace or authority over another worker;
- A worker who has one or more workers under his or her control or supervision; or
- A person who is authorized by an employer to oversee or direct the work of workers.

It should be noted that these definitions are based on function rather than title. Consequently, personnel have been charged under the *OHS Law*, even though they did not hold the title of "supervisor." It should be obvious that in a court of law, they may be required to look at who had the control and responsibility of the work or task, rather than his or her title, to determine who had the responsibility or authority for the work. Examples of supervisory authority include:

- Hire and fire;
- Promotion and discipline;
- Give awards or bonuses;
- Schedule work;
- Decide make-up of the crew;
- Decide which equipment to use;
- Discuss safety issues with workers;
- Discuss details of the job with workers;
- Deal with worker complaints;
- Stop work if hazards arise;
- Grant workers vacation and leave of absence; and
- Determine how workers are paid.

In the event the applicable *OHS Law* does not assign duties to the supervisor or define the position of supervisor, you will have to determine if the responsibilities are "implied" in another definition. For example, "employer." Do the duties assigned or assumed fall into this definition? Or do the responsibilities of the employer also include those of one who could be the supervisor? The implied responsibilities may be used in prosecuting a supervisor who fails to meet the requirements of the *OHS Law*.

Remember, in addition to the *OHS Law*, the commercial diving industry also relies on specific diving regulations and or CSA Standards that also cite supervisor responsibilities and competencies.

In March 2004, the Canadian government introduced *Bill C-45*. The Bill



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added Section 217.1 to the *Criminal Code* which reads:

"217.1 Everyone who undertakes, or has the authority, to direct how another person does work or performs a task is under a legal duty to take reasonable steps to prevent bodily harm to that person, or any other person, arising from that work or task."

Bill C-45 also added Sections 22.1 and 22.2 to the *Criminal Code*, imposing criminal liability on organizations and its representatives for negligence (22.1) and other offences (22.2).

This Bill was introduced following the Westray coal mining disaster, where despite numerous concern over safety, management did very little to correct these issues. Following the incident, the court was unable to convict management of the mining operation for failure to address the safety concerns raised. A Royal Commission investigated the accident, and one of the many recommendations made lead to the introduction of *Bill C-45*.

The intent of *Bill C-45* is to:

- Create rules for establishing criminal liability to organizations for the acts of their representatives;
- Establish a legal duty for all persons "directing the work of others" to take reasonable steps to ensure the safety of workers and the public;
- Set out the factors that courts must consider when sentencing an organization; and
- Provide optional conditions of probation that a court may impose on an organization.

Although primarily used in cases of serious violations of *OHS Law*, the use of the provisions of *Bill C-45* are becoming more common. The Bill can, and will, hold those responsible for the health and safety of the workers accountable for infringements of the law.

To summarize, the workers are protected by two distinct laws, the *Occupational & Safety Law* and the *Criminal Code*. Failure to comply with these Laws may result in financial penalties or imprisonment. For example, in Ontario, the penalties under the *Occupational Health & Safety Act* are:

- For individuals, up to \$25,000.00 or up to 12 months' imprisonment; and
- Corporations, up to \$500,000.00 per charge.

Contraventions to the *Criminal Code* may result in imprisonment or fines in excess of \$100,000.00.

Supervisors, including employers, have both an ethical and legal responsibility to ensure the health and safety of their workers around the dive operation. This responsibility should not be underestimated or taken lightly. It is imperative that all parties know their responsibilities and practice due diligence in providing this protection. Failure to comply with the spirit of intent of *Bill C-45* to protect the safety of the worker can lead to criminal prosecution, including imprisonment. It is a very serious offence. 

Dave Geddes is a CADCC director and chair of the CSA sub-committee for the Competency Standard for Diving Operations, Clinical Chamber Operators and ROV Personnel. He owns and operates D. W. Geddes & Associates Inc., a consulting company for diving and hyperbaric operations.



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Going Nuclear: Diving in a Radioactive Environment



Mistras Services teamed with Underwater Engineering Services to install a waterproofing membrane in the spent fuel storage pool of a nuclear power plant.

The work was simple. A series of membrane panels to install on the walls using anchored frames. Counter-plates at panel overlays. Epoxy joint sealing on the floor. Behind the membrane, draining fabric and pump wells were to be installed.

Due to nuclear environment constraints, the project challenge resided in the planning, preparation, training, operational procedures, safety measures, monitoring, reporting, and safety event downtime. These had tremendous influence on the dive time to work time ratio.

Training

A week training allowed the team to acquire the safety basics in a nuclear environment, get mobility to the work zone without supervision, and learn how to prevent the spread of radioactive material.

Radiation cannot be seen or smelled, and the different types of radioactive particles have specific penetration power, from being stopped at the skin surface to being absorbed by concrete. Only sensors can detect radiation, measured in rem units, or milli-rem (mrem).

Concepts of radiation dose and dose rates are important to understand and bear in mind at the basis of safety and prevention in a nuclear environment.

Typical nuclear sector workers get annual doses of 100 to 500 mrem. Canadian regulation allows 5,000 mrem per year. Annual medical diagnostics represent a 30 to 100 mrem dose, and the annual natural dose Canadians receive is 250 mrem. Project planners expected divers to get doses up to 500 mrem.

Aside from the spent fuel in the pool, sources workers could be exposed to "hot spots" with surface contamination and moving airborne or underwater particles. One could suffer various acute or long-term effects, based on an excess dose received, which could be prevented by strictly following procedures.

Planning

Medical follow up included weekly personnel dose reporting from various sensors that were worn, along with pre-job, weekly, and post job general contamination scans.

Dive equipment selection, maintenance, upgrade, adaptation and testing were performed off-site. This was of upmost importance for the helmets. Of the four models tested, Desco showed the best performance, KMSL17B proved good for the stand-by diver, and KMSL37 and 17K could not prevent slight water intrusions.

Specific procedures were developed for dressing and undressing divers, underwater vacuum cleaning, dive emergency, scaffolding, and installation sequence. Procedures were tested off-site and on-site and tweaked until they were satisfactory to the client representatives.

Above water, personnel dose monitors and dose rate detectors were worn depending on zones. Below water, divers were dose-rate monitored in real-time and wore delayed dose detectors on their hands, feet and head.

Above and below water, spatial organization with clean, transfer and contaminated areas were set up. Together with rules about work clothes, food and drinks prohibition, hot spot dose rate warning panels, no water contact allowed, and maximizing work distances from radioactive sources, this prevented exposure, self-contamination and the spread of radioactive material from top-side into diver suits, out of the pool with divers, and away from the work area.

Realization

Meetings, debriefing, event-specific reporting, documenting activities, constant watch from the Canadian Nuclear Safety Commission, and maintaining objects' in- and out-logs were the daily load.

Preliminary vacuum cleaning and radioprotection mapping of the work area

continued on page 14

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continued from page 13

were to be completed to ensure underwater safety. A safety scaffold cage ensured the minimum safe working distance of 1.8 metres between divers and the spent fuel racks, providing 18-fold, half-cuts of this radioactive material's mortal dose rate.

Moving and modifying CanStor tables present in the pool were peripheral works. Precision was of utmost importance due to the critical function of this equipment used to transfer the spent fuel bundles from wet to dry storage.

These constraints were important to ensure personnel safety. They are, however, weighing heavy on dive time compared to a conventional environment. Daily, we achieved six to seven-and-a-half hours of diving, with one to two divers, for 12 working hours.

Incidents

Over eight months with four dives each day and a total of 1,200 dive hours and 16,750 worked hours, 13 incidents were documented, most of which were associated with water ingress. A few drops to a puddle in the helmet, wet sensation during or observed after diving, defective original parts, and worn suits were the main causes. These become serious events in a nuclear environment that must be documented, reported, root-cause-analyzed, and solved with a lesson learned.

Other incidents included one hand injury with a rotating tool, one suit puncture from a projected rotating brush hair, and one helmet that was over pressure because too many hands were helping.

Beyond the initial emergency response of terminating a dive, providing first aid, and checking for contamination, it was crucial to have control over incident causes, avoid similar incidents, and reduce incident rates, as the nuclear plant responds to the Canadian Nuclear Safety Commission, which can cancel the project based on incident records.

One safety distance barrier transgression also occurred. However, in the end, none of these events were associated with radioactive or high dose contamination. Our personnel experienced a lower cumulative dose than expected and less radioactive contamination from surface work than plant operation personnel did. 

Jérôme Dion is project manager of the diving division at Mistras Services Inc.

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Hiring the Professional Diving Contractor: The Bottom Line

Employing the right underwater contractor can reduce civil and criminal liability exposure in case of accidents and affect your bottom line. Here's what you need to know.

By the Canadian Association of Diving Contractors

Employing an underwater contractor ignorant of current safety standards and regulations can expose the employer to serious (and expensive) civil and criminal liability in case of an accident. Bill C-45 of the Criminal Code of Canada states it is the legal duty of employers and those directing work to take reasonable measures to protect employee and public safety. If this duty is disregarded and bodily harm or death results, an organization could be charged with criminal negligence. Is this a risk you and your company are willing to take?

To educate one's self on employing a commercial diving contractor, pick up the yellow pages or do an online search for commercial diving companies. You will see it's a competitive business—companies offering underwater services, from underwater inspections or repairs inshore, to full-blown deep diving in hundreds of metres of water in the offshore. Add

to this the clearance of unexploded ordinance underwater, and you soon get the idea that special skills and safety requirements are needed to undertake the work.

Independent diving companies and members of the Canadian Association

of Diving Contractors (CADC) participate in these and other activities daily. In searching for a qualified underwater services operator, are all created equal? Do they operate equally? Are you—as an employer—protected from liability should something go wrong? What standards and regulations are currently in place?

The closest thing to a common or nationally-recognized diving standard cited in regulations is the Canadian Standards Association's (CSA) 275 group of Diving Standards. The CSA standards are recognized as preferred industry practice by the Federal Government's Human Resources & Development Canada, the National Energy Board of Canada and by all 10 provincial labour regulators. Regulatory compliance for occupational safety is the responsibility of each province and territory. There are jurisdictional overlaps, like Labour 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. Although they may not be law, many provinces that don't have diving regulations cite the various CSA Dive Standards in their occupational health legislation. Although the standard may not be law, if a province, territory or federal government refers to the standard in legislation, the standard does, in fact, become law. It can—and has been used to—prosecute clients, operators or supervisors if standards are not met.

The CSA Diving standards were formulated by stakeholders in the Canadian underwater industry, with input from educators,



RESPONSIBILITIES

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.

regulators and industry users across Canada. They are reviewed annually and updated every five years.

To the employer, the most important standards are the CSA 275.2 Occupational Safety Code for Diving Operations and the CSA 275.4 Standard on Diving Competency. The CSA 275.2 Occupational Safety Code for Diving Operations concerns itself with operational diving safety standards—including minimum crew sizes, restrictions on the use of scuba in diving operations and equipment, supervision and medical requirements. It is important to realize these are **minimum** requirements for safe diving operations and are not all-inclusive.

The CSA 275.4 Standard on Diving Competency concerns itself with the competency of the underwater worker and support personnel. This also is a **minimum** requirement for all personnel in a diving operation, meant to enhance the safety of the operation. It provides designations for competency in the occupational diving field.

It is law that we have a responsibility to ensure the safety of others. We need to be diligent in planning and executing objectives. The responsibility is not diminished by perceived extent of apparent risk. When things go wrong on a dive, consequences can be swift and severe. Making the right choices when employing diving services is the responsibility of the employer and may require managers to reassess current occupational health and safety programs to ensure compliance with regulatory requirements.

Who certifies to the CSA standards?

Provincially, certification can be provided by the regulatory authority or an authorized representative in the province. Nationally, the federally registered, not-for-profit Diver Certification Board of Canada (DCBC) is currently the only recognized body that certifies offshore and inshore commercial divers throughout Canada. The DCBC certification is issued to commercial diving personnel who meet competency requirements of the appropriate section

Canadian Standards Association (CSA) Diving Standards	
CSA Z275.2 refers to:	Occupational Safety Code for Diving Operations: • Operational Requirements. • Minimum Crew Size. • Restrictions on Scuba. • Equipment Requirements. • Supervision. • Paperwork. • Etc.
CSA Z275.4 refers to:	Diver and Dive Crew Competency: • The competency required for all diving personnel.
CSA Z275.1 refers to:	Chamber Standards: • The requirements of hyperbaric facilities or decompression chambers.
CSA Z275.6 refers to:	Unexploded explosive ordnance (UXO) and munitions diving.
CSA Z180.1 refers to:	Compressed Breathing Air Systems: • Minimum allowable limits of contaminants in breathing air. • Minimum compressor requirements.

of the Canadian Standards Association (CSA) Competency Standard for Diving Operations (CSA standard Z 275.4).

The DCBC also accredits commercial diver training organizations which train to the competency levels described in the CSA Standard Z275.4. Such accredited organizations can assess commercial

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divers with experience but little or no formal training. Eight provinces and two territories cite the CSA Z 275.4 standard in their regulations. Those provinces recognize DCBC certificates as reliable evidence that the holder is competent to the CSA 275.4 competency levels.

Who complies with the CSA standards?

In many provinces, the CSA diving standards and its derivatives are law. Legally, failure to follow regulations and standards and to protect the underwater worker can result in civil and criminal charges.

When one considers the legal requirements for diving operations in Canada—and the intensive training and certification required by those in the industry—picking up the yellow pages and choosing a diving contractor at random is akin to playing Russian Roulette with your business or organization at the end of the barrel.

Due diligence to make sure the diving contractor is in compliance and is cognisant of the occupational health and safety laws and standards within the province protects both the owner and the underwater worker.

Members of the CADC are required—once accepted into membership—to pledge and sign-off on the following mandatory CADC membership requirement:

“As a CADC member, the company pledges to foster safety in all areas of activity; to comply with all regulations as set out by the authority having jurisdiction or—in the absence of regulations—to observe minimum standards as identified in current CSA Z275.2 Occupational Safety Code for Diving Operations + CSA Z275.4 Competency Standard for Diving Operations and Safety upgrades to the standards and amendments as approved by the Board of Directors and to maintain high standards with regard to business ethics, employee relations, and the public image of the underwater industry.”

When considering who does the underwater work, considering the employment of a professional diving services company that has earned membership in CADC and has pledged to observe safety standards and maintain

high standards in business practices is a good starting point.

Hiring a member company of the CADC does not guarantee safety or high performance; there are many variables in underwater work—each company has its own high standard in operations above the minimum requirement. It's up to the owner to make decisions as to who they should hire—and determine what the true price of hiring a low bidder or non-professional company is.

Incidents and accidents cost money. Correctly choosing a professional

contractor will translate into cost savings. The true bottom line in safety, performance and compliance to recognized industry practices and regulations is measured by the owner exercising due diligence in the selection of the contractor. Doing the homework is recognition of the clients' concern for worker safety and is just plain smart business. Considering a CADC member company is a good start.

For additional information or a full list of diving contractors, please go to www.cadc.ca.



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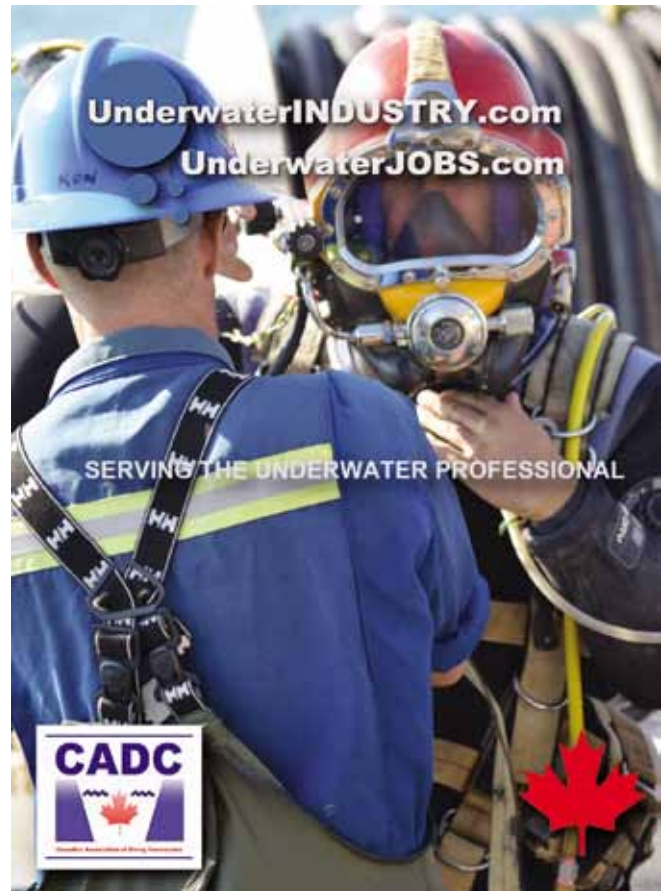
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Advanced Subsea Services:

Inspecting the North Surrey Interceptor Sanitary Sewer

On British Columbia's Vancouver Island, Sidney-based Advanced Subsea Services Ltd. has carved for itself a well-deserved reputation as one of Canada's most innovative and resourceful commercial diving companies. Primarily operating along Canada's west coast and central Arctic, the company serves a wide variety of clients, such as the remote municipalities of the far north, the natural resources sector, the Canadian Navy, hydro-electric facilities, and the oil and gas sector.

Because of its knowledge, expertise, and dedication to safety, Advanced Subsea Services was selected last year to complete the city of Surrey's North Surrey Interceptor Sanitary Sewer pipe project, which tasked the company with inspecting the inside conditions of a large 9,500-metre sewer pipe and to identify any cracks and areas of concern along the concrete bottom, sides, and crown of the pipe. A total of 112 entries will need to be calculated in order to complete the inspections.

There are numerous and obvious challenges associated with working inside a flowing sanitary sewer that is deemed to be a Hazmat environment not suitable for human occupancy. The pipe's diameter ranges from three to eight feet and the distance between manholes along the section that is being inspected is up to 500 feet.

Entry into the space is quite small and, once inside, the diver will need to overcome the claustrophobic conditions and be comfortable performing in an enclosed space, while also appreciating the risks associated with working underground. The sewage levels inside the pipe can rise and fall, creating a fully- or partially-filled space, and the equipment being used tends to be cumbersome, particularly when the murky water levels drop. But, regardless of water level, there remains a constant flow of brackish, smelly water pushing up against the diver in the pipe, placing considerable drag on the umbilical.

"But the biggest challenge for us in this project was the development of the working and safety procedures," says Murray Mackay, general manager at Advanced Subsea Services Ltd. "The level of accuracy, in regard to documentation and safety, is the most I've encountered since I began working in the offshore oil and gas sector. It was often difficult to draw a clear line between diving in a hazardous environment and confined space classification. As a result, several months were used up in the development of documentation and then submitting it for review, making changes where required."

Advanced Subsea Services employs four to seven divers for regular scheduled maintenance work relating to water control structures, submarine outfall pipes, and storm and sanitary sewer inspections and repairs. The company strictly follows Work Safe B.C. regulations and CSA guidelines to maintain its excellent safety rating and track record, with all staff members meeting or exceeding current training and education requirements. In most cases, all Advanced Subsea Services' divers are fully-

continued on page 20



The Advanced Subsea Services team dresses a diver in Hazmat gear.



An Advanced Subsea Services diver enters the manhole.

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trained in the personal protective and life support equipment that can easily cross from wet to dry as the type of situation and environmental conditions change.

Some of the equipment being used in the completion of this project includes Whites/Aqualung Hazmat diving suit with a neck-dam mated to a Kirby Morgan SL17K helmet; dry gloves with a puncture resistant over-glove for sharps and steel-toed over-boots; a 600-foot twisted umbilical with video, communications, and lighting; rescue winches, and; harnesses and SCUBA packs for the surface crew. There are also two independent air supplies, portable fresh water tanks, pumps, and a heated

pressure washer to decontaminate divers and equipment once out of the pipe.

"Training and experience with this type of equipment naturally leads to the progression of confined space training and Hazmat work for our teams," says Mackay. "That being said, working in a Hazmat environment still requires a site-specific review and the development of procedures that will inform workers of the hazards, risks, and safety guidelines that need to be followed."

Advanced Subsea Services' divers are Diver Certification Board of Canada surface-supply certified, have undergone basic confined space awareness and confined space rescue training, and have training in hazmat diving and

decontamination techniques. Divers are also fully trained in the use of gas monitors, rescue winches, back-up rope rescue techniques, hard-wire throat mic and earphone communications, National Institute for Occupational Safety and Health standards for confined space work, and identifying hazards. 

Advanced Subsea Services Ltd. is dedicated to the highest standards of technical proficiency, marine safety, environmental awareness and professionalism. The company provides services to the civil and offshore marine industries, and its global experience comes from working offshore in diverse environments such as Hibernia, Sable Island, Russia, the Caspian Sea, China, India, Japan, Thailand, Indonesia, the Straits of Malacca and the South China Sea.



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Canadian Working Divers Institute: Celebrating 25 Years of Training Divers

By Gord Hay, Diving Safety Specialist, Canadian Working Divers Institute

Canadian Working Divers Institute (CWDI) is celebrating a change of ownership and 25 years of training divers to international standards. Over the years, CWDI has run 44 unrestricted surface-supplied courses with over 500 graduates worldwide and has trained divers from around the globe, including countries like Turkey, Israel, Bermuda, Italy, Mexico, the United Kingdom, Japan, India, Spain, Switzerland, Panama, Aruba, Columbia, Cypress, Australia, Mexico and the U.S.

CDWI aims to operate the best entry level commercial diver training program in the world, with training beyond the Canadian Standards Association's Z275.5 Diver Training Guidelines and Auditing Procedures. Gord Hay, chief instructor at CWDI, chairs the training standard.

"When we started," says Hay, "the only other diver training college in Canada was Seneca, and we were training to Canadian Oil, Gas and Land Administration guidelines, which then became the National Energy Board. Back then, we were audited by Jan Merta, the chief diving inspector of Canada."

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Celebrating a Change in Ownership

John Pegg, Offshore Diving Supervisor

"Every Beginner Poses the Potential to be an Expert"

John was raised on a family farm near Rondeau Park, ON and was inspired to become a commercial diver in the late 1970s, when he would watch the Consumers Gas company divers work in the Lake Erie gasfield, which worked out of the Erieau Harbour.

John graduated from Seneca College's Underwater Skills program in 1990-1991 and worked for several Ontario-based companies, like Can-Dive Ltd., Forand Marine and Aquatic Sciences around Ontario as a construction diver. A few years later, he was hired by Pembina Resources and worked for 22 years as a Lake Erie gasfield diver/ diving supervisor.

In 2000, he attended Underwater Centre-Tasmania and obtained his Closed Bell Saturation Diving Certification and IMCA Offshore Supervisor Certification. John worked as saturation / air diver in East Coast Canada and several countries in southeast Asia during the Lake Erie offseason.

He is a Certified Joint Health & Safety Representative for Lake Erie divers and is a Certified Diving Medical Technician. John was an instructor for IMCA Offshore Diving Supervisor (Offshore Hazards and Safety) at Seneca College, and is also a Certified Kirby Morgan Dive System Maintenance and Repair Technician.

John loves to spend time with his wife, Kristen, and kids, Brayden and Emma.

"I would like to take this opportunity to express my gratitude, which I know mirrors the sentiments of many working divers and companies that have had the good fortune of being trained and had divers working for them that are the product of Gord Hay's vision of a properly trained working diver that CWDI has produced over the last 25 years. Hats off and helmets on to Gord, his family and CWDI!" says John.

"I would also like to take this opportunity announce to the industry that I have been honoured with the opportunity to pick up the hose and tend Canadian Working Divers Institute into the future as the new owner and chief diving instructor. It is my intent to take CWDI into the future in the same light that has been such a time-tested success over the years, and look forward to being an integral part of shaping future divers into competent, safe and efficient members of our industry."



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continued from page 21

If you want to get good at something, you need to do it daily

This philosophy helped design CWDI's course, which immerses divers in the trade so they can find out quickly if it's up their alley or not. Because an underwater diving career is demanding, it's only fitting that a training program is demanding, too. That way, contractors know they can produce, whether they're on the surface or under it.

"I paid my 21st visit to a diver training school, CWDI in Canada, and I consider it to be probably the toughest and most intensive course in the world," said commercial diving advocate, Michael Cocks, over a decade ago.

While most training programs require divers to spend eight months completing an 840-hour course, CWDI's intense, accelerated offering has a low student to instructor ratio (four students per instructor) allows students to complete the requirements in fewer than three months with plenty of direction, as divers are working in offshore and onshore environments for 12-hour days, six or seven days per week.

Diving barges are moored close to the classroom and living facilities so that students can get in a full day of diving on practical projects that duplicate actual working environments.

As CWDI celebrates a change in ownership, John Pegg, diver, diving supervisor, and health and safety representative, will be the new owner and manager of CWDI, and Gord Hay will remain with the team as a diving safety specialist. 🇨🇦

Gord Hay is a diving safety specialist at Canadian Working Divers Institute.



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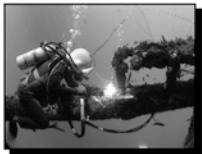
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4



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8

Our Members at Work

1. A Fraser Burrard Diving Ltd. diver, Kale, takes a leap of faith from a pier in North Vancouver during an intake cleaning. Photo provided by Fraser Burrard Diving Ltd.
2. One of Advance Diving's own makes his way through a bio basin. Photo provided by Advance Diving Projects.
3. The Advanced Subsea Services team salvages a pump house from a tailings pond. Photo provided by Murray Mackay.
4. An Unrestricted Surface Supplied student at Commercial Diving Institute of Canada, Rochelle Krebs, waits on standby. Photo by Vern Johnston and provided by CDI of Canada.
5. Gotta clean up after a day in a water treatment basin in Trois-Rivières. Photo provided by MVC Océan Inc.
6. O.D.S. Marine Diver/Supervisor Chris Davies using a hydraulic 14-inch Dragon Saw to cut 12-inch concrete piles during the demolition of the Young St. Bridge in Burks Falls, ON. Photo provided by O.D.S. Marine Ltd.
7. A diver suiting up to for underwater repair work. Photo taken by Phil Jenkins and provided by Canadyne Navigation.
8. During a project to install new chains, diver Matt Babin gets to work in the Salish Sea, tightening the shackles. Photo taken by Adam Coolidge and provided by Cold Water Divers.

If you're a member of the CADC and have some great shots of your crew at work (in and out of the water), we want to see them! Showcase what you do. Send images for consideration to delsey@cadc.ca.
















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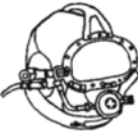
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CADC Initiates Phase 1 of Diving Safety **Self-Audit Program**

By Doug Elsey, Executive Director, Canadian Association of Diving Contractors

As of January 1, 2017, the Canadian Association of Diving Contractors (CADC) has ramped things up by initiating the first phase of its Diving Safety Self-Audit Program, which is based on current CSA diving standards recognized by the CADC and its members as one of the best minimal diving safety standards available both nationally and internationally.

A requirement by CADC members to follow current CSA Dive Standards Z275.2 and Z275.4 in the absence of regulations as a minimum level of safety has always been necessary for membership in the organization.

Diving Operations involve a unique combination of occupational health and safety issues performed in an unforgiving environment, where errors can quickly develop into fatal accidents. Individual risks must be managed if diving is to be conducted in a safe and efficient manner.

Following a recognized diving standard is recognition of the requirement for minimum safe dive standards for all professional diving services providers to end the confusion as to what is acceptable within our industry for the protection of our workers. Anything less is viewed as jeopardizing safety and is in potential criminal violation of Canadian *Bill C-45* on the legal requirement to protect the worker. The CSA Z275 Diving Standards fulfil this requirement as a good place to start.

The CADC Diving Safety Self-Audit Program consists of a declaration of compliance and is in the form of a guideline / checklist based on the current CSA Z275.2-15 Diving Operations standard. The pertinent line items have been transposed onto a table for ease of confirming code compliance. If codes are found to be non-compliant, comment space has been provided to identify how and when the requirement will be met.

This self-check audit serves as a checklist to re-affirm that operations comply to the current CSA dive safety standard and identifies shortfalls for the operator to adjust operations to ensure standard compliance. It serves as a tool to ensure all diving operations operate

to a standard recognized by responsible operators as the absolute minimum level needed to protect the underwater worker and support personnel.

FAQs on CADC's Diving Safety Self-Audit Program

Q: Why do a safety audit?

A: A safety audit ensures that a diving firm is operating in a safe manner and in compliance with provincial or offshore regulations in the areas of operations. Or—as a minimum—will be based on the current CSA Diving Standards 275.2 (Operations) and 275.4 (Competency) if no other regulation or standard are in place.

Clients hiring diving or underwater services need assurances that the firms they are hiring follow minimum safe diving practices recognized by the industry. In Canada—in absence of provincial or federal regulations or standards—one of most highly regarded operational standards are the CSA Z275 series of Dive Standards. Companies operating under these standards provide a level of assurance to the client that the operations follow strict minimal industry safety standards. CADC members, as a condition of membership, have signed-off that they follow these minimum standards (in the absence of provincial/federal regulations) as a baseline in their operations. They may operate under more stringent standards beyond the minimum as a company policy or as required by the client, but they do follow at least a minimum standard in ALL operations.

Q: Is this a requirement for membership to the CADC?

A: Yes, it is. There has always been a requirement for compliance to CSA Standards as a condition of membership in the CADC in absence of regulations. The provision of the Statement of Compliance to the standards and the guidelines simplifies this requirement. Starting in 2017, all new members will be required to submit the statement of compliance on their application or list deficiencies (and date of anticipated corrections to these deficiencies.)

Q: What will the safety audit be based on?

A: The safety audit will be based on the CSA Diving Standards 275.2 (Operations) and 275.4 (Competency) as a minimum if no other regulation or standard is in place. In a self-audit, a form / checklist has been provided to the members by the CADC in the form of a guideline to determine compliance to the standard. On completion, the form will be sent back to CADC and placed in the members file. All information is confidential and is kept by the executive director.

Q: Who is going to pay for an audit?

A: In the case of a self-audit, there is no external cost associated with the audit as the contractor does it in-house. In the case of having the audit done by an auditor, the cost will be covered by the member being audited. On request, an auditor experienced in diving safety audits can be sent from a location nearest the contractor to assist in the audit. CADC may add a small administrative charge but it is envisioned the audit will be at-cost only. This is not intended to be a money-making proposition by CADC; the focus is safety and accountability to adhere to safety standards.

If the audit is done correctly, the member will derive the benefits in having a complete list of all deficient items and instructions on how to correct them. It can be the firm's blueprint to compliance and should be approached with that in mind. This is not a "pass/fail" audit, as the goal of the audit is to determine deficiencies—if any—and provide suggestions to eliminate them in order to comply.

Q: What if a member company does not comply? What happens?

A: Our industry and organization is based on professionalism, trust and the goal of making the industry safe for our workers. All efforts will be made to help the member identify deficiencies in their safety program to achieve a recognized

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level of safety and aid them in correcting the deficiencies. Ignoring compliance with these minimum safety standards can result in termination of CADC membership if not corrected in a timely manner. There are no exceptions.

Q: I have already done an audit as required by my client. Do I have to do it again?

A: No, as long as the safety audit covers the pertinent requirements of the CSA Z275.2-15 items of the CADC / CSA

diving audit and meet or exceed it. Refer to the audit you have done, check off the compliance declaration of our audit, and attach or reference it on the CADC Safety Audit as compliant.

Q: Is this part of the mission by CADC to have a single standard across the country?

A: Definitely! Recognition and compliance to a single minimum diving standard across the country prevents confusion in different jurisdictions and increases safety for the worker.

Q: If this is Phase One, what is Phase Two...or beyond?

A: Phase Two may be for mandatory third-party audits for compliance. There is a lot of merit to this. It is being done in other jurisdictions.

Participate—it's **your** industry. 🍁

Doug Elsey is executive director of the Canadian Association of Diving Contractors (CADC). For further information or inquiries, contact the CADC through its website, www.CADC.ca.

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Diver's Safety: Evaluating CSA Dive Standards

By Ian Rodd, Learning Manager, Commercial Diving Program, Holland College



With the advent of the 1970s, commercial diving in Canada was going through a period of transition, from the heavyweight deep-sea type of diving dress to the use of SCUBA and new lightweight surface-supplied diving equipment. During this period, there was a significant increase in the number of diving-related injuries and fatalities.

A large group of representatives from the diving industry, from coast to coast to coast, agreed action was needed to develop safer underwater working standards for the commercial diving industry in Canada.

In 1971, stakeholders, including government regulatory authorities, Defence and Civil Institute of Environmental Medicine, employers, workers, and labour groups met in Toronto to discuss an approach to address the growing concern for the need of a robust diving standard within the industry.

Early work began on the development of the CSA Z275.1 *Hyperbaric Facilities* standard, followed in 1972 by the CSA Z275.2 *Occupational Safety Code for Diving Operations* (CSA Z275.2). The first two, of what would become six standards in the CSA Z275 family, were published in 1974.

In 1992, the Canadian Association of Administrators of Labour Legislation (CAALL) was interested in the harmonization of Occupational Health and Safety (OSH) regulations in Canada. At the time, each province and territory had its own unique set of OSH regulations: 13 sets of OHS

regulations to control workplace activities in Canada. CAALL wanted to reduce this duplication of effort and concentrate the limited technical resources available to develop better regulations and make it easier for the increasingly mobile workforce to comply with a single national set of regulations. In spring 1992, an inter-governmental working group was established to act as a steering committee for the national harmonization project.

In 1994, a new edition of CSA Z275.2 was released to the regulatory authorities, prompting several OSH jurisdictions to review their own diving regulation. Because of this, CAALL determined this would be a good regulatory template to include in a study for harmonization of regulations. In spring 1994, two pilot projects were identified: diving and confined spaces.

In fall 1994, a working group for the study of diving regulations was established, pulling together representatives from government, labour and employer groups. Their task was to develop a set of common requirements that could be used by groups in each jurisdiction responsible for the drafting of regulations.

By 1997, the first edition of the CSA Z275.4 *Competency Standard for Diving Operations* (CSA Z275.4) was published, and the working group had completed its work on the proposed common requirements. Unfortunately, among the provinces, there were still numerous issues regarding enforcement that weren't resolved.

By this time, CSA was in negotiations with the National Energy Board (NEB) to take over the responsibilities for operational and diver competency standards in use at the time in the Canadian offshore industry. CSA concluded it could write a standard pertaining to competence for all divers and not just the ones working offshore. This was the genesis for CSA Z275.4 and, because the NEB was looking to shed itself of this responsibility, it helped fund the development of the new standard.

Subsequently, in 2003, the Diver Certification Board of Canada (DCBC) was established to fill the gap of diver certification—another responsibility shed by the NEB. Today, most professional divers in Canada are certified by the DCBC to CSA Z275.4.

CSA has been developing consensus standards for occupational diving for 45 years. These standards have been adopted voluntarily by the diving sector across Canada and are recognized and used internationally. They have been widely adopted in provincial and territorial OHS regulations by reference to a section or sub-sections of a particular standard(s) in the regulation.

Several provinces simply state that CSA Z275.2 and/or CSA Z275.4 are adopted and constituted as part of the diving regulation. One jurisdiction makes a softer reference to the CSA standards in a code of practice that provides practical guidance to help comply with the law.

One of the reasons CSA develops national standards is to encourage

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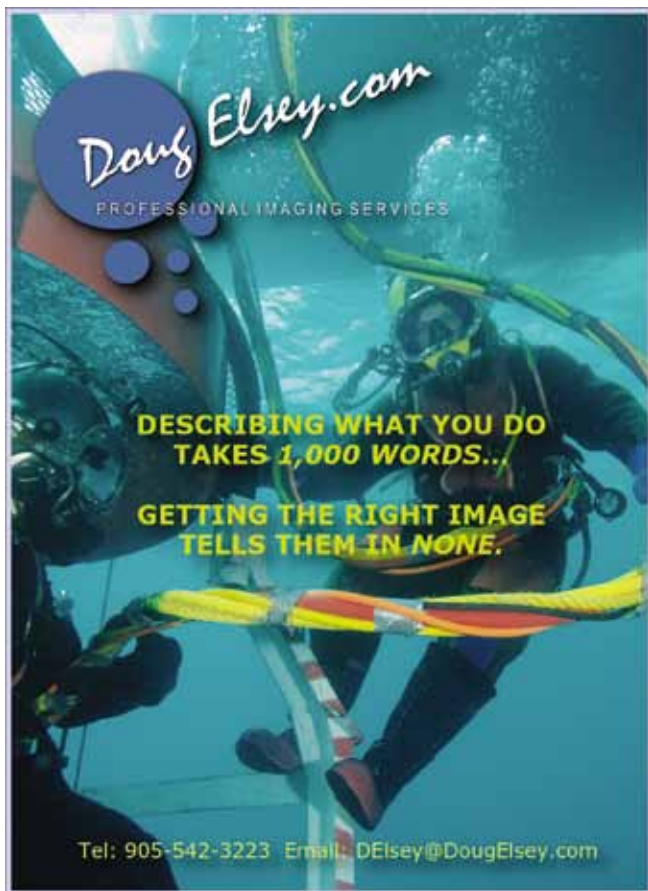
recognition of a common set of competency and safety requirements across the country. The establishment of national standards also supports the recognition of the Canadian standards among international organizations—equipment suppliers, service providers, employers, and other governments. For these reasons, CSA's technical committee encourages the recognition of the current editions of these industry consensus standards in all jurisdictions.

CSA applauds organizations such as the Canadian Association of Diving Contractors, which has called upon its membership to bring their operations into compliance with the CSA Z275.2 and have made available a self-audit tool that will assist them in their efforts to comply (see page 25 to learn more).

CSA has worked, and will continue to work, diligently with industry groups, government, regulators, and divers to advance the development of the CSA Z275 family of standards to ensure the

safety of all diving personnel and others involved in diving activities. 

Ian Rodd has worked in both the inshore and offshore diving industries, employed with the Occupational Health and Safety Division of the Workers Compensation Board of PEI and with Holland College as a learning manager with the Commercial Diving Program since 2015. He is a past director of the Diver Certification Board of Canada and maintains membership with the Board of Canadian Registered Safety Professionals and the Canadian Society of Safety Engineering.



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ASSOCIATE MEMBERS

AXSUB Inc.
Luc Garand
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Canadian Forces Diving Safety / DND
Robert Klein
Ottawa, ON
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Deep Tech Services Ltd.
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Divers Institute of Technology Inc.
John Paul Johnston
Seattle, WA
(206) 783-5542
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Holland College
Steve MacFarlane
Stephan White
Summerside, PEI
(902) 652-2055
smacfarlane@hollandcollege.com

Institute maritime du Quebec
Julie Normand
Rimouski, QC
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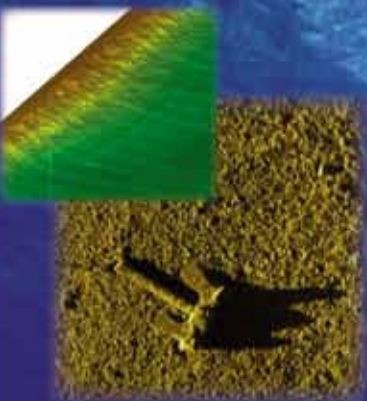
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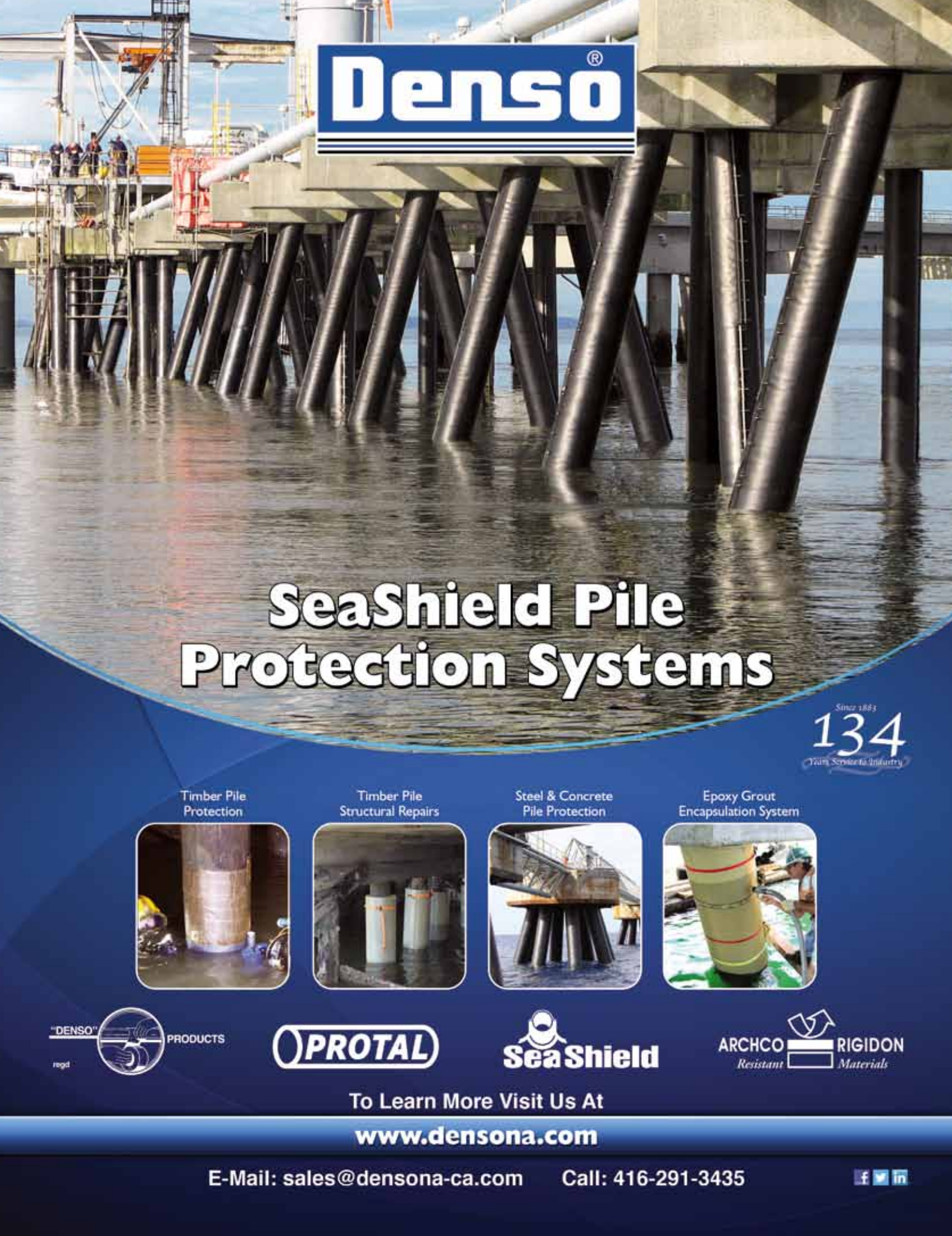
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