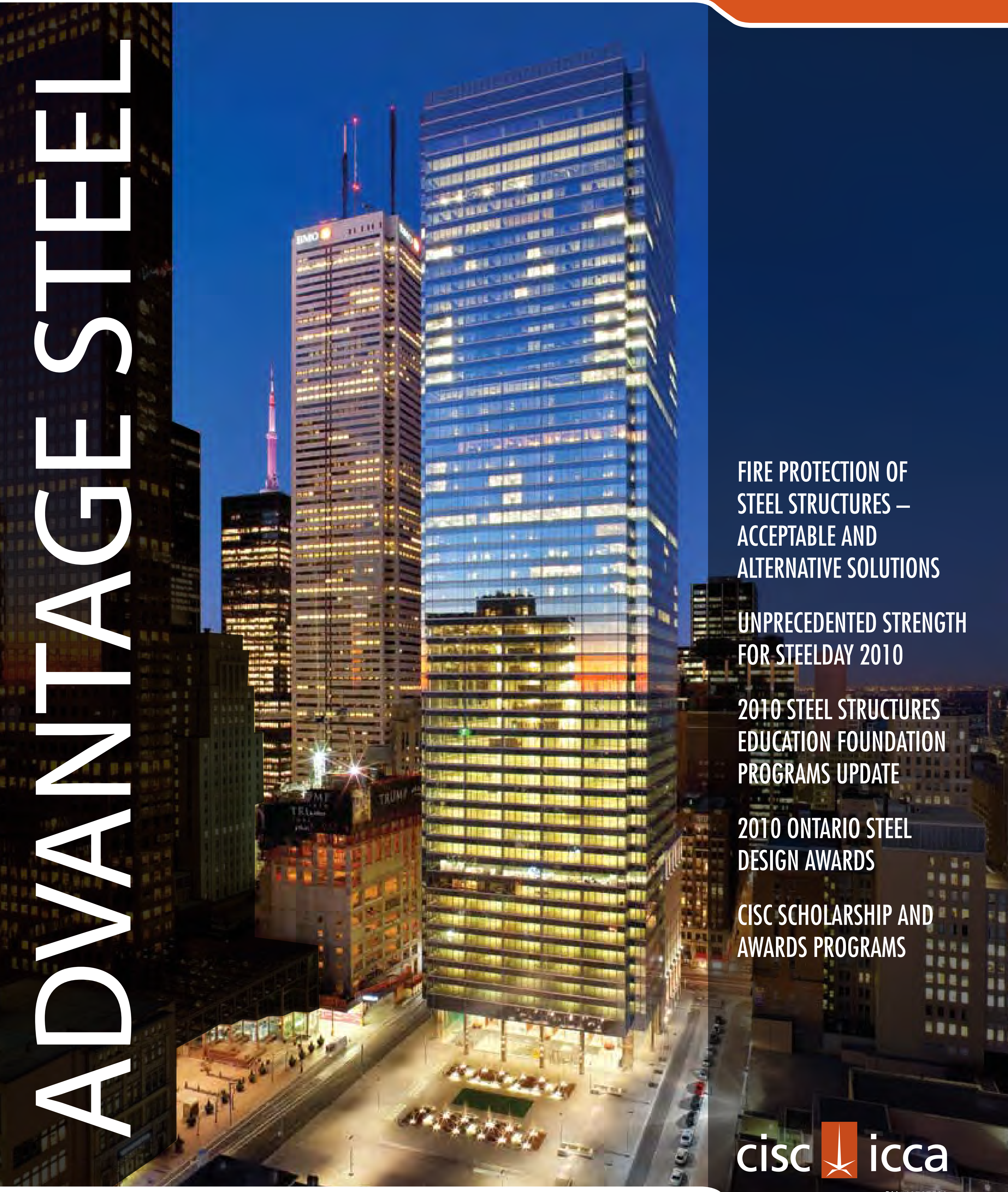
NO 39 SPRING 2011

ADVANTAGE STEEL



FIRE PROTECTION OF STEEL STRUCTURES – ACCEPTABLE AND ALTERNATIVE SOLUTIONS

UNPRECEDENTED STRENGTH FOR STEELDAY 2010

2010 STEEL STRUCTURES EDUCATION FOUNDATION PROGRAMS UPDATE

2010 ONTARIO STEEL DESIGN AWARDS

CISC SCHOLARSHIP AND AWARDS PROGRAMS

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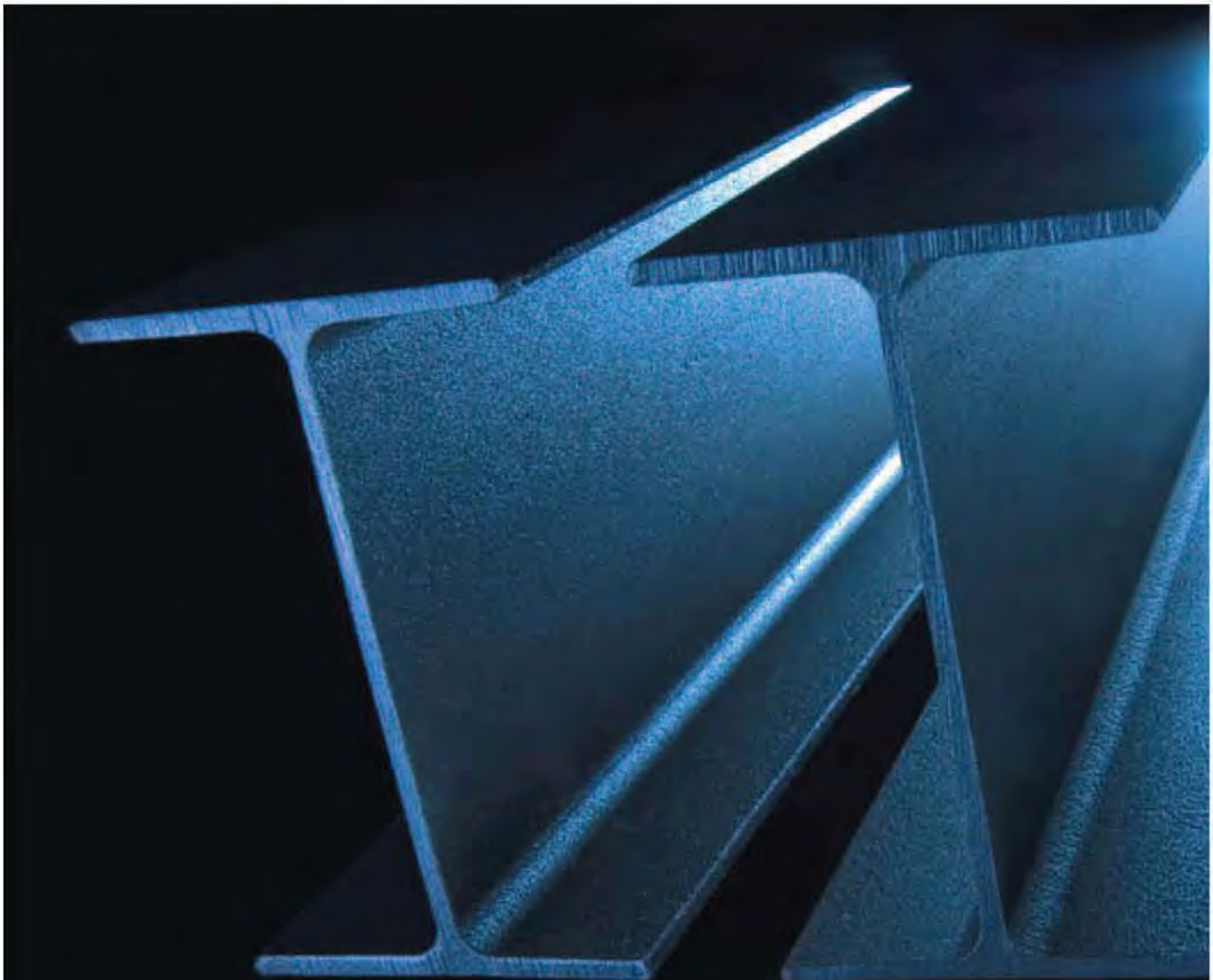

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FROM THE PRESIDENT

STEEL PRIMER

As I travel Canada, I still see the majority of buildings framed in structural steel primed. Old habits die hard and old specifications even harder. Did you know that most enclosed buildings do not need the simple shop primer? We are spending more time and money on a product that has no real benefit to the building.

Structural steel primer is either a temporary erection coating or is used as a base for a simple coloured top coating. For buildings that are erected and enclosed within a short period, primer is not needed. In an environmentally enclosed building space the steel ceases to rust and provides the same longevity as primed steel. If the steel frame is expected to remain exposed to the elements for a long time, in an environment of high corrosion, you might consider a primer or something more high tech.

The colour trend in steel primers is going grey. Owners and specifiers love the grey because they think of it as paint and use it as the finish coat. However, shop primer is a temporary coating not intended as a finish coat. Grey primers will show surface rust and some bleed through, more so than red primers. If you want a deluxe no-rust look, either specify it clearly in the specifications or go to a field top coat system. The key is to communicate exactly what you want in the specification.

In this day of sustainability, LEED, speed, environmental consciousness and cost awareness, it makes sense to eliminate unnecessary steps. In most cases the priming of structural steel is one of them.

Ed Whalen, P.Eng.
President, CISC

IN THIS ISSUE

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Professional engineers, architects, structural steel fabricators and others interested in steel construction are invited to inquire about CISC membership. Readers are encouraged to submit their interesting steel construction projects for consideration for inclusion in this publication by contacting CISC.

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COVER IMAGE: Bay Adelaide Centre, Toronto, ON, an Ontario Design Award, Engineering Recipient | Photo: Tom Arban Photography Inc.

PHOTO ON THIS PAGE: Juilliard School / Alice Tully Hall, New York, USA, an Ontario Design Award of Excellence Recipient | Photo: Iwan Baan / Arup

Q & A

Alfred F. Wong, P.Eng.

This column highlights the answers for selected questions received from readers and others seeking technical information on steel structures. Suggested solutions may not necessarily apply to a particular structure or application, and are not intended to replace the expertise of a professional engineer, architect or other licensed professional.

QUESTION 1: Is knife edge angle connection the right choice for axial tension or combined shear and axial tension?

Figure 1 Knife edge connection

ANSWER: Knife edge angle connection, commonly known as knife connection, is a very common type of beam shear connection. It features a pair of angles that are typically welded to the column in the shop and bolted to the beam web in the field (Figure 1). While knife connection serves as a popular beam shear connection, its use is not recommended where significant axial tensile forces are to be transmitted, such as end connections for braced frame members and collectors that are subjected to significant axial tensile forces. Research studies, reported in the reference below, have demonstrated that knife connection exhibits limited axial tensile resistance. In the reference below, the test results of several other common beam shear connections subjected to combined shear and axial forces were also reported.

Reference: Guravich, S. J. and Dawe, J. L. 2006. Simple beam connections in combined shear and tension. Canadian Journal of Civil Engineering. 33(4): 357-372.

QUESTION 2: Should I aim for full composite action for composite beams in building structures? Otherwise, where do I begin?

ANSWER: Due to the substantial increase in bending resistance gained from composite action, partial composite capacity for beams usually suffices. Factors other than the ultimate limit states of the composite beam often dictate the steel beam size and the percentage of composite shear connection:

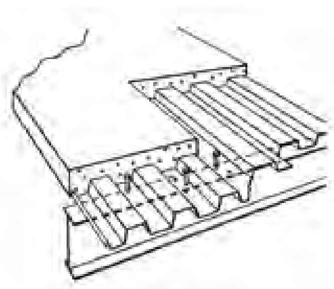


Figure 2 Deck perpendicular to beam

1. In order to benefit from one of the advantages of steel construction, beams are unshored. In that case, construction loading conditions may govern;
2. Since the deck flutes typically run perpendicular to the beam, as shown in Figure 2, (and wide-rib profile deck should be used for optimal stud shear capacity) full composite design often results in placing multiple studs per flute resulting in inefficient use of shear studs due to overlap of concrete shear cones; and
3. Live load deflection or floor vibration control may govern the design.

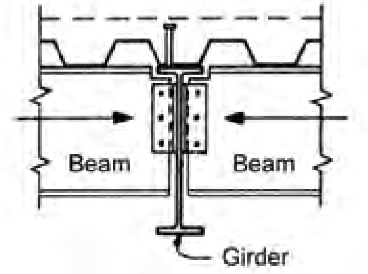


Figure 3 Deck parallel to girder

In accordance with S16-09, 40% or larger composite shear connection must be provided for composite resistance. Due to the above-mentioned factors, most composite beams are designed for 40% to 60% shear connection. However, composite girders are usually connected for higher composite capacity because the deck flutes run parallel to the girder and, during construction, the girder is often laterally braced by the beams framing into it (Figure 3). Where composite action is only required for stiffness measures, S16 permits 25% shear connection as the minimum.

QUESTION 3: In accordance with the National Building Code, steel building systems shall be manufactured by companies certified to CSA A660 "Certification of Manufacturers of Steel Building Systems." Does this requirement apply to all steel fabricating plants?

ANSWER: No, CSA A660 does not apply to all steel fabricating plants. A steel building system (SBS) features steel for the structural components plus related accessories engineered and designed as a total building system, commonly referred to as "pre-engineered buildings" for which the manufacturer is responsible for both the

“Where composite action is only required for stiffness measures, S16 permits 25% shear connection as the minimum”

structural design and fabrication of the building system. Since the designer of the steel building system is also the seller, there is no independent third-party representing the interests of the public. CSA A660 ensures that the SBS manufacturer is complying with the applicable building codes and design standards, and the public is protected.

The vast majority of structural steel fabricators in Canada are only involved with fabrication of building structures that are designed by engineers employed by others. These fabricators are not required to be certified to CSA A660. They are certified to CSA W47.1 (welding). Some are also certified to CISC Quality Certification Program for Steel Structures.

For information on CISC Certification Programs, visit the CISC website at www.cisc-icca.ca/certification.

Questions on various aspects of design and construction of steel buildings and bridges are welcome. They may be submitted via email to faq@cisc-icca.ca. The CISC receives and attends to a large volume of inquiries; only a selected few are published in this column.

SEISMIC CORNER
CONVENTIONAL CONSTRUCTION IN NBCC 2010

Charles Albert, P.Eng.

A look at new provisions to account for greater uncertainty in predicting force demand in taller structures

Although the name "Conventional Construction" was introduced in the National Building Code of Canada (NBCC) 2005, the use of seismic-force-resisting systems based on a force modification factor of R = 1.5 goes back to the NBCC 1990.

Ductility requirements for Conventional Construction were introduced in CSA Standard S16-01, Clause 27.10, for regions of moderate and high seismicity. Because of the low force modification factor, seismic design forces in Conventional Construction are greater than in other systems, but connection details are simpler since the other ductility provisions of Clause 27 do not apply. In regions of higher seismic hazard, however, the building height limit of 15 m represented a significant restriction in the NBCC 2005.

In the NBCC 2010, the use of Conventional Construction was extended for buildings taller than 15 m in moderate and high seismic zones provided they comply with the more stringent requirements in S16-09 Clause 27.11, outlined below.

- Seismic forces are increased in proportion to the height for buildings taller than 15 m.
- The height is limited to 60 m and 40 m for buildings subject to increasing levels of seismicity.
- A dynamic analysis must be used, and due consideration given to elements affecting seismic response and to stability effects.
- There are more stringent requirements for steel material ductility, notch toughness of base and weld metals, and cross-sectional stockiness.
- Design loads have been increased for columns (in some situations), as well as connections, diaphragms and members intersecting at unbraced locations.
- There are additional ductility requirements for connections.

Overall, these provisions are intended to account for the greater uncertainty in predicting force demand in taller structures, to prevent premature failure and non-ductile response, and to encourage beam and brace yielding rather than column buckling. The CISC Commentary in Part 2 of the Handbook of Steel Construction may be consulted for further information.


Our flagman

A look at new developments that impact the application of paint on steel

FOR GREEN'S SAKE
PAINTS & LEED: SITE VS SHOP APPLICATION

Sylvie Boulanger, Ph.D., P.Eng.

A sustainable solution is an integrated one employing several strategies and many materials to produce a high performance building. Steel's attributes – recycled, recyclable, reused, adaptable, low waste, low site disturbance, adaptable, aesthetic – make it an important player for a greener tomorrow. The goal of this column is to help design team members take advantage of those attributes for green's sake. This issue deals with paints, LEED, the progress of paint products, some clarifications about water-based paints and the new Canadian law on paints.

Does LEED require the paint applied on the steel to be low in VOC at the site only, or both at the shop and the site? Only at the site. This is a question we get often and creates confusion. Credit IEQ 4.2 for LEED 2009 NC + CS clearly states that the intent of the credit is "to reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants." The requirements are more specific and state that the credit applies to paints and coatings used on the interior of the building applied on-site. Hence, any further requirements are beyond LEED. A trend from the steel fabrication point of view has been to submit a paint specification for what will be used in the shop and what will be used on site. The paint specified for the field is mostly for touch-ups and is generally water-based.

What types of paints applied to structural steel meet the LEED IEQ 4.2 requirement for application on site? The IEQ 4.2 credit is broken into three applications, two of which apply to structural steel: architectural paints and anti-corrosive paints. There are three ways to reach the low VOC (volatile organic compound) content limits of this credit for structural steel. Either the paint specified is water-based, is 100% solid (like intumescent coatings) or is HAP-free (where HAP stands for hazard air pollutant). Although there are unique advantages to the latter two, the water-based alternative is clearly less expensive and tends to be the solution retained for site application. Under credit IEQ 4.2, anti-corrosive paints must not exceed the VOC content limit of 250 g/L. Primers fall in this category. In the case of architectural paints, the limit can fall as low as 100g/L.

If water-based paints are the most common alternative used for site touch-ups in a LEED project, how do they differ from the commonly used oil-based (alkyd) paints? Compared to current industry standards, water-based paints are not necessarily more expensive but they are more delicate to handle, which can then induce additional costs and environmental burdens. A good approach is to have the water-based paint for touch-ups on site and the standard paint applied in the shop under controlled conditions for a LEED project. The main concern about water-based paint is the drying conditions needed to attain satisfactory results. For example, when the water-based paint is applied in January in Canada, there is no doubt that a heated environment will be needed for drying. Additionally, extra surface preparation (at least a commercial blast cleaning or SSPC SP 6 and sometimes a near-white metal blast cleaning of SSPC SP 10) may be required.

When a water-based coating system is used for architectural applications – that is when a water-based primer is applied in the shop and a water-based topcoat on the site – one needs to make sure that the steel does not sit on the trailer too long. Otherwise, the steel may be more susceptible to "flash rusting" (water evaporates, creates air pockets, rust starts and shows through) and additional touch-ups before the topcoat is applied.

In summary, water-based paints are bound to improve in the future, as have other paints. At this point, they may be less durable when there are important delays between coats and large temperature differentials. If timing and temperature can be controlled (which is easier to do in California than in Canada), then the coating performance improves.

What about the recycled content and recyclability of paints? Anti-corrosive and architectural paints used on structural steel do not contain recycled content. You can find recycled paints that are made from post-consumer paints and have low VOC content in hardware and retailer stores like Home Depot for residential renovation use only because they do not have to meet the same stringent standards.

In a steel fabrication shop, most of the paint that is purchased gets used and there is very little waste. When unused paints must be disposed of, the fabricator either sends them to a collection agency approved at the provincial or community level or recovers the thinners first! Indeed, the thinners are often separated in the

"Steel buildings require no paint when the steel is hidden behind drywall and suspended ceilings. Unfortunately, there is no LEED recognition for applying no paint!"

shop from the paint particles and reused. Special equipment then "cooks" the paint byproduct, which gets sent to a recycling depot. When painted structural steel is recovered at the end of the building's life, it can get reused but usually gets recycled "as is." The paint byproducts are separated when steel is melted. At this point, there are obviously no VOCs left, as VOCs, by definition, are volatile upon paint application on the steel.

How are paints handled in the shop?
When the paint is shop applied, several measures are taken to alleviate its impact on workers and the environment as per the local bylaws in place. Many fabricators do more than the minimum required to ensure the safety of workers by having proper air extraction and cleaning systems, respirators for workers and frequent air exchanges. Those companies that specialize in the surface preparation and application of paints have impressive high-tech equipment.

As recently as September 9, 2010, Canada has a new law imposing maximum VOC limits on paints produced and a two-year transition period for those already on the shelf. Interestingly, that hardly affects the steel industry as most of the paints it uses come from international suppliers and hence, they are already meeting other regulations, even the more stringent California rules. Note that this law will require shops to have a paint permit. Again, for many fabricators and specialized surface treatment companies, that will not be an issue. For example, one specialty supplier is already certified by the SSPC and NACE, and has established a certified ISO 9001:2000 quality control of its operations.

Is a primer necessary? Steel buildings require no paint when the steel is hidden behind drywall and suspended ceilings. Unfortunately, there is no LEED recognition for applying no paint! The industry continues to stress that paints should only be applied where absolutely necessary. For more information, read our very informative "Paint Alert." (cisc-icca.ca/resources/tech/coatings/alert/)

As I was gathering content for this article, fabricators and paint suppliers reminded me that paints have been keeping an international pace of improvement. In fact, whereas the standard in place 15 to 20 years ago was over 60% VOC, now the norm is around 20 to 25%… and counting down.

I would like to take the opportunity to thank the fabricator members of the new CISC Sustainability Committee for their help:

Paul Auton, Waiward Steel Fabricators Ltd., Edmonton – Alberta Region

Bernie Blakely, Ocean Steel & Construction Ltd. – Atlantic Region

Claude Desrosiers, Charpentes d'acier Sofab inc., Boucherville – Quebec Region

Peter Steunenberg, Solid Rock Steel Fabricating Co. Ltd., Surrey – BC Region

Anthony Tessaro, Lorvin Steel Ltd., Brampton – Ontario Region

Laurier Trudeau, Abesco Ltd., Winnipeg – Central Region

My gratitude extends to the following paint specialists for their comments. They have sent me very useful material for my viewing and I encourage you to contact your regional CISC member paint supplier for additional resources:

Alain Belzile, Sherwin-Williams

Michel Drysdale, Drytec Trans-Canada

Gilles Masse, Amercoat Canada

Jean Mayrand, International Paint

Protected steel: spray-applied fire-resistive materials on steel truss, beam and deck

Acceptable and alternative solutions to protect steel structures against the threat of fire

FIRE PROTECTION OF STEEL STRUCTURES

George Frater and Carol Kleinfeldt

Fire safety requirements in North American Building Codes stipulate that materials, assemblies of materials and structural members used in building construction must have some level of resistance to fire that depends on the fire hazard and risk to life safety. Except where non-combustible materials are used in low hazard and low risk buildings, Codes specify fire resistance ratings for these elements. By way of fire resistance ratings, the Building Code regulates the division of a building into fire compartments by physical barriers termed "fire separations" which resist the spread of fire from one compartment to another. The fire resistance rating is also used to regulate building elements which maintain the structural integrity of theses fire separations. The Building Code defines fire resistance rating as the time in minutes or hours that a material or assembly of materials will withstand the passage of flame and the transmission of heat when exposed under specified conditions of a "standard fire test." The National Building Code of Canada (2005), in Division B, Part 3 (titled "Fire Protection, Occupant Safety and Accessibility") references the standard fire test given by the Underwriters Laboratories of Canada's (ULC) standard, CAN/ULC-S101, "Fire Endurance Tests of Buildings Construction and Materials." In these tests model building construction assemblies representative of the construction to be employed are exposed to a standard time-temperature curve that rises rapidly to 840°C at 30 minutes and then increases more gradually to 1090°C at four hours. In essence the fire resistance rating determined by fire testing describes the ability of the assembly or element to withstand fire in a relative sense compared with other assemblies or elements.

Steel, like all materials, loses strength at elevated temperatures and this will begin at temperatures in excess of 300°C. At 600°C steel retains around 50% of its room temperature yield strength and with the heat exposure of a standard fire test at 30 minutes being 840°C requires fire protecting structural steelwork. Fire testing, predominantly by producers of fire resistive materials and systems, has established a range of fire resistance ratings for fire protected steel floor, roof and wall assemblies and beams and columns that are listed by ULC in their directories for fire resistance and also available online at their website (www.ulc.ca).

Fire resistance ratings are crucial to early decisions in the design process and can be influential in the selection of the dominant structural system and therefore the architectural expression of the structure. When using structural steel, a designer can comply with Building Code requirements using an array of fire protection techniques. An optimal building design balances the fire safety requirements with the economic and aesthetic specifications of the building.

Fire safe steel buildings use active and passive fire protection systems. An active fire protection system is where a sprinkler system eliminates the heat source and severity of the fire by water's extinguishing action. A fusible link in the sprinkler head activates the sprinkler system when it melts and at the same time smoke or heat detectors generate an alarm for building occupants to exit the building by safe escape systems. A passive fire protection system delays the rate of temperature increase in steelwork thereby providing the necessary time for building occupants to exit, combustibles to burn out and firefighters to arrive to extinguish the fire. Passive fire protection systems basically insulate steel or provide heat dissipation. They can be categorized into four systems:

1. Directly applied systems that insulate against heat, such as spray-applied fire-resistive materials and intumescent coatings;
2. Membrane systems that provide a thermal barrier against heat, such as gypsum wallboard;
3. Concrete systems where the concrete encasing of steel slows down the conduction of heat, or where concrete-filled hollow structural sections produce composite behaviour with force redistribution occurring at elevated temperatures; and
4. Water systems that provide a cooling effect, such as water-filled hollow structural sections within steel structural frames to dissipate heat from fire. This is a rare form of fire protection that has been used since the 1970s with about forty case examples worldwide.

While all of these systems can have aesthetic implications, the design team can consider different applications to different parts of the structure in order to maximize the design potentials and minimize the costs.

The 2005 edition of the National Building Code of Canada, now adopted countrywide, is written in "objective based" format, where the intent and objective of each code provision is spelled out and creates more favourable conditions to pursue "alternative solutions" for fire protection of steel structures. While a prescribed "acceptable solution" can be followed, if desirable, the objective based format offers designers the option of finding "alternate solutions" (previously "equivalencies").

An alternative solution in fire safety, with a Fire Protection Engineer as a consultant on the design team, can identify areas where the amount of fire protection can be engineered or possibly not required and lead to an economic innovative solution in steel for a building's fire safe requirements.

The architect must have a broad perspective in the design of the building and its elements and work within a team of client, consultants, contractor, authorities having jurisdiction, etc. In large part they are responsible for the scheduling of the project. Any approach which considers alternative solutions would need to be approved by the entire team and there would have to be both the time and budget to pursue them. This decision to pursue alternatives would be based, most likely, on aesthetic considerations given that currently available fire protection

Protected steel – concrete-filled hollow structural steel columns in exit stairwell

strategies are acceptable where the structure is invisible, with the exception of intumescent coatings. An interesting document titled *Fire Safe Multi-storey Buildings, Economic Solutions in Steel*, published by the World Steel Association (www.worldsteel.org), illustrates an array of 23 alternative fire safe solutions from 17 countries, including Canada, where the design team has decided to investigate and ultimately use alternative solutions for the enhancement of their design ideas.

The architect would also need to consider the possible interpretations of the Authorities Having Jurisdiction and whether an active exchange of information would be in order prior to finalizing any design decisions. This requires demonstrable evidence that the intent of the Code has been met and the case may be made by the Fire Protection Engineer on the design team through assumptions, interpretation and modelling.

The method to arrive at an alternative solution is commonly referred to as "Performance-based Design," or PBD, or in other words is an engineered approach to fire protection and carried out by specialized "fire protection engineers." Fire protection done by PBD is manifesting itself in more and more buildings as fire researchers develop a wider understanding of the response of structures in fires. In Canada, for example, fire protection engineering with the aid of advanced calculation techniques and computer fire modelling produced a PBD where "unprotected" structural steel was used in a Nova Scotia Community College expansion project, Halifax's new Citadel High School project and at the new Vancouver Convention Centre (CISC, *Advantage Steel*, No. 23 Summer 2005, No. 27 Fall 2006 and No. 33 Winter 2008, respectively).

Traditionally, the structural steel in these types of projects would require some form of passive fire protection such as spray-applied fire-resistive materials or gypsum wallboard encasement. However, the steel work cited in the *Advantage Steel* articles features an innovative use of exposed structural steel assemblies. The Authority Having Jurisdiction reviewing these projects requires that the fire protection engineering analysis should follow an established process, i.e., all the steps outlined in the Society of Fire Protection Engineers (SFPE) Engineering Guide to Performance-Based Fire Protection Analysis and Design of Buildings. This guide basically describes "how to" conduct a PBD.

The SFPE guide overviews the development of design fire scenarios that in turn require an examination of expected fire hazards and fuel loads within building compartments. The design fires for the Nova Scotia school buildings and Vancouver Convention Centre were modelled with a software package

"There are many examples where a PBD approach has led to steel components in the building structure being designed to be unprotected or with a significant reduction in fire protection materials"

called Fire Dynamics Simulator, which was developed by the National Institute of Standards and Technology in the United States and is categorized as a computational fluid dynamics field model. The model also represents the compartment's associated physical properties such as geometry, ventilation, finish, etc. Output from the model simulations provide relevant information such as ceiling jet temperatures, fuel burning rates, heat flux on enclosure boundaries and sprinkler activation times. The data was used in traditional heat calculation methods to determine the structural response of the exposed structural steel assemblies.

The Fire Protection Engineer involved in a PBD of a building's fire protection can use a range of computer models. A useful website with an international survey conducted on a range of computer models for fire and smoke is www.firemodelsurvey.com. The site lists 168 computer fire and smoke models in six categories: fire endurance, egress, detector response, zone, field and miscellaneous.

There has also been a development in a set of sophisticated codes of practice for the fire design of structures, namely Eurocodes. Eurocodes apply to the common building materials of concrete, steel, composite steel-concrete, timber, masonry and aluminum. For steel structures, the code is EN 1993-1-2:2005, Eurocode 3: Design of Steel Structures, Part 1-2: General rules – Structural Fire Design. The provisions in Eurocode 3 for steel structures and fire deal with the complexity of internal forces induced by thermal expansion, strength reduction due to elevated temperatures, the associated amplified deflections and other design factors (the document's technical content is over 80 pages). Similar engineering guidance in North America has recently been published by both AISC and CSA, i.e., ANSI/AISC 360-05's Appendix 4 and CSA S16-09's Annex K, entitled Structural Design For Fire Conditions, which provide an aid for structural engineers to develop PBD fire safety for buildings designed with structural steel. The provisions in ANSI/AISC 360-05 and CSA S16-09 appendix/annex are general introductory guidelines (about 10 pages) to orient a structural engineer in performance-based fire engineering, a skill that, for the most part, is unfamiliar territory for the profession. This is an exciting advance because it opens the door to new design possibilities once the team has demonstrated that the alternative meets the fire safety levels required by the Code without adopting all of the prescriptive Code provisions.

Protected steel truss – thermal barrier with gypsum board (before application with furring channels attached)

Protected steel truss – thermal barrier with gypsum board

Many organizations such as the SFPE have enhanced the dissemination of information related to fire protection engineering. Recently, collaboration among Building Code organizations in Australia (Building Codes Board), New Zealand (Department of Building and Housing), the United States (International Code Council) and Canada (National Research Council of Canada) has resulted in a 500-page document entitled International Fire Engineering Guidelines that was published in 2005 by the Australian Building Codes Board. These guidelines set the stage for more fire safety design of buildings by aiding both the authorities who approve building designs and the practitioners who are plying the relatively new approaches to fire protection engineering.


Unprotected steel floor assembly using fire protection engineering

In summary, designers, especially fire protection engineers, use PBD to demonstrate that buildings meet the fire safety levels required by the Code without adopting all of the prescriptive Code provisions. Most building designs still follow the prescriptive-based design requirements in NBCC's Division B, Part 3, Fire Protection, Occupant Safety and Accessibility, however, there is a strong demand from design groups and developers to design some areas of buildings, such as main entrances and atriums, using fire protection engineered analysis as an alternative solution.

There are many examples where a PBD approach has led to steel components in the building structure being designed to be unprotected or with a significant reduction in fire protection materials.

The confluence of the release of the first objective based National Building Code of Canada (2005), the development of sophisticated modelling software and the expansion of the Fire Protection Engineering corps, provides expanded design possibilities for architects and their design team. Historic restrictions may now be reviewed in detail to ensure that safety is the first consideration for the team while opening opportunities for design flexibility. These alternative solutions add to the knowledge base and tools that are available to the architect and their design team.

George S. Frater is Codes and Standards Engineer at the Canadian Steel Construction Council in Markham, ON.

Carol Kleinfeldt is Principal at Kleinfledt Mychajlowycz Architects Inc. in Toronto, ON.


AGT employees make final preparations

Scores of students and professionals attend CISC's inaugural SteelDay to view industry presentations and displays firsthand

UNPRECEDENTED STRENGTH FOR STEELDAY 2010

Canada's inaugural SteelDay was held September 24, and if this first event was any indication SteelDay will grow as a premier showcase for the construction industry in Canada.

A total of 58 CISC Host locations from coast to coast welcomed nearly 3,000 guests, including developers, architects, engineers, students, family, politicians and business partners. It provided participants with an excellent opportunity to connect with the construction industry as well as their individual communities.

Here is what hosts and visitors had to say.

ATLANTIC CANADA
Host: Russel Metals Inc.

"Personal invitations were sent to many of our customers, trades schools, engineering firms, detailers, construction companies and government operations, with followup by sales reps by phone and emails," commented Emil Peckham of Russel Metals. "We had an overview of Russel information sessions on Auto Cad/ Nesting/ Plasma Profile cutting, Steel Making, the production of HSS."

The plant tour illustrated various aspects of the working environment, and participants viewed a classic van that was refurbished by a customer using copper, stainless, brass and aluminum, and a fully detailed truck, which was equipped with a sleeper unit. The day was completed with a barbecue, cake and door prizes.

"In all, this was a very successful day for us and our 226 visitors. Many people commented on the event as a real learning experience. Our staff was able to show who they are and what they do, and we had the opportunity to talk metal with folks from all sectors within our industry for the better part of the day. For a metal distribution facility, it doesn't get much better than that," concluded Peckham.

QUEBEC REGION
Host: AGT

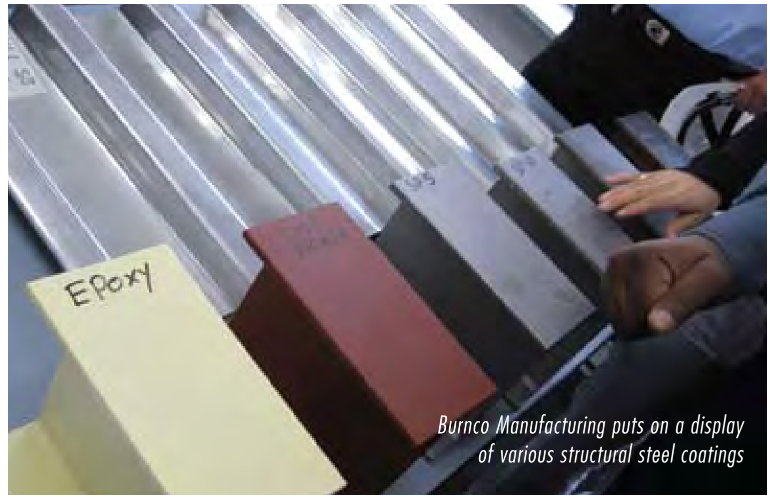
"Over the course of the day we had nearly 200 guests from the industrial, education and business communities. People like to see the newest technology and they also like having an activity to do," said AGT's Paul Archambault.

For AGT, this was a pit stop competition – most of the nearly 200 guests took a turn changing a simulated F1 tire to see how fast they could do it. There were door prizes for the quickest time.

But the centrepiece of the event was AGT's new "Self Learning Welding Technology." Guests had the opportunity to see, in person, how this new technology could help them. There is no replacement for experiencing things first hand.

"Overall, SteelDay allowed us to re-engage with existing relationships and forge new ones," summed up Archambault.

ONTARIO
Host: Burnco Manufacturing Inc.



Burnco Manufacturing puts on a display of various structural steel coatings

"We used regular email invitations to get the word out to approximately 350 contacts from within the company," said Burnco's Kevin O'Neill. "We then sent individual email invitations, and made phone calls to those consultants and contractors we specifically wanted to attend."

An unused public space was used as the centre point of the celebration. Around the room, large poster-size pictures of Burnco current and recent projects were shown. Their coatings and corrosion expert put on an enlightening display of surface preparation and coatings technology and instrumentation. One of their business partners (Carboline) joined in the day to provide the latest information in corrosion protection and technology, and Baseline Detailing demonstrated how structural drawings are turned into erection drawings and shop fabrication drawings.

In keeping with the educational emphasis of the day, Burnco invited their partners from Air Liquide and ESAB to set up a welding station as the last stop on the plant tour. All guests were invited to try their hand at the latest sub-arc welding machine from ESAB. Many took home a commemorative paperweight they had welded themselves.

"SteelDay 2010 exceeded our expectations regarding the number of people who would attend," concluded O'Neill.

Host: MBS Steel Ltd.

"I wanted to thank you on behalf of the students at Seneca College (and myself) for the fantastic tour of MBS Steel on SteelDay," wrote Maura Lecce of Seneca College.

"The tours were well organized, thorough and informative, and the guides answered all the questions asked," continued Lecce. "Refreshments and souvenirs were very generous and much appreciated. Thank you for hosting the event and for being part of our students' educational experience. Field trips like this get students excited about the career path they have chosen."

CENTRAL & WESTERN REGIONS
Host: Waiward Steel Fabricators Inc.

"We extended invitations to our suppliers, subcontractors and customers as well as to our staff and their families," said Jackie Saide of Waiward Steel. "We also looked to involve students through our association with Careers – The Next Generation, NAIT and the University of Alberta."

Information on SteelDay was posted on the company website, and the Edmonton Ironworkers' Union Local 720 added a reference in the current events and news section of their website. In co-operation with other Edmonton area SteelDay hosts, an ad was also placed in the business section of the *Edmonton Journal*.

Two-hour structured tours were offered, with participants taking part in the following sessions.

Shop Tour: an overview of shop operations from the receipt of steel to preparing the fabricated product for shipping. Their robotic welder was in operation.

M&D Drafting Presentation: offered insight into the world of drafting in 2010, including a short presentation that focused on taking the plan "from paper to reality" through automation.

Waiward Presentation: an overview of the company and the services provided to their customers, along with information on the advantages of steel construction and careers in the industry.

Waiward Gallery: participants could explore displays and meet with industry representatives. A poster display highlighted projects completed by Waiward.

Approximately 400 guests were hosted with representation from each of the groups invited and members of the general public. This included 75 students from three high schools as well as 70 post-secondary students.

SteelDay 2011

Mark your calendars for next year's event!

Preliminary scheduling for next year's SteelDay is September 23, 2011. CISC is looking forward to even more members participating in the event and developing new and exciting demonstrations.

Waiward Steel's display of recent projects

Tarana Haque (right) is presented with her 2010 Jackson Fellowship award

The Steel Structures Education Foundation continues to award fellowships and grants to deserving recipients

2010 SSEF PROGRAMS UPDATE

Maura Lecce

2010 G.J. JACKSON MEMORIAL FELLOWSHIP AWARD

The G. J. Jackson Fellowship is awarded annually by the Steel Structures Education Foundation in memory of the late Geoffrey Jackson. Jackson was, for many years, a leader in the Canadian structural steel fabrication industry and a founding member of the Steel Structures Education Foundation.

The award is presented to Canadian engineering students conducting graduate studies in structural engineering, with major emphasis on steel structures. This prestigious award is currently valued at $15,000 over a one-year period. It is presented at the SSEF Annual General Meeting and commemorated with the Geoffrey J. Jackson Memorial Medal.

The 2010 Jackson Fellowship recipient is Tarana Haque from the University of Toronto. Tarana was presented with her award at the annual SSEF / CISC Convention this past June in Kananaskis, Alberta.

Tarana is a Master's student, working under the supervision of Professor Jeffrey A. Packer. Her project involves the investigation of EHS-to-EHS connections. Twelve large-scale EHS-to-EHS connection specimens will be tested in the newly renovated Structural Testing Facility at the University of Toronto. Results will be used to evaluate existing design equations, based on conventional HSS connections, for their adequacy and applicability to EHS connections.

Information about the Jackson Fellowship can be found on the SSEF website at www.ssef-ffca.ca.

2010 SSEF UNIVERSITY RESEARCH GRANTS

The SSEF has been actively promoting research of topics that are considered to be of interest and importance to the steel industry since 1995. University research grant applications are reviewed and ranked by the SSEF and, at the discretion of the SSEF, are awarded to full-time members of engineering faculties of Canadian universities for a one-year period. The total value of grants awarded in 2010 was $94,250. The principal researcher of the top-ranked SSEF university research grant applications is also awarded the H. A. Krentz Award.

Loraine Fallow presents the Award of Excellence to Tara Hagan

The 2010 grant recipients and topics include: Professor Jeffrey A. Packer, "Weld Design for HSS Connections"; Professor Siegfried F. Stiemer, "Hybrid Steel-Wood Systems"; Professor Robert G. Driver, "Steel Plate Shear Walls for Economical Industrial Protective Structures"; Professor Scott Walbridge (in collaboration with Professor Jeffrey West) "Steel Precast Composite Girders"; and Professor Tony T.Y. Yang, "Development of Performance Based Design Procedures for Innovative Steel Framing Systems." Information about these research topics as well as those from previous grant years can be found on the SSEF website.

Suggestions for research topics can be made by completing the "SSEF Research Topic Suggestion Form" found on the SSEF website at www.ssef-ffca.ca.

2010 H.A. KRENTZ AWARD

The H.A. Krentz Award recognizes a researcher whose research topic has special merit and interest with promise that it will make a significant contribution to understanding the behaviour of steel structures, advances in the economy, safety or reliability of steel structures. A gift of $5,000 is part of this notable award. The 2010 H.A. Krentz Award is awarded to Professor Jeffrey A. Packer, Bahen/Tanenbaum Professor of Civil Engineering, Department of Civil Engineering, University of Toronto. Professor Packer was also the recipient of the very first H.A. Krentz Award in 2005.

Professor Packer is a world renowned researcher and an international authority on tubular structures and connections of hollow structural sections (HSS), with emphasis on practice-oriented results for design engineers. He serves on CSA, AISC, AWS and IIW technical committees, the CIDECT Technical Commission and has chaired the International Institute of Welding sub-commission on "Tubular Structures." His research interests include the behaviour and design of tubular structures with particular emphasis on welded, bolted, nailed and cast steel connections and joints subject to static, fatigue, blast, impact or seismic loading. His research has also included the mechanical behaviour and reliability of cast-iron pipes; composites (Steel-FRP, Steel-concrete); rehabilitation and repair of infrastructure; steel wind turbine towers; HSS and glass under high-strain rate loading.

The Steel Structures Education Foundation awarded a grant of $20,000 for Professor Packer's research on "Weld Design for HSS Connections."

2010 NATIONAL STUDENT STEEL BRIDGE COMPETITION

CISC and SSEF are proud sponsors of the ASCE/AISC National Student Steel Bridge Competition (NSSBC). The competition requires civil engineering students to design, fabricate and construct a steel bridge and encourages them to apply their theoretical knowledge in a hands-on project that addresses the full breadth of steel design requirements, including aesthetics, speed of erection, lightness, stiffness, economy and efficiency.

The 2010 NSSBC was held May 28 to 29 at Purdue University, West Lafayette, Indiana, and this year marked the 19th anniversary of the competition. A total of 46 teams qualified for the national level competition including Canadian student teams from Lakehead University, University of British Columbia, Université Laval and L'École de Technologie Supérieure.

The next NSSBC will be held at Texas A&M University, College Station, Texas, from May 20 to 21, 2011. For more information about the Student Steel Bridge Competition, please visit our SSEF website at www.ssef-ffca.ca.

2010 UBC Student Steel Bridge Team, photo courtesy of Gwenda Sulem

2010 ARCHITECTURAL STUDENT DESIGN COMPETITION

The SSEF Architectural Student Design Competition was initiated in 2002. The idea of the competition is to encourage architectural students to consult with experts, engineers and fabricators to arrive at a true understanding of the structural design and detailing requirements of an actual steel structure – taking the study of steel beyond the technical and into the realm of supposed application. Eligibility for this competition is limited to students registered in professional architectural programs in Canada.

The 2010 competition challenged students to include curvature in their designs. Curvature evokes a poetry of architecture at play. Tension and compression reside in a ballet of intertwine and interplay, where explorations of space and surface, structure and form merge and fold upon themselves to create infinite spatial possibilities.

While notions of curvature might immediately bring to mind images of the free-form buildings and blobitecture of such architects as Frank Gehry, this exploration is not meant to be limiting in its scope. As a material, steel presents a palette of possibilities in the processes that allow it to be formed and shaped in ways that allow an exploration of curvature to be limited only by the scale of imagination.

Students are invited not only to explore curvature as it may be expressed in form, surfaces, members and connections; they are also invited to engage in the exploration of curvature as part of a structural dialogue of tension and compression that must be brought into balance in the structural resolution of architectural form. While they may range from utilitarian to exquisite in their execution, all responses must, nonetheless, come to terms with one simple problem: the clear expression of curvature encapsulated within a structural form.

To this end, the solution cannot hide this structural requirement; it must, instead, be celebrated and exploited, both architecturally and structurally. Students are challenged to design a structure that explores curvature on a site of the designer's choosing. While the purpose and scale are left to the discretion of the designer, it is important to focus on what it means for us to engage and experience curvature. The structure must be primarily steel, but otherwise the material palette is open.

AWARD WINNERS

The awards were presented as part of the 2010 SSEF – CISC Annual Convention.

AWARD OF EXCELLENCE

Claire Wang & Tara Hagan, McGill University
Faculty Sponsor: Peter Sijpkes

Claire Wang and Tara Hagan will share $3,000 and the Faculty Sponsor will receive $1,500.

AWARD OF MERIT

Andreea Toca & Juan Pablo Uribe, University of Waterloo
Faculty Sponsor: Terri Meyer Boake & Mark Cichy

Andreea and Jaun will share $2,000 and the Faculty Sponsors $1,000.

Keith Thomas, McGill University
Faculty Advisor: Peter Sijpkes

Keith will receive $2,000 and the Faculty Advisor will receive $1,000.

Award of Excellence Recipient – The Sunken Gardens

Julliard School

Leading examples of innovative and ground-breaking steel design in Ontario

2010 ONTARIO STEEL DESIGN AWARDS

ARCHITECTURAL AWARD

Roy McMurtry Youth Centre

Award of Excellence
Roy McMurtry Youth Centre

OWNER: Infrastructure Ontario; Ontario Realty Corporation; Ministry of Children and Youth Services
ARCHITECT: Kleinfeldt Mychajlowycz Architects Inc.
STRUCTURAL ENGINEERS: Halsall Associates Ltd.
GENERAL CONTRACTOR: Bird Construction Company Limited
CISC STEEL FABRICATORS: Paramount Steel Ltd.

The site for this project is an existing 40-hectare institutional site, cleared of an existing women's prison, with the exception of two buildings, which were maintained and renovated as part of the Youth Centre. The project is an inversion of the existing institutional model. At the RMYC, the iconic freestanding prison wall disappears into the facades of the buildings and defines the progression from public to private spaces. Steel was essential for this project. It was used for its architectural expressions, structure, colour, finishes and profile properties. It was also the obvious choice for sustainable construction, including local production and delivery and recycled content.


Shops at Don Mills

Award of Merit
Shops at Don Mills

OWNER: The Cadillac Fairview Corporation Ltd.
ARCHITECT: Pellow & Associates Architects Inc.
STRUCTURAL ENGINEERS: Read Jones Christoffersen Ltd.
GENERAL CONTRACTOR: EllisDon
CISC STEEL ERECTOR: K C Welding Limited
CISC STEEL DETAILER & FABRICATORS: M&G Steel & MBS Steel Ltd.

ENGINEERING AWARD

Award of Excellence
University of Waterloo, Quantum-Nanotechnology Centre

OWNER: University of Waterloo
ARCHITECT: Kuwabara Payne McKenna Blumberg Architects (KPMB)
STRUCTURAL ENGINEERS: Halsall Associates Limited
GENERAL CONTRACTOR: Aecon Buildings
CISC STEEL ERECTOR K C Welding Limited
CISC STEEL DETAILER & FABRICATORS: M&G Steel Limited

The design team selected structural steel to overcome many of the design challenges for the Quantum-Nanotechnology Centre. With several portions of the building either cantilevered or hung, the use of steel was fundamental in reducing the self-weight of the building, while at the same time being strong enough to resist the large forces encountered. Meanwhile, the desire for


Quantam-Nanotechnology-Centre

large column free spaces supporting vibration sensitive floors, while maintaining minimal floor-to-floor heights, could only work using modern steel construction.

Bay Adelaide Centre

Award of Merit
Bay Adelaide Centre

OWNER: Brookfield Properties Corporation
ARCHITECT: WZMH Architects Inc.
STRUCTURAL ENGINEERS: Halcrow Yolles
GENERAL CONTRACTOR: EllisDon
CISC STEEL ERECTOR, DETAILER & FABRICATORS: Walters Inc. & MBS Steel Ltd.

GREEN BUILDINGS AWARD

Award of Excellence
Roy McMurtry Youth Centre

Roy McMurtry Youth Centre

OWNER: Infrastructure Ontario; Ontario Realty Corporation; Ministry of Children and Youth Services
ARCHITECT: Kleinfeldt Mychajlowycz Architects Inc.
STRUCTURAL ENGINEERS: Halsall Associates Limited
GENERAL CONTRACTOR: Bird Construction Company Limited
CISC STEEL FABRICATORS: Paramount Steel Ltd.

This project was the first building designed to meet LEED Gold/Silver Certification by the Province of Ontario, and the first campus project to be submitted to the CaGBC for LEED certification, initiating a new standard for environmental stewardship for public buildings in Ontario. The scale of the interventions range from the expansive bio-swale and retention pond to the operating windows in the residents' bedrooms. It was critical to the intent of the design that natural daylight was available to every occupied space within the entire institution and this was a challenge and a delight to accomplish.

PROJECTS CONSTRUCTED OUTSIDE OF ONTARIO

Award of Excellence
Juilliard School / Alice Tully Hall – Expansion, Renovation & Acoustical Upgrade

OWNER: Lincoln Center Development Company
ARCHITECT: Diller Scofidio + Renfro with FXFOWLE Architects
STRUCTURAL ENGINEERS: Arup
GENERAL CONTRACTOR: Turner Construction Company
CISC STEEL DETAILER & FABRICATORS: Walters Inc.

The transformation of the Juilliard School and Alice Tully Hall opens the existing building to the neighbourhood, making it more accessible to the public. The project adds approximately 150,000 square feet of new spaces and at the same time upgrades interior


Julliard School


Ontario Olympic Pavilion

finishes, building services and life safety systems in the existing building. As a sub-consultant to the architects, Arup provided structural, mechanical, electrical, plumbing and fire protection engineering services.

Award of Merit
The Ontario Olympic Pavilion, Vancouver 2010

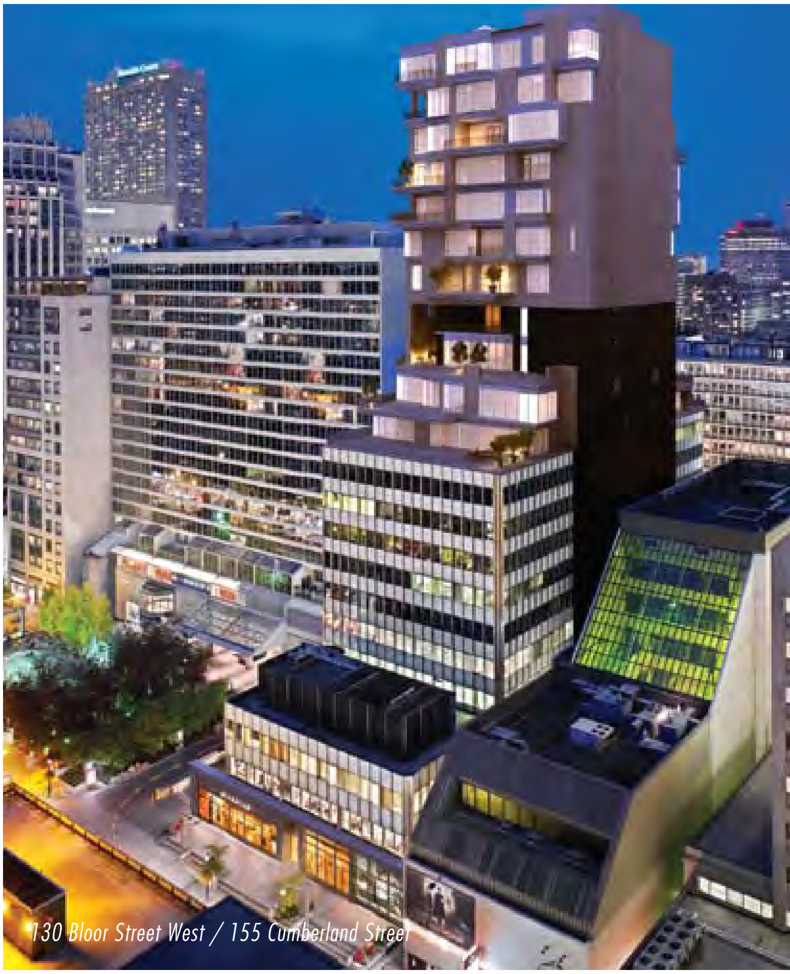
OWNER: The Province of Ontario
ARCHITECT: Hariri Pontarini Architects
STRUCTURAL ENGINEERS: Blackwell Bowick Partnership Ltd.
GENERAL CONTRACTOR: Nussli Special Events Canada
CISC STEEL ERECTOR, DETAILER & FABRICATORS: Benson Steel

PROJECTS CONVERTED TO STEEL AWARD

Best Converted Project
130 Bloor Street West / 155 Cumberland Street

OWNER: Kingsett Capital Inc.
ARCHITECT: Quadrangle Architects Limited
STRUCTURAL ENGINEERS: Halcrow Yolles
GENERAL CONTRACTOR: PCL Constructors
CISC STEEL ERECTOR, DETAILER & FABRICATORS: Walters Inc.

The additional residential levels situated on top of the tower exceeded the capacity of both the existing structural frame and the existing foundations. The key to the development of the new space was the reinforcing program applied to the existing structure. With virtually every design challenge, the application of structural steel provided a solution that was significantly better than the alternative design option.


130 Bloor Street West / 155 Cumberland Street

Students from across Canada benefit from CISC's aid programs aimed at promoting structural steel studies

CISC SCHOLARSHIP AND COOP PROGRAMS

Rob White

CISC offers a number of scholarship and coop programs for students across Canada. Funded and administered through regional efforts, these initiatives are offered to students conducting studies in the field of structural engineering and are designed to help promote structural steel studies at Canadian education institutions.

ATLANTIC REGION

The Atlantic region's scholarship program offers a scholarship with a value of $7,500. The Atlantic Regional Committee of the Canadian Institute of Steel Construction (CISC) has established this graduate scholarship to support an engineer who is pursuing a postgraduate degree in Civil Engineering with emphasis on structural steel structures or a related steel topic at one of the four Atlantic universities with engineering programs: University of New Brunswick, Université de Moncton, Dalhousie University and Memorial University.

Professor John Newhook, Ed Whalen and Joshua Levy

The applicant can be a recent engineering graduate or an engineer that is working in industry, government or the academic field. The goal is to provide monetary support to a person who is continuing his or her study in the structural steel field, while encouraging that person to continue with a career in the steel industry.

Joshua Levy has been chosen as the recipient of the 2010 CISC Atlantic Canada Scholarship for Steel Structures Studies. Research is being done under Professor John Newhook at Dalhousie University in Halifax, Nova Scotia. This award is intended to help towards Mr. Levy's graduate work examining the structural response of long-span steel cable suspension bridges under live load.

This scholarship has been made possible through the contributions of the Atlantic Region CISC members and the International Association of Bridge, Structural, Ornamental and Reinforcing Ironworkers Locals 752 and 842.

ONTARIO REGION

The Ontario Regional Committee awarded scholarships in 2010 to students who excelled in their steel design courses, eight of which were presented to engineering students and two to architectural students. Chosen recipients were selected based on input from their professors at each respective institution. This year scholarships went to:

Jennifer Anne Fournier, Windsor University

Matthew Lammers, Waterloo University

Curtis Williams, University of Western Ontario

Matthew Smith, University of Toronto, Engineering

Niel Van Engelen, McMaster University

Meimei Lam, Ryerson University, Engineering

Juan Giraldo Velez, Carleton University

University of Toronto, Architectural

Queen's University

Ryerson University, Architectural

Curtis Williams
University of Western Ontario
Mike Minielly, Dymin Steel

Meimei Lam
Ryerson University, Engineering
Peter Boyle, MBS Steel

Niel Van Engelen,
McMaster University
Chris Adach, M&G Steel and Greg Kern, Walters Inc.

Matthew Smith
Waterloo University
Tsvet Tsokov, Telco Steel Works and Steve Benson, Benson Steel

These awards provide each recipient with $2,000 in scholarship funding. The applicants must be undergraduate students who excel in the steel design course during their third year and who also selected a steel elective in their final year. The award presentations were part of the Ontario Region's 20th Annual Spring Reception, held May 19, 2010, at the Living Arts Centre in Mississauga.

The awards are given by CISC Ontario in partnership with the member sponsors of the program, Benson Steel, Dymin Steel, M&G Steel, Mariani Metal, MBS Steel, Mirage Steel, Telco Steel Works, and Walters Inc.

CENTRAL REGION

The Central Regional Committee has established an annual scholarship award in the amount of $2,000, which is presented to a student or students enrolled in the College of Engineering at the University of Saskatchewan.

ALBERTA REGION

The Alberta Regional Committee offers civil engineering students from the University of Alberta an opportunity to participate in a Cooperative Employment Placement Program. The program selects a group of outstanding third-year students based on their submissions, and places them into a working environment with a CISC Alberta region steel fabricator.

BRITISH COLUMBIA REGION

The BC Regional Committee offers a Fabricator's Engineering Cooperative Program. The program formally integrates a University of British Columbia student's academic studies with work experience in cooperative employer organizations for a four-month work term, working with both a CISC fabricator and structural engineering consultant. Congratulations to the following student who was selected to participate in the 2010 program. The CISC steel fabricator employer is also listed.

Melody Tung, George Third & Son Ltd.

For more information about these education initiatives or to find out how to apply for an award, please contact your Regional Manager or visit the CISC website at www.cisc-icca.ca.

Mont Tremblant, Québec, location of the 2011 CISC SSEF Convention; photo courtesy Fairmont Tremblant

NEWS & EVENTS

CISC SSEF ANNUAL CONVENTION

The CISC and SSEF 2011 Annual Convention will take place June 8 to 11 in picturesque Mont Tremblant, nestled in the magnificent Laurentian Mountains. Mont Tremblant offers European ambience with warm Québécois hospitality. You will have the opportunity to enjoy a European-style village with charming bistros, relaxing spas, exclusive boutiques and a dazzling array of lakes and trails.

We are looking forward to an exciting time for all of our members during the four-day convention. As in the past, this coming year's convention will include educational seminars, marketing discussions and several incredible and informative speaker seminars, providing opportunities to learn and experience the latest in steel industry ideas, trends and research initiatives.

ATLANTIC REGION DESIGN AWARDS

2011 will see the arrival of the first ever CISC Design Awards of Excellence in the Atlantic Region.

There will be three categories:

Architectural Award: Steel structures (all types of buildings and bridges) in which architectural considerations predominately influence the design, particularly those with exposed steelwork;

Engineering Award: Steel structures in which engineering considerations and efficient use of steel in unique applications are the predominant factor; and

Green Structures Award: Buildings or other structures in which steel has been reused, recycled or used as part of a sustainable development project, i.e., LEED certification.

For more information please contact Alan Lock, Regional Manager, or see the website www.cisc-icca.ca/atlanticawards.

NEW PUBLICATIONS

NEW EDITION – NOW AVAILABLE!

Limit States Design in Structural Steel, 9th Edition 2010
By G.L. Kulak and G.Y. Grondin

The Ninth Edition reflects changes in CSA Standard S16-09, "Design of Steel Structures," with regard to bolted and welded connections, laterally unsupported beams, block shear and composite beams.

This textbook serves as a comprehensive teaching text for universities and technical colleges, and also as a valuable reference document for practicing engineers. It offers an explanation of the philosophy and practical application of limit states design procedures and provides comments on design requirements contained in S16-09. Divided into 11 chapters, the book covers tension members, flexural members, columns, beam-columns, stability, fatigue behaviour, connections, plate girders, composite construction, and types and grades of structural steel.

THE 2010 NATIONAL MODEL CONSTRUCTION CODES

Prepared under the auspices of the Canadian Commission on Building and Fire Codes (CCBFC) and published by the National Research Council of Canada (NRC), they comprise the National Building Code of Canada (NBC), the National Fire Code of Canada (NFC) and the National Plumbing Code of Canada (NPC).

Close to 800 technical changes have been incorporated in the 2010 National Model Construction Codes. They address the many technological advances and health and safety concerns raised since the 2005 editions were published.

Printed versions of the 2010 NBC, NFC and NPC are available in two practical formats:

- A full-size binder (8.5 x 11 in) that lies flat, for easy reference, and easily accommodates updates; and
- A soft-cover version (8.5 x 11 in) that contains the same information as the binder but weighs half as much. This format is ideal for the job site.

Electronic versions of the 2010 NBC, NFC and NBC are also available as downloadable PDF documents, which will replace the CD-ROM versions. Online subscriptions to the 2010 NBC, NFC and NPC will also be offered. Two User's Guides will be added later, namely the User's Guide - NBC 2010, Structural Commentaries (Part 4 of Division B) and the Illustrated User's Guide to Part 9 of the 2010 NBC.

To order the 2010 National Model Construction Codes, please visit NRC's Virtual Store at www.nrc.gc.ca/virtualstore.

CONTINUING EDUCATION COURSES

At CISC, we draw on the skills of leading designers, researchers, steel fabricators and industry experts to develop and deliver our courses.

Course material is developed under the auspices of the Steel Structures Education Foundation (SSEF).

Along with our ongoing calendar of courses, we are pleased to present four new courses in 2011, Seismic Connections for Steel-Framed Buildings, Connections I for Steel Detailers, Nouveautés de CSA S16-09 et découverte du Handbook and Assemblages pour structures en acier, plus three significantly updated and enhanced courses, Steel Bridges – Design, Fabrication, Construction, Seismic Design of Steel-Framed Buildings and Conception, fabrication et construction de ponts en acier.

For full course information, online registration and the latest updates please visit our website www.cisc-icca.ca/courses.

STEEL BRIDGES - DESIGN, FABRICATION, CONSTRUCTION – NEW COURSE

This course covers the design, fabrication and construction of steel bridges based on CAN/CSA-S6-06, Canadian Highway Bridge Design Code and S6S1-10, Supplement #1. The practical and economical aspects of fabrication, erection, choice of material and their impact on design will also be emphasized.

The presentation and the Course Notes include four design examples illustrating extensive design calculations for I-girders and box girders of straight and curved configurations. Topics receiving greater emphasis in 2011 include fatigue and brittle fracture, integral abutments, aesthetics and sustainability.

Course leaders for the English language edition are Gilbert Grondin, Ph.D., P.Eng., Professor of Civil Engineering, University of Alberta; James Montgomery, Ph.D., P.Eng., LEED® AP, Principal, DIALOG; and Paul J. King, P.Eng., VP Engineering, Rapid-Span Structures Ltd. The course schedule is as follows:

Fredericton, NB	Feb. 28, Mar. 1
Halifax, NS	Mar. 2 & 3
Toronto, ON	Apr. 5 & 6
Regina, SK	Apr. 7 & 8
Edmonton, AB	May 3 & 4
Vancouver, BC	May 5 & 6
Ottawa, ON	May 31, June 1
Winnipeg, MB	June 2 & 3
St. John's, NF	Oct. 4 & 5
Moncton, NB	Oct. 6 & 7
Toronto, ON	Oct. 31, Nov. 1
Calgary, AB	Nov. 29 & 30
Victoria, BC	Dec. 1 & 2

Course leaders for the French language edition are Gilbert Grondin, Ph.D., P.Eng., Professeur de génie civil, Université de l'Alberta; Jean de Gaspé Lizotte, M.Sc., ing., Directeur, Projets spéciaux, Dessau Soprin inc.; and Richard B. Vincent, B.Eng., ing., Vice-président, recherche, Groupe Canam Inc. The course schedule is as follows:

Montréal	8 et 9 nov
Québec	10 et 11 nov

CONNECTIONS FOR STEEL STRUCTURES

This course is intended to provide practical guidance to steel designers and clarify the complementary roles of the fabricator and the design engineer with respect to connection design. Emphasis is placed on connections and their impact on costs and economy.

The basic objective is to assist designers in their understanding of how connections influence member design and vice versa, and to emphasize the importance of considering both connections and member selection for optimum economy. The scope of the course is limited to connections normally encountered in common types of steel building structures.

The presenters will highlight major changes in S16-09 that influence the design of structural steel connections. Topics include high strength bolts, welds, bolts in tension and prying, slip-critical connections, welds and bolts in combination, eccentric connections, simple shear connections, seated beam connections, connection to concrete, column connections, moment connections (W & HSS Sections), bracing connections, gusset plates and truss connections.

The English language course leaders are John R. Mark, M.Sc., P.Eng., M&G Steel Ltd., and Peter C. Birkemoe, Ph.D., P.Eng., Professor Emeritus, University of Toronto. The course schedule is as follows:

Saskatoon, SK	May 17
Calgary, AB	May 18
St. John's, NF	May 31
Toronto, ON	Oct. 6

The French language course leaders are Serge Dussault, M.Eng., ing., Vice-président, ingénierie, Groupe Canam, and Danilo D'Aronco, M.Ing., ing., Associé et directeur de l'ingénierie, DPHV. The course schedule is as follows:

Montréal, QC	12 avril
Québec, QC	13 avril

CSA S16-09 CHANGES & STEEL HANDBOOK HIGHLIGHTS

This course covers the changes in CSA S16-09 and the design of steel members and elements using the recently published 10th Edition of the Handbook of Steel Construction. It is presented online in four two-hour live sessions. Participants can register for the first session titled "CSA S16-09 Changes" or all four sessions. In addition, discounted bundles with the CISC Handbook and CISC Membership are available.

The first session covers the major changes and new provisions introduced in CSA Standard S16-09, "Design of Steel Structures" and the CISC Commentary on CSA S16, including Clause 27 Seismic design. A brief overview of the Handbook is also included.

The intent of the next three sessions, titled "Steel Handbook Highlights," is to provide understanding on the background and use of design aids contained in the Handbook while drawing the participants' attention to changes, new additions and hidden gems. The presenters use numerous design examples to illustrate design aids for simple connections (single angle, double angle, end plate and shear tab), tension members, compression members and flexural members (composite and non-composite).

The English language course leaders are David H. MacKinnon, M.A.Sc., P.Eng., Director of Training, CISC; and Charles Albert, M.Sc.E., P.Eng., Manager of Technical Publications, CISC. The webinar schedule is as follows:

March 9 & 10	12:00 p.m. & 3:00 p.m. EST
June 14 - 17	10:00 a.m. EDT
September 14 & 15	10:00 a.m. & 1:00 p.m. EDT
December 5 - 8	12:00 p.m. EST

The French language course leaders are Sylvie Boulanger, Ph.D., ing., Directrice, ICCA-Québec; and Charles Albert, M.Sc.E., P. Eng., Directeur des publications techniques, ICCA. The webinar schedule is as follows:

23 et 24 mars	12 h et 15 h (HNE)
21 et 22 septembre	10 h et 13 h (HNE)

INDUSTRIAL BUILDING DESIGN

This course is intended to provide understanding on design theory and the rationale behind code provisions that are unique to steel-framed industrial buildings. It focuses on practical and economical solutions for framing a typical industrial building to the requirements of the 2010 National Building Code of Canada and the pertinent provisions of CSA Standard S16-09.

The learning goals for this course include the following: the identification of the unique environmental and mechanical loading conditions in industrial buildings, learn the applicability and limitations of current codes and standards in Canada, select the most cost effective framing schemes, design crane-supporting girders, stepped columns, purlins and girts, explore lateral force resisting systems, roof trusses and efficient connections, understand serviceability considerations and limitations, design for high and low temperatures, learn the implications of seismic provisions, plus other topics such as fatigue, standing seam roofs, rehabilitation, tolerances and coatings.

The course leaders for the English language edition are Robert A. (Bob) MacCrimmon, P.Eng., Senior Civil/Structural Specialist, Hatch; and Greg Miazga, P. Eng., Engineering Manager, Waiward Steel Fabricators Ltd. The course schedule is as follows:

Toronto, ON	September 26
Saskatoon, SK	September 27

Calgary, AB	September 28
Vancouver, BC	September 29

The course leaders for the French language edition are Richard Vincent, B.Eng., ing., Vice-président, recherche, Groupe Canam Inc.; and Julien Richard, M.Sc.A., ing.jr., Hatch. The course schedule is as follows:

Montréal, QC	4 mai

CONNECTIONS I FOR STEEL DETAILERS

This 40-hour online course is the first in a two level series intended to develop the skills necessary for the design of steel connections as related to the construction of steel-framed structures. It is presented in 20 two-hour live sessions, two nights a week. The basic objective is to assist steel industry personnel in their understanding of basic connection design principles, and to design simple welded and bolted connections suitable for fabrication. Participants will also understand the origin of the rules and standards used in the steel industry.

The scope of the course is limited to connections normally encountered in common types of steel building structures and does not include connections in Seismic Force Resisting Systems.

The learning goals of this course are to understand and apply the major principles of the static forces and strength of materials in connection design, recognize the properties and characteristics of steel, use the appropriate connecting elements (bolts and welds), develop curiosity and critical judgment. Topics include properties of steel, high strength bolts, welds, tension members, bolted shear connections and welded shear connections.

The course leader is Marc Robitaille, M.Sc.A., P.Eng., Vice-President Engineering, Supermétal Structures Inc. The webinar schedule is as follows:

Tuesdays and Thursdays, 7:00 p.m. to 9:00 p.m. (ET)

October 4 to December 8

NEW MEMBERS

At the November meeting the CISC Board of Directors elected the following organizations as new members. Welcome all!

FABRICATOR
Anglia Steel Industries (1984)
6120 40th ST SE, Calgary, AB T2C 1Z3
Tel: 403-720-2363 | Fax: 403-720-2710
www.angliasteel.ca

I&M Welding & Fabricating Ltd.
859 60th St E, Saskatoon, SK S7K 5Z7
Tel: 306-955-4546

IBL Steel Limited
1827 Drew Road, Mississauga, ON L5S 1J5
Tel: 905-671-3301 | Fax: 905-671-2126
www.iblsteel.com

Impact Ironworks Ltd.
#107-19433-9th Ave., Surrey, BC V4N 4G2
Tel: 604-888-0851

Steelcon
120 Jevlan Drive, Woodbridge, ON L4L 8G3
Tel: 905-850-3147 | Fax: 905-850-3149
www.steelcongroup.com

EVENTS

NASCC – The Steel Conference
May 11 – 14, 2011 Pittsburgh, U.S.A.
www.aisc.org/nascc

ASCE/AISC Student Steel Bridge Competition
May 20 – 21, 2011 Texas A&M University, U.S.A.
www.aisc.org/content.aspx?id=780

2011 CISC / SSEF Annual Convention
June 8 – 11, 2011 Mont Tremblant, Quebec
www.cisc.ca/events/national/2011/06/agm/

REGIONAL EVENTS

SSEF Lecture, "Structural Steel Becoming Architecture: Case Studies of Aesthetics, Form, and Efficiency."
Jon Magnusson, Magnusson Klemencic Associates
February 14, 2011 McGill University, Montreal

Alberta Region Steel Design Awards
March 24, 2011 Edmonton, AB

Ontario Steel Design Awards
May 2011 Toronto, ON

Please contact the Regional Manager for further details.

REGIONAL PROJECTS

New Highway 25, six-lane, cable-stayed bridge linking Montreal to the North Shore
Structal-Bridges, a division of Canam Group, CISC Fabricator
Montreal, QC

Legend:
*sales office only
B - buildings
Br -bridges
S -structural
P -Platework
J -open-web steel joist

ATLANTIC

Cherubini Metal Works Limited S, P
Dartmouth, NS 902 468 5630
www.cherubinigroup.com

MacDougall Steel Erectors Inc. S
Cornwall, PE 902 855 2100
www.macdougallsteel.com

Marid Industries Limited S
Windsor Junction, NS 902 860 1138
www.marid.ns.ca

MQM Quality Manufacturing Ltd. S, P
Tracadie-Sheila, NB 506 395 7777
www.mqm.ca

Ocean Steel & Construction Ltd. S, P
Saint John, NB 506 632 2600
www.oceansteel.com

Prebilt Structures Ltd. S, P
Charlottetown, PE 902 892 8577
www.prebiltsteel.com

RKO Steel Limited S, P
Halifax, NS 902 468 1322
www.rkosteel.com

Tek Steel Ltd. S
Fredericton, NB 506 452 1949

QUÉBEC

Acier Fortin Inc. S
Montmagny, QC 418 248 7904
www.acierfortin.com

Acier Métaux Spec. inc. S
Chateauguay, QC 450 698 2161
www.metauxspec.ca

Acier Robel inc. S
St-Eustache, QC 450 623 8449
www.acierrobel.com

Acier Trimax Inc. S
Ste-Marie de Beauce, QC 418 387 7798
www.trimaxsteel.com

Alma Soudure inc. S
Alma, QC 418 669 0330
www.almasoudure.com

B.K. Fer Ouvré S
St-Bruno, QC 450 441 5484
www.bkiron.com

Canam Canada -
A division of Canam Group Inc. S, J
Boucherville, QC 450 641 4000
www.canam.ws

Charpentes d'acier Sofab Inc. S
Boucherville, QC 450 641 2618
www.sofab.ca

Charpentes Métalliques
TAG (6541984 Canada inc.) S
Ange-Gardien, QC 450 379 9661

Constructions PROCO Inc. S
St. Nazaire, QC 418 668 3371
www.proco.ca

Industries Canatal Inc. S
Thetford Mines, QC 418 338 6044
www.canatal.net

Lainco Inc. B, Br, S
Terrebonne, QC 450 965 6010

Les Aciers Fax inc B, S
Charlesbourg, QC 418 841 7771

Les Constructions Beauce-Atlas Inc. S
Ste-Marie de Beauce, QC 418 387 4872
www.beauceatlas.ca

Les Industries V.M. Inc. S
Longueuil, QC 450 651 4901

Les Métaux Feral Inc. S
St-Jérôme, QC 450 436 8353

Les Structures C.D.L. Inc. S
St-Romuald, QC 418 839 1421
www.structurescdl.com

Les Structures GB Ltée S, P
Rimouski, QC 418 724 9433
www.structuresgb.com

Locweld Inc. S
Candiac, QC 450 659 9661
www.locweld.com

Métal Moro inc S
Montmagny, QC 418 248 1018

Métal Perreault Inc. B, S, P
Donnaconna, QC 418 285 4499
www.metalperreault.com

Mometal Structures Inc. B, S
Varennes, QC 450 929 3999
www.mometal.com

Nico Métal inc. S
Trois-Rivières, QC 819 375 6426
www.nico-metal.com

Poutrelles Delta Inc. J
Ste-Marie, Beauce, QC 418 387 6611
www.deltajoists.com

Produits Métalliques PMI S
Rimouski, QC 418 723 2610
www.pmibuilding.com
batiment modulairs et structures dacier

Quéro Métal Inc. S
St. Romuald, QC 418 839 0969
www.querometal.com

Quirion Métal Inc. S
Beauceville, QC 418 774 9881
www.quirionmetal.com

Ray Metal Joliette Ltée S
Joliette, QC 450 753 4228

Structal-Bridges S,P
A division of Canam Group Inc.
Management, Plant and Sales Office,
Québec, QC 418 683 2561
Plant and Sales Office, Laval, QC 450 786 1300
www.structalbridges.ws

Structal-Heavy Steel Construction
A division of Canam Group Inc. S,J
Boucherville, QC 450 641 4000
www.structal.ws

Sturo Metal Inc. S
Levis, QC 418 833 2107
www.sturometal.com

Supermétal Structures Inc. S, P
St. Romuald, QC 418 834 1955
www.supermetal.com

Tardif Metal Inc. B, S, P
Lac St-Charles, QC 418 849 6919
www.sm-inc.com

Tecno Metal Inc. B, S
Quebec, QC 418 682 0315
www.tecnometal.ca

ONTARIO

ACL Steel Ltd. S
Kitchener, ON 519 568 8822
www.aclsteel.ca

Austin Steel Group Inc. S
Brampton, ON 905 799 3324
www.gensteel.ca

Azimuth Three Enterprises Inc. S
Brampton, ON 905 793 7793

Benson Steel Limited S, J
Bolton, ON 905 857 0684
www.bensonsteel.com

Burnco Mfg. Inc. S
Concord, ON 905 761 6155
www.burncomfg.com

C & A Steel (1983) Ltd. S
Sudbury, ON 705 675 3205

C_ore Metal Inc.
Oakville, ON 905 829 8588
www.coremetal.com

Canam Canada -
A division of Canam Group Inc. S, J
Mississauga, ON 905 671 3460
www.canam.ws

Central Welding & Iron Works Group S, P
North Bay, ON 705 474 0350
www.central-welding.com

Cooksville Steel Limited S
Kitchener, ON 519 893 7646
www.cooksvillesteel.com

Cooksville Steel Limited S
Mississauga, ON 905 277 9538
www.cooksvillesteel.com

D & M Steel Ltd. S
Newmarket, ON 905 936 6612

Eagle Bridge Inc. S
Kitchener, ON 519 743 4353

Ed Lau Ironworks Limited S
Kitchener, ON 519 745 5691
www.edlau.com

Fortran Steel Inc. S
Greely, ON 613 821 4014
www.fortransteel.com

G & P Welding and Iron Works S, P
North Bay, ON 705 472 5454
www.gpwelding.com

Gorf Contracting Limited S, P
Schumacher, ON 705 235 3278
www.gorfcontracting.net

IBL Steel Limited S
Mississauga, ON 905 671 3301
www.iblsteel.com

Lambton Metal Services S
Sarnia, ON 519 344 3939
www.lambtonmetalservice.ca

Laplante Welding of Cornwall Inc. S
Cornwall, ON 613 938 0575
www.laplantewelding.com

Linesteel (1973) Limited B, S
Barrie, ON 705 721 6677

Lorvin Steel Ltd. S
Brampton, ON 905 458 8850
www.lorvinsteel.com

M & G Steel Ltd. S
Oakville, ON 905 469 6442
www.mgsteel.ca

M.I.G. Structural Steel
(Div. of 3526674 Canada Inc.) S
St-Isidore, ON 613 524 5537
www.migsteel.com

Maple Industries Inc. S
Chatham, ON 519 352 0375
www.mapleindustries.ca

Mariani Metal Fabricators Limited S
Etobicoke, ON 416 798 2969
www.marianimetal.com

MBS Steel Ltd. J
Brampton, ON 905 799 9922
www.mbssteel.com

Mirage Steel Limited S, J
Brampton, ON 905 458 7022
www.miragesteel.com

Norak Steel Construction Limited S
Concord, ON 905 669 1767
www.noraksteel.com

Nor-Weld Ltd. B
Orillia, ON 705 326 3619
www.norweld.com

Paradise Steel Fab. Ltd. S
Richmond Hill, ON 905 770 2121

Paramount Steel Limited S
Brampton, ON 905 791 1996
www.paramountsteel.com

Pittsburgh Steel Group S
Vaughan, ON 905 669 5558
www.pittsburghsteel.com

Quad Steel Inc. S
Bolton, ON 905 857 9404
www.quadsteel.ca

Quest Steel Inc. B, Br, S, P
Mississauga, ON 905 564 7446

Refac Industrial Contractors Inc. S, P
Harrow, ON 519 738 3507
www.refacindustrial.com

Shannon Steel Inc. S
Orangeville, ON 519 941 7000
www.shannonsteel.com

Spencer Steel Limited S
Ilderton, ON 519 666 0676
www.spencersteel.com

Steelcon Fabrication Inc. S, B
Woodbridge, ON 905 850 3147
www.steelcongroup.com

Steel 2000 Inc. S
Chelmsford, ON 705 855 0803

Telco Steel Works Ltd. S
Guelph, ON 519 837 1973
www.telcosteelworks.ca

Times Iron Works Ltd. S
Pickering, ON 905 831 5111

Tower Steel Company Ltd. S
Erin, ON 519 833 7520
www.towersteel.com

Tresman Steel Industries Ltd. S
Mississauga, ON 905 795 8757
www.tresmansteel.com

Victoria Steel Corporation S
Oldcastle, ON 519 737 6151

Walters Inc. S, P
Hamilton, ON 905 388 7111
www.waltersinc.com

CENTRAL

Abesco Ltd. S
Winnipeg, MB 204 667 3981

Capitol Steel Corp. S
Winnipeg, MB 204 889 9980
www.capitolsteel.ca

Coastal Steel Construction Limited S, P
Thunder Bay, ON 807 623 4844
www.coastalsteel.ca

Elance Steel Fabricating Co. Ltd. S
Saskatoon, SK 306 931 4412
www.elancesteel.com

Empire Iron Works Ltd. S
Winnipeg, MB 204 589 7371
www.empireiron.com

IWL Steel Fabricators Ltd. S, P
Saskatoon, SK 306 242 4077
www.iwlsteel.com

JNE Welding Ltd. S, P
Saskatoon, SK 306 242 0884
www.jnewelding.com

Shopost Iron Works (1989) Ltd. S
Winnipeg, MB 204 233 3783
www.shopost.com

Supreme Group Inc. S, P
Saskatoon, SK 306 975 1177
www.supremesteel.com

Weldfab Ltd. S
Saskatoon, SK 306 955 4425
www.weldfab.com

ALBERTA

Anglia Steel Industries (1984) S, B, P
Calgary, AB 403 720 2363
www.angliasteel.ca

Bow Ridge Steel Fabricating S
Calgary, AB 403 230 3705

C.W. Carry (1967) Ltd. S, P
Edmonton, AB 780 465 0381
www.cwcarry.com

Canam Canada - A division of Canam Group Inc. S, J
Calgary, AB 403 252 7591
www.canam.ws

Capital Steel Inc. S
Edmonton, AB 780 463 9177

Collins Industries Ltd. S
Edmonton, AB 780 440 1414
www.collins-industries-ltd.com

Empire Iron Works Ltd. S, P, J
Edmonton, AB 780 447 4650
www.empireiron.com

Eskimo Steel Ltd. S, P
Sherwood Park, AB 780 417 9200
www.eskimosteel.com

Garneau Manufacturing Inc. S
Morinville, AB 780 939 2129

JV Driver Fabricators Inc. B, S
Nisku, AB 780 955 1746
www.jvdriver.com

Leder Steel Limited S
Edmonton, AB 780 962 9040
www.ledersteel.com

Moli Industries Ltd. S
Calgary, AB 403 250 2733
www.moli.ca

Norfab Mfg (1993) Inc. B
Edmonton, AB 780 447 5454

Northern Weldarc Ltd. S, P
Sherwood Park, AB 780 467 1522
www.northern-weldarc.com

Omega Joists Inc. J
Nisku, AB 780 955 3390
www.omegajoists.com

Petro-Chem Fabricators Ltd. S
Edmonton, AB 780 414 6701

Precision Steel & Manufacturing Ltd. S
Edmonton, AB 780 449 4244
www.precisionsteel.ab.ca

Rampart Steel Ltd. S
Edmonton, AB 780 465 9730
www.rampartsteel.com

RIMK Industries Inc. B, S
Calgary, AB 403 236 8777

Spartan Steel Ltd. S
Edmonton, AB 780 435 3807

Supermétal Structures Inc., Western Division S, P
St. Romuald, QC 418 834 1955
www.supermetal.com

Supreme Group Inc. S, P
Edmonton, AB 780 483 3278
www.supremesteel.com

Supreme Group Inc., Bridge Division S, P
Edmonton, AB 780 467 2266
www.supremesteel.com

Triangle Steel (1999) Ltd. S, P
Calgary, AB 403 279 2622
www.trianglesteel.com

TSE Steel Ltd. S
Calgary, AB 403 279 6060
www.tsesteel.com

W.F. Welding & Overhead Cranes Ltd. S
Nisku, AB 780 955 7671
www.wfwelding.com

Waiward Steel Fabricators Ltd. S, P
Edmonton, AB 780 469 1258
www.waiward.com

Whitemud Ironworks Limited S
Edmonton, AB 780 701 3295
www.whitemudgroup.ca

BRITISH COLUMBIA

Bar None Metalworks Ltd. S
Chilliwack, BC 604 701 6070
www.barnonemetals.com

Canron Western Constructors Ltd. S, P
Delta, BC 604 524 4421
www.supremesteel.com

Clearbrook Iron Works Ltd. S
Abbotsford, BC 604 852 2131
www.cliron.com

Empire Iron Works Ltd. S
Delta, BC 604 946 5515
www.empireiron.com

George Third & Son S, P
Burnaby, BC 604 639 8300
www.geothird.com

ISM Industrial Steel & Manufacturing Inc. B, Br, S, P
Delta, BC 604 940 4769
www.ismbc.ca

J.P. Metal Masters Inc. S
Maple Ridge, BC 604 465 8933
www.jpmetalmasters.com

M3 Steel (Kamloops) Ltd. S, P
Kamloops, BC 250 374 1074
www.m3steel.com

Macform Construction Group Inc. B, S, P
Langley, BC 604 888 1812
www.macform.org

Rapid-Span Structures Ltd. S, P
Armstrong, BC 250 546 9676
www.rapidspan.com

Solid Rock Steel Fabricating Co. Ltd. S
Surrey, BC 604 581 1151
www.solidrocksteel.com

Warnaar Steel Tech Ltd. S
Kelowna, BC 250 765 8800
www.warnaarsteel.com

Wesbridge Steelworks Limited S
Delta, BC 604 946 8618
www.wesbridge.com

XL Ironworks Co. S, J
Surrey, BC 604 596 1747
www.xliron.com

DETAILER

A.D. Drafting B
Brampton, ON 905 488 8216

A-1 Detailing and Engineering Ltd. B, P
Nackawic, NB 506 575 1222

ABC Drafting Company Ltd. B
Mississauga, ON 905 624 1147
www.abcdrafting.com

Acklam Drafting Service B, Br, S
Tecumseh, ON 519 979 1674

Aerostar Drafting Services B
Georgetown, ON 905 873 6565

Automated Steel Detailing Associates B, Br, P
Toronto, ON 416 241 4350
www.asda.ca

Base Line Drafting Services Inc. B
Concord, ON 905 660 7017
www.bld.ca

CADD Atla Drafting & Design B
Edmonton, AB 780 461 3550
www.caddalta.com

Cadmax Detailing Inc. B, Br
Boisbriand, QC 450 621 5557
www.cadmax.ca

Dessin Structural B.D. Inc. B, Br, P, J
Boucherville, QC 450 641 1434
www.bdsd.com

Dessins de Structures DCA Inc. B
Levis, QC 418 835 5140
www.structuredca.com

Draft-Tech Inc. B
Windsor, ON 519 977 8585

Dtech Enterprises Inc. B
White Rock, BC 604 536 6572
www.dtechenterprises.com

GENIFAB Inc. B, Br
Charlesbourg, QC 418 622 1676
www.genifab.com

Haché Technical Services Ltd. B, P
Caraquet, NB 506 727 7800

Husky Detailing Inc. B
London, ON 519 850 9802
www.huskydetailing.com

IRESCO Ltd. B
Edmomton, AB 780 433 5606
www.steeldetailers.com

JCM & Associates Limited B, P
Frankford, ON 613 398 6510

JP Drafting Ltd. B, Br, P, J
Maple Ridge, BC 604 465 8933
www.jpdrafting.com

KGS Group Steel Detailing Division
Winnipeg, MB 204 896 1209
www.kgsgroup.com

Les Dessins de Structure Steltec Inc B, Br, P
Ste-Thérèse, QC 450 971 5995
www.steltec.ca

Les Dessins Trusquin Inc. B, Br
Boisbriand, QC 450 420 1000
www.trusquin.com

Les Systèmes Datadraft Inc., Datadraft Systems Inc. B
Montréal, QC 514 748 6161
www.datadraft.com

M & D Drafting Ltd. B, Br, P
Edmonton, AB 780 465 1520
www.mddrafting.com

M & D Drafting Ltd. (BC) B, Br, P
Surrey, BC 604 576 8390
www.mddrafting.com

M & D Management Consulting Ltd. B
Parksville, BC 250 248 4871
www.detaileddesign.com

M-Tec Drafting Services Inc. B, Br, P
Sherwood Park, AB 780 467 0903
www.mtecdrafting.com

ProDraft Inc. B, Br, P
Surrey, BC 604 589 6425
www.prodraftinc.com

Ranmar Technical Services B, P
Mt. Pearl, NF 709 364 4158
www.ranmartech.com

River City Detailers Limited B
Winnipeg, MB 204 221 8420
www.rivercitydetailers.com

Saturn Detailing Services Ltd. B
Winnipeg, MB 204 663 4649

SDE Structure D'Acier B, S
Trois-Rivières, QC 819 376 9089
www.sde-draft.com

Summyx inc. Br, S
Ste-Marie, Beauce, QC 418 386 5484
www.summyx.com

TDS Industrial Services Ltd. B, P
Pitt Meadows, BC 640 465 6085
www.tdsindustrial.com

Techdess Inc. B
Saint-Jérôme, QC 450 569 2629
www.techdess.com

Tenca Steel Detailing Inc. Br
Charlesbourg, QC 418 634 5225
www.tencainc.com

ASSOCIATE ERECTOR

E.S. Fox Limited B, Br
Niagara Falls, ON 905 354 3700
www.esfox.com

K C Welding Ltd. B
Angus, ON 705 424 1956

Montacier International Inc. B, Br
Boisbriand, QC 450 430 2212
www.montacier.com

Montage D'Acier International Inc. Br, P
Laval, QC 450 727 5800

Niagara Rigging & Erecting Company Ltd. B, Br, S, J
Niagara on the Lake, ON 289 296 4594

ASSOCIATE SUPPLIER

Acier Altitube Inc.
Chomedey, Laval, QC 514 637 5050
www.altitube.com

Acier CMC, division de Crawford Metal Corp.
Longueuil, QC 450 646 6000
Angles, channels, hss, beams,

Acier Picard inc.
St-Romuald, QC 418 834 8300
www.acierpicard.com

Advanced Bending Technologies Inc.
Langley, BC 604 856 6220
www.bending.net
Rolled or bent structural sect

Agway Metals Inc.
Brampton, ON 905 799 7535
www.agwaymetals.com

Amcan Jumax Inc.
St-Hubert, QC 450 445 8888
www.amcanjumax.com
bolts, studs, anchors, hot-dip galvanization

Amercoat Canada
Montréal, QC 514 333 1164
www.amercoatcanada.com
Protective paints and coatings

Amercoat Canada
Oakville, ON 905 847 1500
www.amercoatcanada.com
Protective paints and coatings

Behlen Industries COM-BLD Division
Edmonton, AB 780 237 8497
www.behlen.ca

Blastal Coatings Services Inc.
Brampton, ON 905 459 2001
www.blastal.com
Blast Cleaning, Protective Coatings, Intumesent Fire Protection

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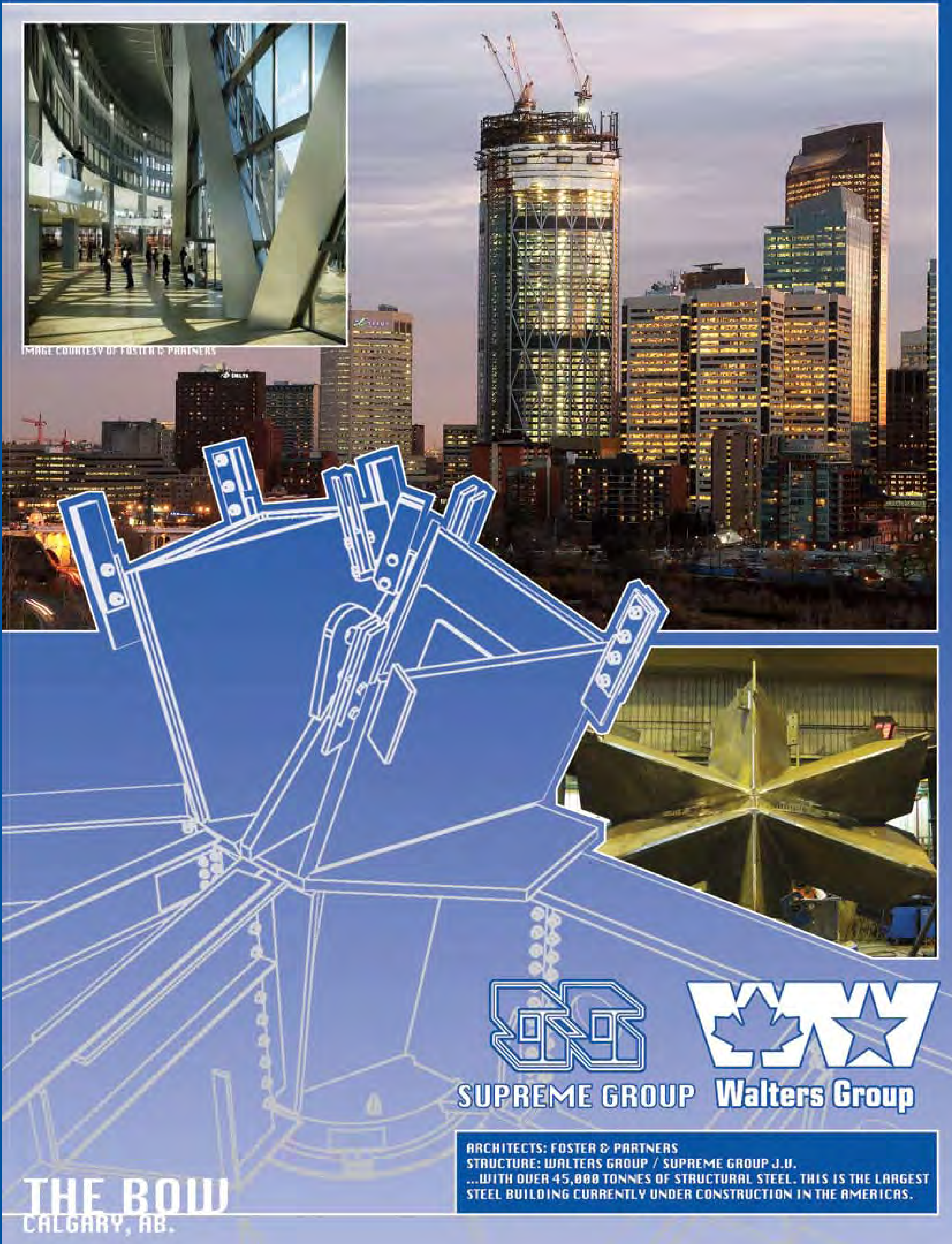
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