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Vancouver Aquarium Revitalization

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Work is currently underway at the Vancouver Aquarium for a significant expansion and revitalization of its facilities. Started in the fall of 2011, the upgrade is expected to take up to four years to complete. Part of that upgrade includes improved mechanical water treatment systems by Alpha Mechanical Contracting Ltd.

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Kal-West Building Systems relies on the best possible talent to get ahead. John Davina launched the company 26 years ago in Kelowna and believes pride in a job well done has been key to their success.

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Rendering courtesy of Musson Cattell Mackey Partnership.



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The December 27th BCUC Decision

Over the past few months MCABC has been reporting to the membership about the actions of FortisBC to expand and develop a market on the regulated side of their business. While FortisBC is a valued associate member of MCABC (both as a supplier to industry and a partner in many programs that support the mechanical contracting sector), it's a reality that this company has a unique role in business in the province. This role is primarily due to FortisBC's interest to enter into new business areas that were considered to be outside the scope of traditional gas utilities.

Who is FortisBC? FortisBC is the successor company to both Teresen Gas and BC Gas — the latter, a once publicly-owned utility that was deregulated and privatized in the mid-1990s. The assets of BC Gas were sold to private interests and the company's activities divided into regulated and non-regulated businesses. Some 15 years ago the regulator, the BC Utilities Commission (BCUC), created a set of guidelines to separate the regulated from non-regulated activities. This set of guidelines was intended to prevent the guaranteed return on investment resources of the regulated activities from being used as subsidies to compete in "Retail Markets Downstream of the Meter" (RMDM). Our business — mechanical contracting — competes in the retail market downstream of the meter.

What is happening today? This story goes back in time: In April 2011, Energy Services Association of Canada (ESAC), an industry association that represents commercial energy service companies, requested that the BCUC "exercise its supervisory powers under section 23(1) of the Utilities Com-



mission Act (UCA)" to inquire into the practices of FEI (FortisBC Energy Inc.) in the AES (alternative energy services) market. ESAC's letter outlined four concerns that the BCUC was asked to examine. In May 2012 the BCUC initiated the inquiry, invited and reviewed submissions and then issued its report December 27th, 2012.

What concerned ESAC? It has been summarized by the Heating Refrigeration Air Conditioning Institute (HRAI) that FortisBC had plans to enter into new business areas that were considered to be outside the scope of traditional gas distribution. These new plans warranted BCUC intervention, and thus public examination. Among these new proposed alternative energy businesses are what Fortis referred to as "Thermal Energy Services" — the provision of heating and cooling

for large building projects using a variety of applications including geothermal (GSHP), solar thermal and district energy (heating and cooling) systems.

The BCUC Decision The Commission confirmed the set of guidelines concerning RMDM continue to be relevant and should apply to Fortis in relation to its AES activities.

In particular, the BCUC re-affirmed that: "a) there must be no subsidy of unregulated business activities, directly or indirectly, by utility ratepayers; b) the risks associated with participation in the unregulated market must be borne entirely by the unregulated business activity; and c) the most economically efficient allocation of goods and resources for ratepayers should be sought."

In making this decision, the BCUC made a distinction between "discrete energy projects" (mainly involving one customer) which are best left to the competitive marketplace, versus certain district energy projects (serving multiple customers), where some regulation of a utility-type service provider might be required.

On the matter of how the utility allocated EEC funds, BCUC confirmed that there is a conflict of interest when the utility collects EEC funds from ratepayers (effectively making it the trustee of those funds) and then makes decisions on the allocation of these funds for thermal energy systems projects in which the utility or its affiliates have an interest. The BCUC found that a neutral third party should make those allocation decisions in any circumstance where the potential for this conflict exists.

Lessons Learned Several years ago, when the deregulation of public utilities in B.C. began, various private market services for whom the BC Hydro and BC Gas were customers (like mechanical contractors), discovered that marketplace competition had changed. Suddenly, in the case of BC Gas and its successor FortisBC, the possibility existed that our customer, under some circumstances, could become a subsidized competitor. The effort of MCABC and its private sector allied associations to monitor the activities this composite — regulated/non-regulated corporation has proven necessary given the ever changing landscapes of technological advances, market conditions and political needs.

Our system makes virtues of innovation, opportunism, and competitiveness, but we do so with the understanding that underlying all this are the principles of equal opportunity and fairness. No competitor should be asked to subsidize his or her own destruction. Mechanical contractors are encouraged to read the articles, editorial and transcripts of the BCUC decisions to better understand the need to be vigilant, and to support your association to stand guard on your behalf.

Dana Taylor, CAE
Executive Vice President, MCABC



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Operation Eyesight



water wells either, but the more that I learned about Operation Eyesight and the international work that they do, the more I began to understand the importance of building wells in developing areas, like Zambia in Africa.

Canada has high standards of sanitation — something we often take for granted because we have easy access to clean water, one of the most precious resources in the world. Yet in developing countries, nearly 80 percent of illnesses are linked to contaminated water and poor sanitation. Trachoma is the world's leading cause of preventable blindness. Preventable blindness is a serious global health issue, affecting more than 325 million people worldwide. The vast majority of those affected live in low income countries like Zambia, where poverty prevents access to clean water. Despite its abundant water reserves, Zambia has inadequate safe water points and few facilities to utilize water for irrigation development (<http://www.operationeyesight.com/>).

With your help, MCABC has the possibility of raising \$15,000 towards the construction of a new water well for one of Zambia's developing areas in need. Register for our MCABC "Run for Well-ness" and be part of something BIG. Get it? Run for "WELL"-ness? You can help bring clean, protected water to Zambia to prevent this disease.

Our annual conference and AGM is happening next month, and I'm looking forward to getting reacquainted with friends and association members that I have not seen throughout the year.

As an annual event, our conference is always a hit with our delegates! More importantly, however, is the value in attending an event of this nature. Each year, the conference brings together the many facets of our membership and our industry. Rarely do we take the time out of our busy lives to get to know each other on a personal and social level. What we must remind ourselves is that it is this type of connection that in turn, supports our professional endeavours, and subsequently, our professional success. Join us May 3rd & 4th for a "Desert Diversion" in Osoyoos, B.C. and see for yourself.

Dean Loewen, PGSC
MCABC President

With spring at our doorsteps and summer sneaking up on us fast, MCABC is buzzing with an events schedule that is surely to please. I have already started penciling MCABC's event calendar into my schedule so as not to miss the great networking opportunities and social engagements that we have planned. Be it golf tournaments, chapter meetings, socials, fundraisers, or our annual conference & AGM, there's a lot of fun to be had. MCABC is our community, so take advantage of the perks that being part of this community affords.

As you've probably heard in recent association news, MCABC is lacing up our sneakers, getting back into shape, and assembling a team — on June 23rd, 2013, we'll be ready to take part in the year's Scotiabank Vancouver Half-Marathon & 5K. Our team is dedicated to getting fit and raising money for Operation Eyesight — an international development organization focused on the elimination of blindness caused by unsanitary water reservoirs and poor living conditions in developing countries. The pursuit of this cause was inspired by our very own national MCA chairman, Brad Diggins, who made Operation Eyesight the MCAC's charity of choice for the duration of his term.

You might say to yourself, "what does the construction of a well have to do with eliminating blindness?" When I first heard about MCAC's partnership with Operation Eyesight, I didn't see the connection between eyesight and

AQUARIUM REVITALIZATION

BY SUSANNA CHU



In November 2006, after extensive public consultation, the Parks Board recognized the Vancouver Aquarium's urgent need for mechanical and life support upgrades to cope with saltwater corrosion and seismic challenges. It approved plans to expand the Aquarium's lease and revitalize the surrounding public spaces.

"[Under the previous lease] there was only so much square footage that you could build on.... We needed to upgrade quickly," says Jay Lang, a senior estimator and business development manager at Alpha Mechanical Contracting Ltd. (Alpha).

An MCABC member since 1977, Alpha has worked on several Aquarium projects before and on the expansion initially played a design assist and budgeting role.

In 2010, the federal and provincial governments announced \$25 million in grants. City Hall issued a development permit in November 2011, and in 2012, Teck Resources donated \$12.5 million toward the \$100 million revitalization project.

Work then began in earnest. Up went a new temporary north entrance. Down came the south entryway, gift shop and public space. In its place, "there's a 30-foot-deep hole," says Allyn McFarlin, Alpha's lead project manager for Phase 1B of the expansion.

After demolition and re-routing of utilities, a new emergency generator was installed in 1A. Phase 1B involves extensive mechanical upgrades to the existing building and construction of a three-storey, 96,000-square-foot addition with new exhibit space and offices. Located just east

of the south entry, the addition will also house a large underground mechanical room, four new temporary, self contained exhibit tanks, and four ozone towers — "concrete vertical shafts" — to be equipped in Phase 1C.

Alpha was awarded the mechanical contract for the expansion in fall 2012.

A DISTRICT ENERGY SYSTEM

"Right now, we're at the bottom of the hole, installing piping," says McFarlin. Piping through the existing building, meanwhile, is 90-percent complete.

After the Aquarium emptied existing spaces, Alpha converted them into small mechanical rooms by installing piping, mechanical pumps and heat exchangers.



“We’ve spent the last four to five months going through the existing building, running a DES [district energy system] loop,” adds McFarlin.

The hydraulic loop “connects the heating and cooling [plant], heat exchangers and cooling towers,” explains Ricardo Rangel, a senior estimator at Alpha. The mechanical crew had to consider routing, operational requirements and future connections as they installed the DES.

Designed by Integral Group (formerly Cobalt Engineering), the single-pipe ambient DES loop provides low-grade energy to the refrigerant-based heating and cooling plant. About 1,100 feet of 12-inch-diameter, schedule-40 PVC piping runs throughout the entire existing facility. Ultimately, the DES will allow energy sharing among buildings.

“[The PVC is] unusual,” notes McFarlin. “You typically see a schedule-40 steel pipe, but the Aquarium and Integral had the foresight to use PVC. It’s more cost effective.”

And PVC won’t corrode — an important feature, given saltwater runs through the heat exchangers, which in turn use coated HDPE piping. “There’s salt everywhere,” says Rangel. “The [old] pipes are starting to wear away.”

Multi-stack water-source heat pumps convert the DES’ heating water to help heat the building and exhibits in the winter.

“The pumps are brand new Grundfos Space Misers — a [true] vertical pump that installs into tight spaces,” says McFarlin.

CO-OPERATION AND CO-ORDINATION

“Working around the existing facility is extremely challenging,” says Lang. “It’s very congested like working in a hospital setting.”

With the Aquarium open to the public 24/7 and sensitive marine life at times mere yards away, scheduling, noise and contamination raised significant concerns.

To minimize disruptions, the Alpha team met weekly, or even daily, with Aquarium staff members.

Four new exhibits — Cold Saltwater, Coral Reef, Tropical Fish and Seafood Pacific — will be located on the new addition's second floor.

“[We walked] through spaces, asking what will fit or won’t fit, how to meet future needs,” says McFarlin. Alpha also consulted with Integral, while Musson Cattell Mackey, the architects, oversaw co-ordination efforts.

Throughout the process, McFarlin has been impressed by Dennis Thoney, the Vancouver

Aquarium’s director of animal operations. “He knows fish, processes, aquariums, like the back of his hand.... the different systems, temperatures, flow rates [required]. It’s really amazing.”

To remain as inconspicuous as possible, Alpha scheduled the most disruptive work for times when members of the Aquarium staff and public were off site. The Aquarium also provided extensive data on the effect of vibration and noise on the animals. Occasionally, work simply had to stop.

LIFE SUPPORT SYSTEMS

While a complete redesign of the life support systems (LSS) will be left for Phase 1C, Phase 1B incorporates complex new technologies in aquatic life support. MWH Global, a wet infrastructure engineering firm based in San Diego, brought highly specialized expertise in aquatic life support systems to the design process.

“Water treatment is very technical,” says Rangel.

Four new exhibits—Cold Saltwater, Coral Reef, Tropical Fish and Seafood Pacific—will be located on the new addition’s second floor. These require different temperature ranges and tank sizes.

“[Water in] the life support systems must be treated properly,” says Lang. “It’s like medical gas.”

Simply put, the main building’s LSS harvests and filters sea water from Burrard Inlet and four new temporary exhibits. An ozone generator treats this water before it goes into a fractionator. The protein fractionator removes



chemicals from the water. The ozone is then degassed in a vertical, circular FRP (Fiber-glass Reinforced Plastic) tower and bio-media (high-density PE or PPE flex rings) provide supplemental treatment. This same process is repeated in Phase 1C for the new outdoor pools using concrete ozone towers.

“I’ve done in my career a lot of large industrial projects,” says McFarlin, “but here we’re dealing with life safety.... These are new technologies, exciting technologies. More than you would see in a normal building.”

On track for LEED Gold certification, Phase 1B also includes a rainwater harvesting system for non-potable use. Other features include Aquarise CPVC pipes for domestic water, high-efficiency systems to replace a solar system for water, and radiant floor heating and cooling.

LOOKING AHEAD

While the precise scope of Phase 1C has yet to be confirmed, it includes a new LSS which will dramatically reduce sea water requirements. The excess seawater, harvested from Burrard Inlet, will then provide free cooling for the DES.

Logistics dictate that larger piping and equipment from 1C be installed before spaces are closed up, and other specialty items must be ordered now. Then there are plans for Phase 2. The Vancouver Aquarium expansion and renovation will definitely be a high-profile project for years to come.

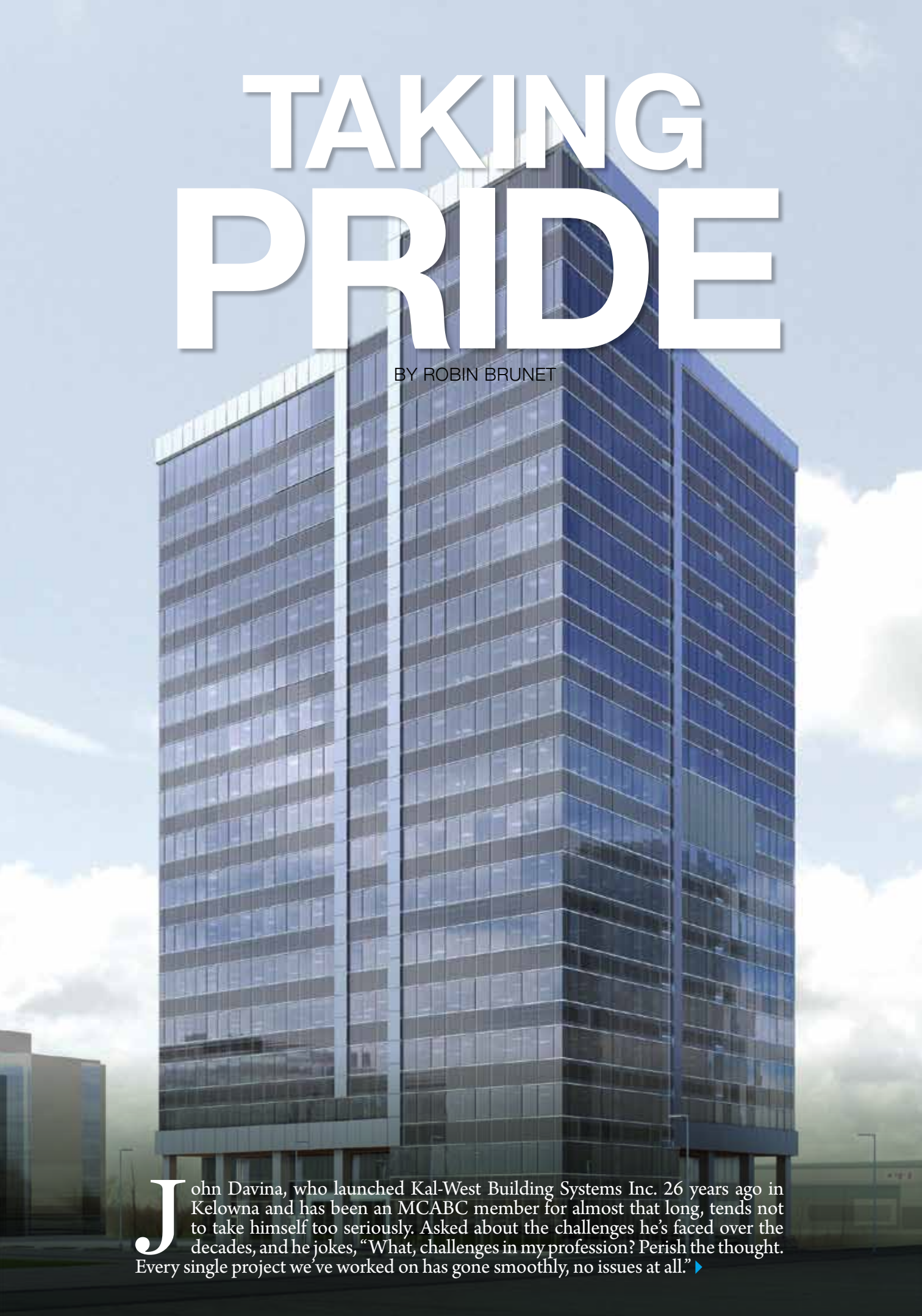
Having been involved in the earliest budgeting and planning stages, Lang is “very excited to be back on site... We’ve now come full circle.” **PM**

AQUATIC CONSERVATION

The Vancouver Aquarium is a non-profit society dedicated to the conservation of aquatic life. With more than 50,000 unique aquatic creatures, the Vancouver Aquarium connects people of all ages to the natural world inspiring them to learn, to care and to make a difference. Each year, the Aquarium welcomes more than one million visitors to its amazing facility—every visitor directly contributes to its mission as a conservation organization. From its award-winning sustainable seafood program, Ocean Wise, to its Marine Mammal Rescue Centre—the only rescue hospital of its kind in Canada—Vancouver Aquarium’s conservation, research and education programs help raise awareness and encourage everyone to reduce the impact we have on our natural world.

TAKING PRIDE

BY ROBIN BRUNET



John Davina, who launched Kal-West Building Systems Inc. 26 years ago in Kelowna and has been an MCABC member for almost that long, tends not to take himself too seriously. Asked about the challenges he's faced over the decades, and he jokes, "What, challenges in my profession? Perish the thought. Every single project we've worked on has gone smoothly, no issues at all." ▶



...the great thing about the association is that as a member, you have a powerful voice other people recognize and respect...

But when it comes to the work standards he holds his colleagues to, Davina turns serious. “Over the years I’ve told my people, ‘I want your work to be such that if your loved ones and their friends suddenly paid you a visit on the job, you’d do them proud,’” he says. “They’ve taken that to heart; they unfailingly do good work and stand behind it, and that’s what distinguishes us from the competition.”

Perhaps not surprisingly given his long involvement with the association, Davina credits the MCABC for supporting his company over the decades. “I’ve been a member for a quarter century, on the board for 20 years, served as president — done just about everything you can do as a member. And the great thing about the association is that as a member, you have a powerful voice other people recognize and respect,” he says. “For example, when you have an issue with city hall or other branches of government, you’re not standing there as an individual, you’re part of a large

group. Instead of being ignored, you get your foot in the door and people listen to what you say.”

With a team of 17 in the field and three office staff, Kal-West presides over the same type of projects today as it did when Davina first opened for business: that is, it handles pretty much whatever regional developers require. Work have included schools, hospitals and a sewage treatment plant.

“We began by working on retirement homes and we continue to do so, along with offices and tons of hotels,” he says. “When I first moved with my wife and kids to Kelowna in 1980 this was just a small town with 60,000 people. Today it’s grown to 150,000 residents, and you could argue that we’ve helped along that growth. If Kelowna gets any bigger I might have to consider moving!”

For all of his acumen, Davina didn’t plan a career as a mechanical contractor; instead, he spent the 1970s in Metro Vancouver as a plumbing and gas inspector. “It was a good job, and at one point I even taught at BCIT,” he recalls. “When I moved

to Kelowna it was to work as an inspector for the city. But two years later the economy went south, and because I was the latest public employee to be hired I was the first to be let go.”

Davina describes getting his walking papers “As the best thing that ever happened to me — but I’m saying that in retrospect. At the time it was devastating. Soon after I was offered a teaching job in Vancouver, and I spent an entire winter driving back and forth between there and Kelowna — this was long before the Coquihalla Highway was built. And that was intolerable: I decided to become a mechanical contractor because as a gas and plumbing inspector I’d gotten to know a lot of contractors in Kelowna and figured I could do the job.”

Davina’s first project, in 1983, was providing the mechanical components for the Cottonwoods Extended Care Centre, a job that occupied him for one and a half years. “Yes, it was a challenge and fairly complex, but I was young and had a can-



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do spirit," he recalls. "I also had two really good foremen, so right from the start I realized that if you surround yourself with great people you have a chance to survive in this business."

When asked if he isn't lapsing into his habit for self-deprecation, Davina replies, "I'm quite serious. I deliberately developed Kal-West so I would be surrounded by the best possible talent. If you retain people who are proud of their work as I have, it not only gives the company good word of mouth but enables the owner to step back a bit — which I fully intend to do in the near future."

Davina is just as enthusiastic about the merits of the MCABC as he is his work team. "The biggest strength of the association is that it's trade-specific and deals with issues in our sector of division 15 [complete mechanical]," he says. "Therefore its power as a lobby group as well as an education and information provider is more potent compared to other construction-related associations."

Davina adds, "On a practical level, the MCABC gives us connections to all of our suppliers, which is a huge group that specializes in many different products. Quite a few of these people are members themselves, incidentally. Plus, we as members get the chance to attend conferences and meet people in related professions: engineers, architects, designers — you name it."

Having just completed work on the new 18-storey Landmark 6 office tower (Kelowna's tallest office building) and currently busy providing mechanical services for the new Four Points by Sheraton Kelowna Airport hotel, Davina is compelled to draw his interview to a close. "I'm turning 63, and I've reached a point where I'll be comfortable letting my team assume more responsibility and make more decisions. I'd love to come in just two or three days a week, and hopefully that will be the case in a year or so. I'll have fun skiing, or swimming or traveling, because I'll know the company is in good hands." **PM**

How Can We Improve Training

BY LESLEE MONTGOMERY



An important cornerstone of any safety management program is training. Ensuring employees are trained and competent to perform their work is a responsibility of the employer, one that is starting to be taken more seriously.

During the Middle Ages apprentices entered into a contract with the local tradesmen who would provide food and shelter while they learned the trade. While today's tradesmen face the same challenges as those in the Middle Ages, the advances in technology and the carnage it has left behind, has paved the road for our current system. In order to present a case for due diligence evidence must be presented to show all reasonable efforts were taken to prevent an accident, so where does one begin when discussing training. Turning to the Internet can be overwhelming. Some of the more common certificates contractors are looking for are fall protection, confined space, and aerial work platform training. These are now

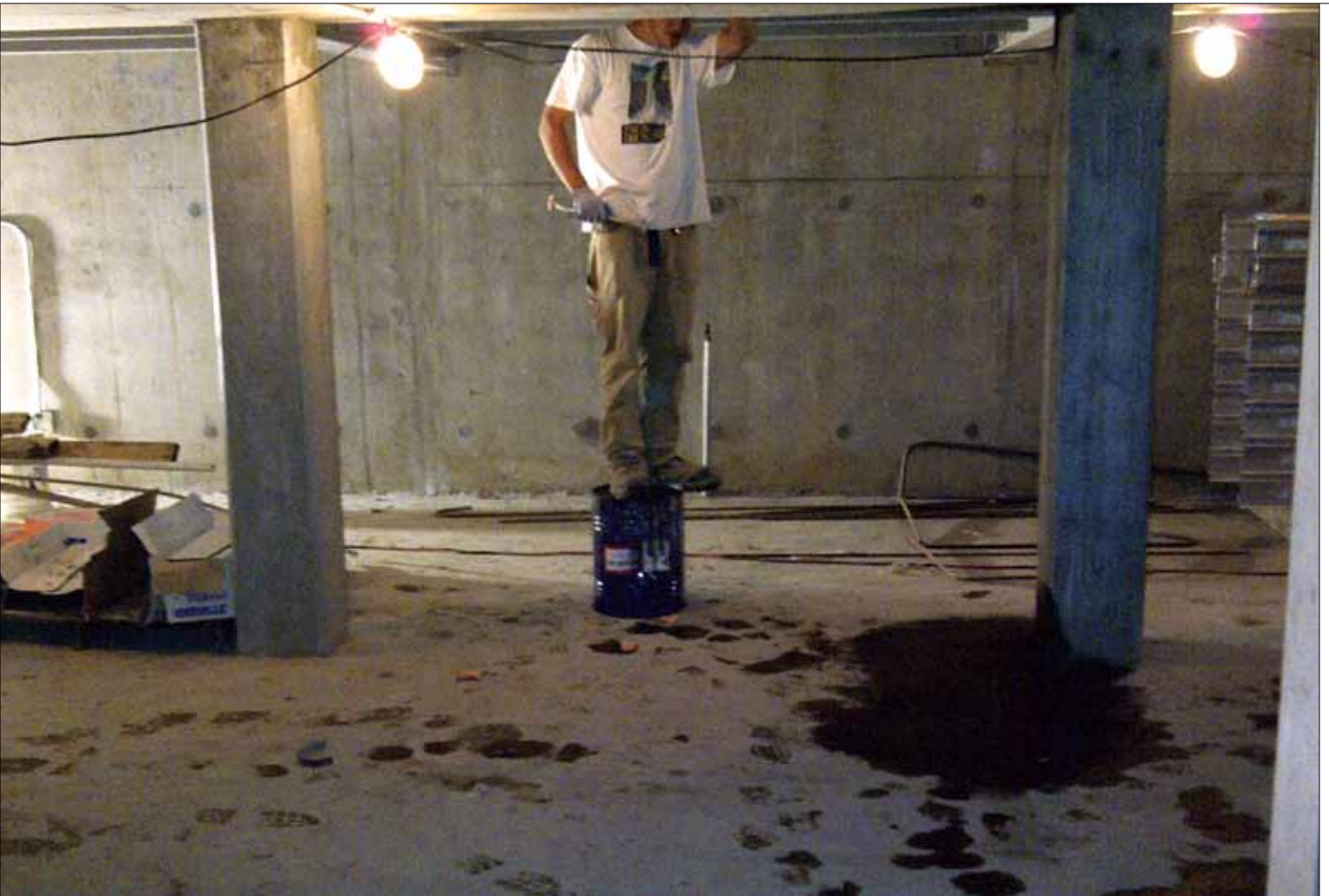
being offered online, with discounts for higher attendance, at a fraction of time that would be spent in a classroom. These classes offer the student an awareness of the provincial legislation, but no practicable hands on experience leaving

**Statistics show that
between 2002 and 2011
ergonomic type injuries
and falls were at the
forefront for the
mechanical industry.**

a gap in the system. Employers who accept the certification without evaluating the employee could be doing more to complete the due diligence circle.

The employees are in the midst of the training revolution, caught in a system difficult to respect. Employees have a difficult time understanding how sitting through an eight hour course with practical hands on experience, could possibly be the same as completing a four hour online course. With no established standards for course content, the regulation becomes the only guideline, and while legislation is the backbone there needs to be consistency.

Statistics show that between 2002 and 2011 ergonomic type injuries and falls were at the forefront for the mechanical industry. With fall protection being almost mandatory training now; it is curious why falls are still a major contributor to the industry. Twenty-six per cent of all falls were falls from ladders. "Common sense" suggests at this stage of evolution we should know how to properly use a ladder, but if this were true companies in Vancouver wouldn't have to offer ladder safety training. The reaction to a training class solely devoted to proper lad-



der usage is one of complete and utter shock. “Enough is enough” people are saying “when is any work supposed to get done?” A valid question; some companies implement best practices and establish their own training programs to meet the requirements of the regulation. Workers who rotate through a few companies a year may find the implementation of best practices frustrating. Some companies view this kind of internal training as company specific, and won’t accept the certification as valid forcing the employee to sit through the course again.

So what can we ascertain from all this? Training is here to stay, but there is always room for improvement. There is a tremendous opportunity here to truly put together a successful system that will benefit all. Development of standards for all training would establish best practices for the training industry. Requirements for retraining would be the same across the board. Companies with a large head count wishing to implement a training program would be required to submit their programs for review. Upon program approval they would be issued accreditation, enabling companies that can afford an internal training program one that would be accepted across the board.

An industry audit should be conducted to see how effective overall the training component of our safety management system is. As a professional instructor and facilitator I understand the importance of interaction between the worker and

the workplace. By tailoring the system to the end users, you increase their involvement and awareness. Perhaps the development of a fall protection class that devotes a certain amount of time to safe ladder usage would be viewed as beneficial rather than condescending.

CSA standards recognized the need for a standardization regarding confined spaces, currently pending approval CSA Z1006 Management of Work in Confined Spaces aims to better protect workers from injury or even death. Already the need for standardization has been recognized by other industries and associations. It will only be a matter of time before it reaches the construction industry.

Change takes time though and is not always met with open arms. Persistence and account-

ability is key. With education comes knowledge and with knowledge comes power. Workers who are competently trained tend to work safer, because they know what they are doing. Safer workers means less accidents and ultimately that is the goal for everyone on the jobsite. Less people going home through the clinic or hospital means we are doing something right. All that is needed now is some tweaking to the system. [PM](#)

Leslee Montgomery is an EHS advisor with Lockerbie & Hole whose responsibilities include training. She has been in construction for the past six years, overseeing safety for commercial and industrial as well as a couple Olympic venues.



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Make Training a Priority

BY TANIA JOHNSTON



Training should always be viewed as an investment in your employees and ultimately your company. Many contractors are making training a priority and have incorporated it into their performance evaluations and as part of their annual budget. An employee who wants to receive training should be commended. They want to learn, to make themselves a better employee and thus a greater asset to your company.

With the pending skills shortage in the construction industry, the role of employer training becomes increasingly important.

An obstacle to training that we too often hear about is cost. It is not always the cost of the course that prevents owners from sending employees on training but the cost of their time away from the job as well as whether or not they will have to pay the employee their wages while on the training. The owner needs to look at it as a win-win situation. They now have a more valuable employee and the employee sees that the owner values them and regards them as an asset to the company. Training should never be seen as an expense but as a value added opportunity that can only help your company grow and employees flourish.

As many of you may recall in 1998, a study was conducted through the National Pipe Trades Hu-

man Resources Committee where it was determined that there would be a shortage of middle management employees in the not too distant future and that there were many educational voids that must be filled. This concern led to the immediate creation of the CMCEF (Canadian Mechanical Contracting Education Foundation). Members of MCA Canada are extremely fortunate to have an association strictly devoted to delivering industry specific education. We are the only national trade association in Canada to have such a luxury.

MCA Canada member, Mr. Keith Ottaway from Allpriser Inc., once said that he believes that "MCA Canada's greatest strength is their Education Foundation, that it is something very special and that the better educated his customers are the more successful they will be."

Since the foundation's inception in 1998 it has experienced constant growth offering countless construction management courses, conferences, spearheading the development of the Student Chapter program, and the formation of a scholarship program. The foundation offers an array of courses and conferences that will help members learn the best practices in construction management and improve their businesses and ultimately their bottom line.

Until recently seminars have been through the traditional in-class seminar forum. In 2011 webinars were introduced as a way to reach out to members from coast to coast and they are also a very affordable form of training. This method has proved to be quite successful and will continue to be a form of training offered for years to come.

The foundation prides itself in offering courses that are current and deal with industry trends such as building information modeling (BIM). A shortage in supervisors led to the addition of a supervisory program.

Seminars are offered on productivity, change orders, commissioning, supervision, estimating, project management, business management, and service to name just a few.

Having well trained employees is critical in the highly competitive construction industry. It's important to take advantage of the industry resources available to help increase your company's most important asset — the people. **PM**

Tania Johnston has been CMCEF executive director since 2000. For further information on CMCEF contact Tania by email at Tania@cmcef.org or by phone at 613.232.5169.

The Importance of COR

BY MIKE MCKENNA



Did you know that some jobs in B.C. already have COR certification as a requirement to bid? Did you also know that many prime contractors have already made COR mandatory for their sub-trades?

COR puts a comprehensive company health and safety program in place along with a corresponding manual. Annual audits provide insight into what is working on the ground. It isn't enough to have a health and safety system on paper, it needs to be implemented and followed.

Companies often find the observations they record and interviews they conduct very useful in determining what is working and what needs improvement. With COR a company's health and safety program complies with national standards giving them the opportunity to bid on and take work in other provinces.

With COR certification employers' corporate image can be enhanced and a strong culture of safety created, ultimately attracting safety conscious workers. As the saying goes: 'Safety pays,' and with COR this is actually true.

COR is a one of a kind incentive program that encourages companies to implement health and safety management systems that exceed regulatory requirements and maintain them through annual auditing standards. It recognizes and rewards employers with a 10 per cent incentive payment for OH&S COR that reduces a company's WorkSafeBC base assessments. This can equate to more than \$4,800 dollars for a COR certified company with an assessed annual payroll of \$750,000. The money is incentive but protecting the well-being of workers is the right thing to do and will also help to foster and maintain a culture

of safety and cooperation on the job site — a win-win for everyone.

The BCCSA's Certificate of Recognition (COR) program is founded on evidence and statistics over the past 50-60 years that shows creating and adhering to health and safety management systems improves workplace safety. Annual audits help companies to identify areas for improvement within their company operations and COR certification makes companies eligible to receive an annual incentive payment from WorkSafeBC.

Contractors make a strong statement about worker safety when they take steps to develop and implement health and safety systems that meet a recognized industry standard. COR certification shows an employers' commitment to workplace safety and to reducing the human and financial costs of workplace injuries.

What is the cost of becoming COR certified? While the BCCSA training and services are free, the cost of becoming COR certified is in the time a company must spend to establish a health and safety system (both on paper, and in the field) if it does not pre-exist, put an employee through two days of BCCSA Auditor training, and conduct an audit of a certain number of sites annually as part of their COR process. For large COR companies there is the cost for an external auditor to conduct an audit during non-maintenance years.

Although COR is an important way for a company to show commitment to safety and improve their safety systems, there is other safety training that can benefit companies. There is the two hour owner's webinar that discusses how to meet WorkSafeBC and other regulatory requirements for workplace health

and safety, explores the importance of investing in health and safety wellness, and looks at the elements of an effective health and safety program.

Supervisor training is an important aspect of any organization. It is important to give supervisors' training that provides them with knowledge and skills for health and safety excellence. The two day Foundations for Health and Safety Excellence course is designed for supervisors, safety officers, and managers to enable them to define supervisory and management roles, complete inspections, conduct safety investigations, and learn important information about training/communication and hazard assessments.

Giving toolbox talks and learning how to engage workers isn't a skill everyone has. The Train the Trainer is a one day course designed for anyone that may be required to give a toolbox talk or hold a safety meeting. Participants learn tips on how to engage an adult audience for the purposes of communicating safety information at a site level and practice presentation development and instruction skills using a 'toolbox/tailgate' talk format. Ideas and strategies are presented that provide a basis for making sound decisions in training settings.

Making sure that construction worksites are as safe as possible begins with providing basic safety training to all employees. CSTS-09 is an online worker-specific safety program acknowledged industry wide as an excellent learning tool for individuals who are either new to the construction industry or have not had formal safety training. The certifications do not expire and are valid in B.C., Alberta and the rest of Canada. Although intended for construction workers, the program may also be of interest to new supervisors, joint health and safety committee members, worker health and safety representatives, and business owners or operators interested in improving health and safety in their workplace. CSTS-09 is also a good way for a company to show due diligence in providing basic safety training for workers.

Organizations with an effective safety culture have realized that by making an asset of safety, it brings positive, demonstrable results throughout their business. [PM](#)

Mike McKenna is executive director of the B.C. Construction Safety Alliance. For more information about the BCCSA and our no cost safety training visit www.bccsa.ca or call toll-free 1-877-860-3675.

Copper Mechanical Systems

COPPER TUBE AT CALGARY'S SOUTH HEALTH CAMPUS

The \$1.3 billion first phase of Calgary's new South Health Campus was scheduled for completion in the fall of 2012. As this new teaching hospital is an expansion rather than a replacement facility within the Alberta Health Services, more than 2,400 new staff and 183 physicians will eventually be employed at the site. The new hospital is also a showcase for the use of copper tube in both the medical gas and plumbing systems.

The mechanical construction manager for the massive project, Lockerbie & Hole (an Aecon Company), is responsible for procuring all equipment and material, and for providing labour for the installation of all plumbing, heating and medical gas services. The \$250 million mechanical construction budget will encompass: 40 air handling units weighing 2.8 million pounds to provide 2.2 million cubic feet of conditioned air per minute; 11 gas-fired hot water boilers capable of generating 190 million BTUs per hour to handle the hospital's heating load; 4 low-pressure steam boilers and 3 high-pressure steam boilers for steam humidification and sterilization; five 1,500 ton water-cooled chillers with dedicated cooling towers to satisfy the hospital's cooling load; 18 heat exchangers and 75 pumps to deliver hot water heating and chilled water cooling and 30 tankless type heating units to provide domestic hot water. The equipment is installed on Penthouse Levels 8 and 9.

COPPER AND DRAIN WATER HEAT RECOVERY UNITS

Drain Water Heat Recovery Units (DWHRUs) are becoming increasingly popular in Canada. The all-copper units have no pumps or moving parts, and they can provide significant energy savings for residential, commercial, industrial and institutional retrofits, as well as new construction.

The unit replaces part of the sanitary drainage system and consists of a Type DWV copper tube core, with Type L copper tube tightly wound around it. The coiled tube becomes approximately rectangular during forming, and end fittings are brazed to the tube. Cold water from the underground water service moves into the lower end fitting and up the coiled copper tube surrounding the DWV tube. It is heated by the warm discharge water draining down the DWV tube. The drain water and the incoming cold water are never in contact with each other while the incoming water is heated.

As a result the incoming water is preheated before entering the water heater, resulting in less



energy being needed. Annual energy savings are dependent on a number of factors and information on determining such savings are available at: www.ceatech.ca/calculator. DWHRUs can be used with traditional water heaters, tankless water heaters, and with geothermal and solar water heating systems. What makes a DWHRU work so effectively are some of copper's major properties, particularly its formability and its thermal conductivity. Another energy-saving aspect of the unit is the fact that the copper tube used in its construction is typically made up of more than 70 per cent recycled copper.

For more information, contact the Canadian Copper & Brass Development Association (CCBDA), or visit Watercycles Energy Recovery Inc. at www.watercycles.ca.

DESIGNING COPPER WATER SYSTEMS

The 2012 edition of the British Columbia Plumbing Code has a number of methods for designing hot and cold water supply systems, which are based on the 2010 National Plumbing Code of Canada. Of particular interest is Sentence 2.6.3.5. (1) on velocity: "The maximum permitted water velocities shall be those recommended by the pipe and fitting manufacturer". In response to this requirement, the CCBDA has issued Publication No. 58, Design Velocities for Copper Water Systems. It covers the basic velocity recommendations as well as the influence of installation con-

Soldered domestic water lines and brazed medical gas lines are shown side by side in this very neat ceiling installation.

ditions which should be taken into consideration. This information is increasingly important to consulting engineers and contractors. No. 58 is available on request from the CCBDA office in single or multiple copies. To order copies, please e-mail library@copperalliance.ca.

NEW JOINING TECHNIQUES FOR COPPER TUBE AND FITTINGS

While soldering and brazing have been the predominant methods of joining copper tube and fittings since the 1930s, a number of new joining methods are now available. They include press-connect and push-connect joining, compression fittings, mechanically formed tees, and Roll-groove fittings. (The above information is a reprint of an article that originally appeared in *Construction Canada* magazine titled Copper Connections — Advances in Joining Copper Tube is available from CCBDA.) **PM**

For more information on these and other copper mechanical system applications, contact CCBDA toll-free at 1-877-640-0946, or by e-mail at library@copperalliance.ca. You can also visit the CCBDA website at www.copperalliance.ca.

Low Flow Toilets and Drain Piping

BY GORDON LEFORT



Today across North America, there is a popular trend towards the use of ‘low flow’ (also known as ‘high efficiency’) toilets. With the obvious benefit of using less water for operation, the low flow models are preferred by many environmentally conscious consumers and often mandated by many state, provincial and national plumbing codes.

Through the early 1990s until today, the volume of water used per flush in toilets has evolved from 3.4 US gal. (13 L) to 1.6 US gal. (6.1 L) to today’s increasingly common new standard of 1.3 US gal. (4.9 L). Toilet manufacturers have met the challenge of improved designs to get adequate flushing using less water and the resultant reductions in consumption of the precious resource of fresh water have been noticeable.

However, designers and contractors involved in commercial construction are now realizing that low flow toilets may have a negative downstream effect on the plumbing system, specifically on drain piping. Here’s why.

There are essentially three commonly used piping materials for sanitary drains in commercial construction — cast iron, copper and PVC. The selection of piping is due to a myriad of factors but driven mostly by material and installed cost as well as code acceptance. Regardless, these three piping materials have differing surface smoothness properties and varying internal dimensions and as a result, markedly different flow capacities. Although the flow capacity of all three piping ma-

terials has historically been shown to be adequate with 13L toilets, this may no longer be the case with the low flow models.

Piping materials for gravity flow as in a drain system are characterized by a surface roughness coefficient known as the Manning Flow Coefficient (N). The lower the N factor, the smoother will be the pipe surface. The pipe size 3” is uniformly used across North America for drains from toilets. Critical data for each of the three piping materials are: cast iron (ID = 2.96”, N = .012); copper dwv (ID = 3.03”, N = .011) and PVC Sch. 40 (ID = 3.04”, N = .009).

Using the Manning Formula for a commonly used slope for drain piping (1/4” per foot), the flow capacities for 3” pipe (flowing full) in each material are as follows: cast iron — 6.0 US gpm ; copper — 6.9 US gpm; and PVC — 8.6 US gpm (metric equivalents are 0.39 L/s; 0.45 L/s and 0.54 L/s, respectively). Thus, regardless of flow source, it is a fact that 3” diameter copper and PVC will have significantly more flow capacity (15 per cent for copper, more than 40 per cent for PVC) than the same nominal size of cast iron pipe. Due to cast iron being susceptible to internal corrosion from the acids commonly found in sanitary sewage, its flow capacity will actually worsen over time whereas both copper and PVC will maintain flow capacity due to high levels of resistance to internal corrosion.

With respect to toilets, it stands to reason that less flow through the drain lines will greatly

increase the chance of accumulation of solids in the sanitary flow or worse still, blockage. Contractors today have many times resolved to correct this operational problem by lessening the slope of the drain pipe to be near flat in order to keep solids suspended longer and increase the chances of proper drain flow occurring. This should be of concern to building owners as it not only would be a code violation in most areas, it may introduce other odour or sanitary issues by sewage remaining for prolonged periods of time in drain lines. Only multiple future flushes of the low flow toilet might contribute to the ultimate transport of the sewage into a vertical stack and subsequent delivery into the underground sewer.

Thus, what can be done today to avoid flow problems or blockage? For existing buildings with cast iron laterals where upgrading may be done to low flow toilets, consideration should be given to replacing the cast iron with either copper or PVC for much improved flow capacity. For the same reasons, on new buildings, designers should be aware of this issue when specifying the newer high efficiency toilets and give more attention to the flow capacity of drain piping as a major factor in the selection of piping materials. [PM](#)

Gordon Lefort, P.Eng, is presently employed with IPEX Inc. as Ontario sales manager — mechanical products. Previously he was IPEX Western regional engineer based in Langley, B.C.

TOOLBOX



CURA 960

Aquabross 960 Cura Novelty five spray function showerhead has a sleek stainless steel design, pre-assembled and ready to install. Aquabross.com



ZUVO WATER

The Triflow Bamboo faucet is equipped with new technology that lets users know when the filter needs to be changed through LED lights. Zuwoater.com



DEWSTOP

DewStop is a new, innovative fan switch that monitors humidity and dew point levels in a room and automatically switches the exhaust fan on or off to adjust for condensation. dewstop.com



OXYGEN

Ideal for poorly ventilated rooms in mild climates, Oxygen an intelligent new system delivers fresh, filtered air from the outside to help reduce carbon dioxide (CO2) levels indoors. jaga-canada.com



NAVIEN NPE SERIES

This gas condensing tankless water heater substantially reduces the time and labour for a typical tankless retrofit. The new Navien NPE Series premium gas condensing tankless water heater features advanced technology that revolutionizes installation and helps increase profitability for contractors. navienamerica.com

Closing the Skills Gap

BY MICHAEL GEOGHEGAN

On March 21st Federal Finance Minister Jim Flaherty delivered a budget that while focused on deficit reduction, also emphasized infrastructure funding and reallocating funding to boost skills training.

The training initiative proposes a new Canada Job Grant that will provide up to \$5,000 per person for job training — an amount that must be matched by provinces or territories and employers for a total of \$15,000. The goal is to match unemployed Canadians with more than 220,000 current job vacancies across Canada and provide more job opportunities for disabled people, youth and aboriginals.

The focus on skills training comes from the Conservative government's consultations with employers and unions, who identified gaps in training as one of the biggest obstacles to economic growth. However, this new job grant plan requires that the provinces and territories agree to it; there is also no new money involved.

On February 28, I had a breakfast meeting in Victoria with Ted Menzies who is the Minister of State for Finance and one of the issues he brought up was the disconnect between post secondary institutions and the needs of the job market. One example he provided was where a company had expressed doubts about building an oil refinery in Alberta in part because of a lack of skilled trades people.

As I have been saying for some time now, my suggestion to him was that if money is allocated to individuals rather than given lump sum to colleges and universities it would force those institutions to be less ivory tower and much more attuned to the needs of the business community and the labour market. The federal government appears to have listened. It will be interesting to see how the provinces respond.

The Industry Training and Apprenticeship Commission (ITAC) was created in November 1997 as a provincial government-sponsored, industry-driven, arms length strategic policy board. After receiving some bad advice the Campbell government dismantled ITAC just as the skilled labour shortage was really beginning to hit the construction industry.

As it has done more recently with the Tourism BC, the BC Liberal government did an about face and recreated a similar organization with a slightly different name, the Industry Training Authority or ITA. The ITA works with employers, employees, industry, labour, training providers and government to issue cre-

dentials, manage apprenticeships, set program standards, and increase opportunities in the trades in B.C.

The ITA has struggled to close the gap between the need for skilled trades and the supply. Some have blamed the lingering effects of dismantling ITAC, others that contractor associations like MCABC and trade unions don't have the same day to day input into ITA as they did ITAC while others blame demographics as the front wave of the baby boom are now becoming senior citizens.

All of these have been factors, but there has also been a disconnect with our public education system which has put far more value on encouraging English lit majors than encouraging future contractors, project managers, electricians, welders and the like. School boards that must balance their budgets every year have found it expedient not just to cut funding for music classes but also for those kids who want to take woodworking, metal work and mechanics courses.

Also given the socialist dogma that passes for intelligent discourse within the upper echelons of the BCTF, is there little wonder that our kids learn almost nothing at school when it comes to starting a business or even the importance of compounding interest rates. If our children were taught more in the way of business fundamentals and skilled trades in high school then we would likely have far fewer unemployed youth and I suspect fewer consumers being fleeced by payday lending companies.

Given the latest polls putting the B.C. NDP at 51 per cent and the governing B.C. Liberals at 32 per cent it seems extremely likely that the B.C. NDP will be elected as the next provincial government in May of this year. That will make their leader Adrian Dix the next Premier of B.C.

Having met in February with both Adrian Dix and his finance critic Bruce Ralston I can tell you that education and skills training is a top priority for a Dix government. The challenge will be to ensure that dollars just don't go to academia but to effective skills training that meets employers' needs.

The B.C. NDP plans to instigate a \$100 million grant program to help students obtain post-secondary education. They also plan to pay for this by reinstating a capital tax on banks. But unless the dollars are allocated in a way that allows students to direct those dollars to those



The view and opinions expressed herein are those of the author. They are not endorsed by MCABC and do not necessarily reflect the views of MCABC, its board or executives.

The challenge will be to ensure that dollars just don't go to academia but to effective skills training that meets employers' needs.

institutions and entities that are doing the most effective skills trade training then those millions of dollars can easily be wasted.

That is why I sincerely hope that British Columbia, even under a B.C. NDP government, will be willing to listen to the federal government and be part of a more market driven and market responsive skills training system. Both employer and employee alike will greatly benefit from such an approach. [PM](#)

Michael Geoghegan is a government relations consultant based in Victoria, B.C.



Plumbing Code Changes

Earlier this winter, MCABC held a Vancouver Chapter seminar to offer a comprehensive overview of the 2012 Plumbing Code changes that have recently been introduced to the industry. Anyone and everyone who uses, references, or includes the B.C. plumbing code in their work day was invited to attend. Due to the high demand of this timely issue, this event was well attended — the seminar saw a record turnout of 90 attendees.

Local plumbing inspector, James Nylus captured the attention of the room, while offering a thorough, yet simple introduction to the new code and subsequent changes that accompany it.

Based on the success of the seminar, many attendees are requesting that MCABC bring more information about these code changes

into their respective offices and into the MCABC classroom. As a result, MCABC is now looking into organizing mini workshops for MCABC member companies who might be interested in hosting these sessions in-house for their staff. MCABC will also offer use of the MCABC classroom if members prefer. The goal of these workshops will be to facilitate group discussions within companies to enhance employee knowledge of the changes, and updates that have been introduced.

Water pipe size workshops are anticipated for early spring, and will start once classes have been established. Contact MCABC for more information or to book a seminar for your staff

Jane Andrew 604.205.5058 (x223) jandrew@mcabc.org

UPCOMING EVENTS

May 3 & 4

MCABC Conference & AGM:
A Desert Diversion
Osoyoos, BC

May 4

MCABC Conference Golf Tournament
Osoyoos, BC

May 10

MCABC North Island Golf Tournament
Nanose Bay, BC

May 24

Fraser Valley Golf Tournament
Abbotsford, BC

June 14

Vancouver Golf Tournament
Surrey, BC

June 19

MCABC & BCEA Joint Golf Tournament
Kelowna, BC

September 6

Victoria Golf Tournament
Victoria, BC

September 24

MCABC & CIPH-BC Joint Golf Tournament
Langley, BC

September

MCABC & ECABC Joint Prince George
Golf Tournament
Prince George, BC

ASSOCIATES CORNER

ECCO Supply has announced the relocation of their Burnaby branch to a newer, 30 per cent larger building down the block from their previous location. As of March 15, 2013, the new address of ECCO Supply's Burnaby Branch will be: 7959 Enterprise Street Burnaby, BC V5A 2Z6

Darren Robblee from Milwaukee Electric Tool has been promoted within the organization and has moved to Saskatchewan. His replacement is Patrick Shum who will be taking over the B.C. Territory. Patrick has been with Milwaukee Electric Tool for three years and is excited to meet the members of the MCABC. Patrick is a product expert and has a passion for sharing what Milwaukee Electric Tool has to offer. You can contact him at 604.209.2940 or by email at patrick.shum@ttigroupna.com.



Welcome to the newest MCABC members

- New Central Mechanical Insulation Ltd.
- Western Oil Services Ltd
- Island Temperature Controls Ltd
- MDE Electrical Mechanical Contractors
- Aquarius Mechanical Services Ltd.
- Concept Plumbing and Gas Ltd.
- Dual Mechanical Ltd.





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ANNUAL PENALTY REPORT

The construction sector accounted for the largest share of penalties — almost 85 per cent — handed out by WorkSafeBC in 2012 according to its annual penalty report. Most of these penalties were related to inadequate use of fall protection (59 per cent) and exposing workers to asbestos (14 per cent).

In 2012, WorkSafeBC imposed 260 penalties, totaling \$2.9 million against employers for violations of the Occupational Health and Safety Regulation and the Workers Compensation Act.

In recent years WorkSafeBC has increased its enforcement capacity, directing a more intensive focus to the industries that present the highest risk to workers and to employers where compliance is known to be an issue — such as steep slope roofing and asbestos abatement.

ICE RINK RENOVATION

Canlan Ice Sports Burnaby 8 Rinks will be undergoing a significant renovation of two of their rinks from May to September. Rinks 5 and 6 were a part of the original 4 Rinks built in 1972, and though the rest of the building received a major upgrade in 1995, these rinks were only partially upgraded.

Renovations planned on Rinks 5 and 6 include: structural repair of columns and subfloor; full repairs and replacement of ice rink floors; full repairs and replacement of these rinks refrigeration system; refurbishment of rink boards and glass; improvements to dressing rooms.

The work will be occurring May 1 through September Labour day in 2013. Six out of the eight playing surfaces will remain in service during the renovation.

NEW CCA CHAIR

Frank Rizzardo, president and general manager of Emcon Services in Merritt, has been appointed as the 2013 chair of the Canadian Construction Association. He first became involved with CCA in 1998 as a provincial vice-chair. He joined the CCA board in 2001 and has since served as first and second national vice-chair, honorary secretary, treasurer. He takes over the position from John Schubert, president of McCaine Electric and vice-president of business development for the Canem Group.

PORT CONSTRUCTION

Construction of the Port of Prince Rupert's \$90-million Road, Rail and Utility Corridor project is underway. It will support billions in new terminal developments and boost Canada's trade capacity and exports to fast-growing Asia-Pacific markets.

The Road, Rail and Utility Corridor will be a catalyst for significant terminal developments being advanced through private sector investment on the Ridley Island Industrial Site at the port. The project includes construction of five parallel rail tracks, a two-lane roadway, and a port-owned power distribution system along an eight-kilometre corridor. This will provide shared-use infrastructure for proposed potash, liquefied natural gas (LNG) and other terminals on the island. The capital costs of the terminal developments are currently estimated in the billions of dollars. The first phase of the project will be completed in December 2014.

PIPELINE EXPANSION

Kinder Morgan Energy Partners, L.P.'s Trans Mountain Pipeline ULC has announced plans to increase the capacity of its proposed expansion of the Trans Mountain pipeline, which supplies oil and petroleum products from the Albertan oil sands to the Chevron refinery in Burnaby.

The company has signed new long-term contracts with shippers committing to 700,000 barrels per day (bpd). The company said, as a result of the additional commitments, it will increase the proposed expansion capacity to 890,000 bpd from 750,000.

Over the next several months, the company will do additional engineering work and studies to assess how the increased capacity will impact the scope of the project.

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MECHANICAL UPGRADES

The province of British Columbia is spending \$5 million to assist schools throughout B.C. to reduce their carbon footprint. A total of \$5 million is being provided through the Carbon Neutral Capital Program (CNCP) so 25 districts can undertake electrical and mechanical improvements to their schools.

Districts will embark on their projects this year with completion by March 2014.

The provincial government estimates districts will reduce their emissions by approximately 1,500 tonnes and save \$36,000 in carbon offsets as well as \$416,000 in operating costs every year.

ECONOMIC GROWTH

Vancouver's economic growth will accelerate to 2.9 per cent this year from 2.5 per cent in 2012, according to the Conference Board of Canada. The report, Metropolitan Outlook-Winter 2013, forecasts that Vancouver's growth will average 3 per cent annually through 2016. It assesses, however, that Vancouver's residential construction will slow this year and in 2014, due to a "slightly overbuilt" market in the city's census metropolitan area. The board projects that Abbotsford-Mission's GDP growth will accelerate slightly to 2.7 per cent in 2013 and 2014, following a 5.3 per cent population jump last year.

Calgary is expected to maintain its current 3.3% GDP growth rate, while Edmonton is expected to slow to 3.2% from 4.4% in 2012.

The report, however, notes risks hovering over Albertan cities' growth forecasts. It assesses that uncertainty in the energy sector including a "bitumen bubble" — the discount between Alberta's oil and world prices — and lower natural gas prices could hamper Calgary's growth. The report adds that, if pipeline projects don't go forward to meet rising oil sands production, Edmonton's medium-term growth outlook could similarly be reduced.

TEAMS SHORTLISTED

Three teams have been shortlisted to participate in the selection process to build an acute care centre at the BC Children's and BC Women's Hospital and Health Centre. The three teams are Affinity Partnerships, Oak Street Health Partners and Plenary Health. It's anticipated a preferred proponent will be selected by spring 2014.

The total cost of the redevelopment project is estimated at \$680 million. Phase 2 is expected to cost up to \$543 million and includes the Acute Care Centre. The BC Children's Hospital Foundation has pledged to raise \$200 million through the Campaign for BC Children with \$150 million going toward the redevelopment project.

Construction of the new Acute Care Centre is anticipated to get underway in winter 2014-15 with completion currently targeted for winter 2017-18.

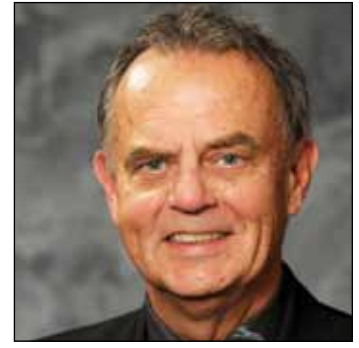
MCW ACQUISITION

The MCW Group of Companies has acquired Perez Engineering Ltd. of Vancouver. With this acquisition, MCW grows to more than 350 across Canada. The new addition will become an integral part of MCW's Vancouver operations, with all Perez staff being immediately consolidated into MCW's downtown Vancouver offices. Willie Perez, the founder of Perez Engineering Ltd. and former partner at Keen Engineering, has now become a principal of the MCW Group of Companies and will help grow their combined customer base in the institutional, commercial, health care and residential sectors.

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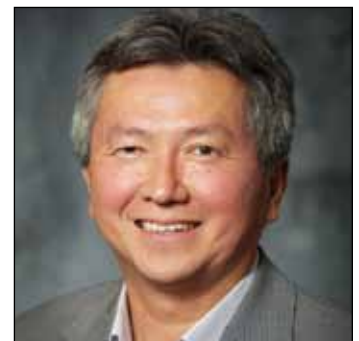
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(Associates 1st Vice-Chairman)
B.A. Robinson



Director
Dan Taillefer
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Director
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~ Project Manager and Estimator positions Available ~