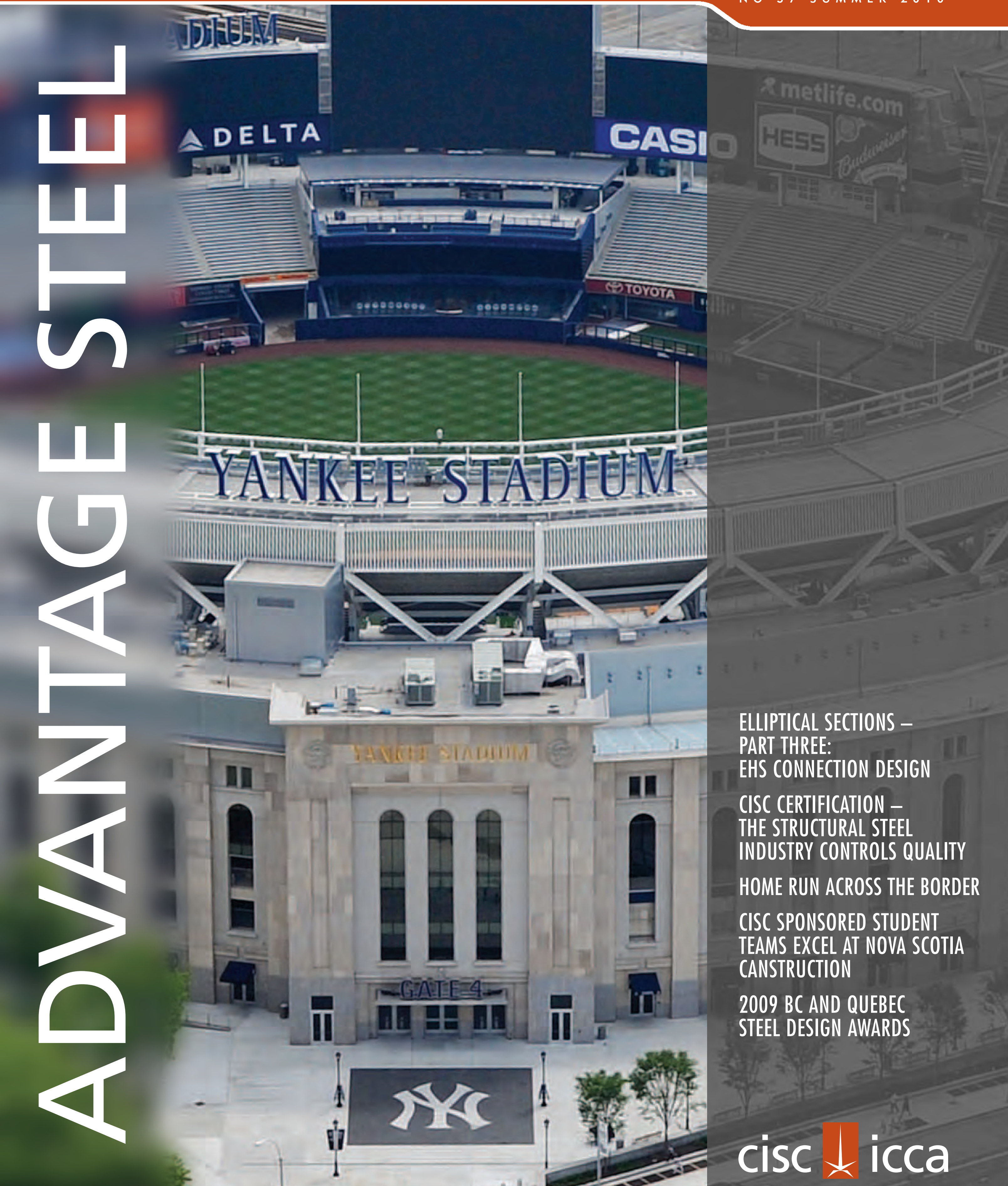
NO 37 SUMMER 2010

ADVANTAGE STEEL



cisc icca

CANADIAN INSTITUTE OF STEEL CONSTRUCTION

FROM THE EDITOR

You are probably asking yourself why we have a photograph of New York's iconic new Yankee Stadium on our cover. We are after all, Canadian. Well, Canam Group won a 2009 Quebec Design Award for their work on this, revitalized steel structure. Our article looks at some of the construction challenges faced and the benefit provided by 3D building information modelling (BIM).

Jeff Packer concludes his series on Elliptical Sections with EHS Connection Design. Many thanks to Professor Packer for this fascinating series. An article on CISC Certification highlights the importance of bringing quality assurance to our industry. Seismic Corner continues its coverage of buckling-restrained braced frames.

We explore the history of success achieved by a series of enthusiastic Dalhousie Engineering students. These students, sponsored by CISC and mentored by Professor Yi Liu have been winning awards for their CANstructions. Yes, they construct projects using cans of food! Afterwards, the food is donated to local food banks.

Not to be missed is our summary of the 2009 BC and Quebec Steel Design Awards. 2009 was one of the best in these regions, illustrating the excellence of steel being fabricated, detailed and constructed by our talented members. Congratulations to all the well deserved recipients including the Robson Square Domes imaged on this page.

This will be the last issue with Ask Dr. Sylvie as Dr. Boulanger is shifting her focus to sustainable steel. Thank you very much for a great run!

Ed Whalen, P.Eng.
President CISC

IN THIS ISSUE

CISC HEAD OFFICE
3760 14th Avenue, Suite 200, Markham, Ontario L3R 3T7
Phone 905-946-0864 Fax 905-946-8574 Email: info@cisc-icca.ca Web: www.cisc-icca.ca

REGIONAL CONTACTS

ONTARIO
3760 14th Avenue, Suite 200
Markham, Ontario L3R 3T7
Phone 905-946-0864 ext. 106
Email sjohn@cisc-icca.ca

QUÉBEC
2555, rue des Nations, bureau 202
St-Laurent, Québec H4R 3C8
Phone 514-332-8894 Fax 514-332-8895
Email sboulanger@cisc-icca.ca

WESTERN & CENTRAL CANADA
P.O. Box 38031
Edmonton, Alberta, T6A 0A0
Phone 780-719-5423
Email mpayne@cisc-icca.ca

ATLANTIC
15 Eydie Drive
Rothesay, New Brunswick E2E 4Z2
Phone 506-849-0901
Email alock@cisc-icca.ca

ADVANTAGE STEEL NUMBER 37 SUMMER 2010

Advantage Steel and the French-language edition Avantage Acier (available on request) are published by the Canadian Institute of Steel Construction (CISC) on behalf of its members. CISC is not responsible for the statements made nor for the opinions expressed in this publication by those contributing articles. CISC gratefully acknowledges the support contributed to this publication by the CWB Group. Visit us at **www.cisc-icca.ca** or Tel **905-946-0864**, Fax **905-946-8574**

CHAIRMAN Rob McCammon, *IWL Steel Fabricators*
EDITOR Ed Whalen, P.Eng.
MARKETING & COMMUNICATIONS SPECIALIST Rob White, BFA
EDITING/TECH ADVISOR Sylvie Boulanger, P.Eng. Ph.D
PUBLISHER Richard Soren
Design Print Media
Tel 416-465-6600 designprint@sympatico.ca
DESIGN & FORMATTING Katherine Lalonde
KLDESIGN
info@kldesign.ca

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

ISSN 1192-5248 PUBLICATIONS NUMBER 40693557

PLEASE RETURN UNDELIVERED COPIES TO:
Canadian Institute of Steel Construction
3760 14th Avenue, Suite 200
Markham, Ontario, Canada L3R 3T7

COVER PHOTO: The New Yankee Stadium, New York City | Photo courtesy of Structal-Heavy Steel Construction, a division of Canam Group Inc.

PHOTO ON THIS PAGE: Robson Square Domes, Vancouver, B. C.| Ziggy Walsh, George Third and Sons


photo: Anne Resta

Sylvie Boulanger, P.Eng. Ph.D. - *Ask Dr. Sylvie is a column for Advantage Steel aimed at readers seeking technical information on steel structures. Questions are welcome on all aspects of design and construction of steel buildings and bridges. 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. Questions for Dr. Sylvie, or comments on previous questions, may be submitted by e-mail to* **faq@cisc-icca.ca**.

ASK DR. SYLVIE

THIS IS MY LAST "ASK DR. SYLVIE" COLUMN. I WANT TO TAKE THIS OPPORTUNITY TO THANK ENGINEERS ACROSS CANADA (AND BEYOND) FOR ALL YOUR QUESTIONS, MY COLLEAGUES AND MY NETWORK OF EXPERTS FOR SHARING THEIR KNOWLEDGE WITH ME AND MIKE GILMOR WHOSE IDEA IT WAS TO TRUST ME WITH THIS UNIQUE COLUMN BACK IN 2003!

AVAILABILITY OF 350AT ANGLES

On a bridge project I am working on, I have specified 350AT angles. I have been told that they are difficult to obtain, and that 300 MPa is more common than 350 MPa. Is this true? What are my options? – A.D.

350AT (atmospheric corrosion-resistant weldable notch-touch) steel is more readily available in plates with thicknesses of at least 10mm. They are less available in angles, channels and W shapes. You know that what is most common is 350W steel. So, how do you meet your goal? Find 350A angles and perform a Charpy test (to meet the required 27 Joules energy absorption at -20C in your case) to obtain the T? Or find 350WT angles and use another corrosion system (galvanized or painted steel)? It would appear that it is easier to galvanize 350WT angles than to find 350A angles and test them to get the notch toughness requirement that you are looking for. However, that is not a hard rule. You should contact fabricators in your region to get an idea of what is more common. The question you must have already answered is whether the T is necessary. In many bridge applications, when the members belong to a secondary framing system, the notch toughness is not required.

300 MPa angles are still considered the standard as compared to 350 MPa angles. However, that is changing. Again, availability seems to have a regional flavour. One major nation wide service centre said it keeps about half and half. Another said it kept 80% of its stock in 300W angles. Structural angles are a hot-rolled product. They are more commonly available in ASTM A572 steel but we are seeing more and more ASTM A992 angles especially for seismic design considerations. You should be aware that there is a tendency for service centres to provide 350W angles even when 300W is asked, depending on stock. Make sure the fabricator lets you know of a substitution as this may have an impact on your connection design.

GALVANIZED BOLTS ON WEATHERING STEEL

I am installing a support for conduits on a future bridge. These supports are galvanized angles that will be connected to a 350AT girder. I plan on using galvanized high-strength A325 bolts. Can I use galvanized bolts on weathering steel? – R.L.

Yes, even though a galvanic reaction will occur. According to the AGA (American Galvanizers Association), when galvanized bolts are used on weathering steel, the zinc will initially sacrifice itself until a protective oxidized layer or patina develops on the weathering steel. Once this patina develops, it forms an insulating layer that prevents further sacrificial action from the zinc. The zinc coating has to be thick enough to last until the patina forms, at least two years. Most hot-dip galvanized bolts have enough zinc coating to last until the protective layer develops on the weathering steel, with only a minimal loss in coating life. You should note that A325 bolts are also available in weathering steel grade.

F_y REDUCTION FOR 350W PLATE

In the CISC Handbook (9th Edition, Table 6-3, p. 6-7), there is a reduction in F_y for 350W and 350WT steel (plates, floor plates, bars, sheet, and welded shapes). In fact, for a thickness >65mm, F_y drops down to 320MPa. Why is there an abrupt drop in resistance? And why does that only apply to W and WT steel, and not to A or AT steel? – B.V.

The decrease in tensile properties with increasing thickness is caused by the fact that the hot-rolling temperature is higher and the rate of cooling after rolling is slower on thick sections than on thinner sections. The drop in tensile resistance for W steel appears to be a compromise between achievable chemical composition and weldability at reasonnable cost. And the lack of drop in A steel appears to have something to do with its superior cooling process. According to one technical source, the thickness breaks

photo: Terri Meyer Boake

in G40.21 are based on breaks that existed in ASTM specifications for structural steels, which were developed much earlier based on many years of tensile testing. The tensile properties on hot-rolled steel products are dependent on the chemical composition. Within the permissible ranges of chemistries, which are limited by the need to maintain good weldability without the need for preheat, the tensile properties decline with thickness of the finished products. The chemistry of the rolled product can be adjusted within these limits for thicknesses up to approximately 65 mm thickness. Above 65 mm in thickness, the chemistry limit results in lower maximum tensile properties, which is why a lower value of 320 MPa has been included in the specification. To achieve the same tensile resistance, additional alloying or a more complex cooling process would have increased the cost of the 350W steel. This was less of a problem for the higher cost atmospheric steel, which is considered to have a superior chemical composition and cooling process already built into its price structure.

ANCHOR ROD REDUCED CAPACITY

Is there some kind of rule of thumb that can help me evaluate the reduced capacity in tension of an anchor rod as a function of the unused threads in the nut?

According to Gilbert Grondin, professor at the University of Alberta, there is a definite reduction in tensile capacity when the bolt (or rod) does not fully utilize the depth of the nut. This of course is due to the stripping of the threads. During a research project at the University of Alberta, it was determined that a reduced resistance occurs even if only one thread is unused. Unfortunately, there does not seem to exist information on the actual reduced capacity as a function of the number of unused threads. Also, the results are not representative of anchor rods, which have a diameter larger than what was used during this study. As far as bolts are concerned, one can use the full resistance of the bolt provided the last thread used is at least flush with the nut.

If you have found this column useful over the years, I would be happy to hear from you. My email is sboulanger@cisc-icca.ca. As a bonus, I will send you a pdf document of all the questions I've written for this column since 2003. All your questions should now be directed to faq@cisc-icca.ca.

SEISMIC CORNER
BUCKLING-RESTRAINED BRACED FRAMES – PART 2

Adam Korzekwa

The first part of this series on buckling-restrained braced frames (BRBF) presented the system and its main advantages. The second part of the series presents the specific design approach for BRBFs and their unique qualification testing requirements.

Buckling-restrained braced frames incorporate buckling-restrained braces (BRBs) as primary seismic-force-resisting elements. The design of BRBs is unique since the provisions of Clause 27 in CSA S16-09 only provide guidance for designing part of the system: the steel core. In order to verify the adequacy of the system preventing buckling, physical testing or adoption of reported test results of similar braces is required.

DESIGN OF BRBS

The steel core, cut from a plate, typically has a dog-bone shape with a yielding segment. For a given frame geometry, both the length of the yielding segment and its cross-sectional area (A_{sc}) can be set independently. It is thus possible for the designer to tune independently the resistance and stiffness of the BRB by adjusting the relative length and area of the yielding segment, as illustrated in Figure 1. Braces can be sized for the required resistance at each storey, thus minimizing overstrength and helping the yielding distribution over multiple storeys.

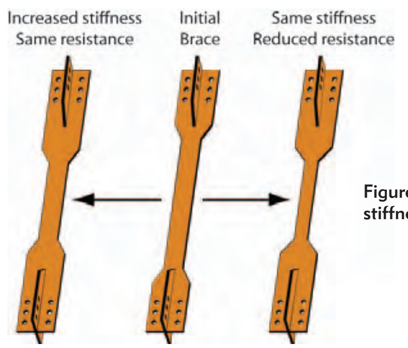


Figure 1 – Adjusting BRB core stiffness and strength

The sizing of the core according to S16-09 is simple and based on a single design equation: $T_r = C_r = \phi A_{sc} F_{ysc}$

This equation assumes an equal resistance in tension and compression and permits the use of the yield strength of the steel core (F_{ysc}), as determined from a coupon test. At the design stage, the core plate dimensions and steel grade are specified. Since the yield stress for a steel grade can vary considerably, possible brace overstrength must be considered in the design. A permissible range of yield strengths can be specified by the designer to reduce the possible variations in brace resistance. Alternatively, the core area can be adjusted to meet capacity requirements according to the results of a coupon test, in which case brace stiffness could vary.

Unlike sizing the core, the BRB resistance for capacity design cannot be assumed equal in tension and compression. The probable resistance of BRBs is higher in compression than in tension due to Poisson's effect and friction between the core and the buckling-restraining system. This overstrength in compression must be considered in the frame capacity design, since it will affect connections and capacity protected elements, as shown for a beam in a chevron configuration in Figure 2(a). In accordance with S16-09, the probable resistances must be based on results from brace testing.

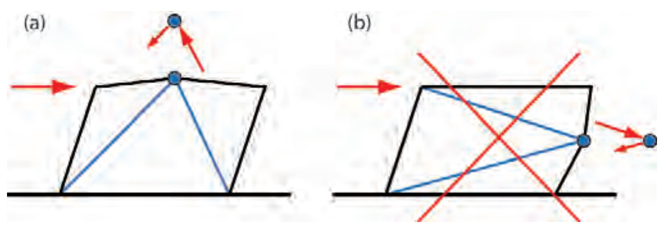


Figure 2 – Unbalanced forces due to brace overstrength in compression

Because of the higher resistance in compression than in tension, K-type bracings are not permitted (Fig. 2(b)). Also, to avoid soft-story response, S16-09 limits the height of BRBF systems to 40 m unless $I_e F_a S_a(0.2)$ is less than 0.35 or a stable inelastic response is demonstrated.

TESTING REQUIREMENTS

CSA S16-09 does not provide requirements for the design of the buckling-restraining system encasing the core nor for other brace details. The standard provides performance-based requirements and the suppliers are usually involved with the detailed design. Results from physical tests are required to demonstrate the system's inelastic cyclic performance and to obtain the resistances used in capacity design. CSA S16-09 refers to the qualification testing requirements outlined in AISC 2005 Seismic Provisions. In those provisions, a minimum of two cyclic tests are required, including at least one subassemblage test with connection rotational demands. To be qualified, braces must satisfy strength and inelastic deformation requirements. They must exhibit, within the required protocol range, a stable hysteretic behaviour with positive incremental stiffness.

Physical testing needs to be representative of the brace used in the project but need not be done on a project-specific basis. While a coupon test of the core plate is always required, brace qualification testing might not be necessary. The design can be based on tests reported in research or documented tests performed for other projects. Similar strength, design methodology, fabrication tolerances and connection detailing are required.

Tests covering various configurations are reported in the literature, and the body of available test data is expected to grow, which will reduce the need for additional testing. Several foreign BRB manufacturers have pretested proprietary products that could be used without further testing. Some Canadian fabricators have also produced, tested and installed BRBs.

ELLIPTICAL SECTIONS THREE-PART SERIES PART THREE: EHS CONNECTION DESIGN

Jeffrey A. Packer

In Part II, we examined member design of elliptical sections. In Part III, the last of the series, we take a closer look at connection design of EHS. As with member design, every attempt is made to simplify and rely on what is familiar. In fact, many conventional limit state failure models can still be applied to EHS connections. For example, research on gusset plate to slotted end EHS welded connections (Figure 1) has shown that the failure modes of circumferential fracture of the tube and tear out (or "block shear") of the tube – well recognized for slotted end CHS and RHS connections – are still applicable to EHS too, and efficient design recommendations have been advocated.

Directly welded tube-to-tube connections always represent a potential problem in tubular construction, due to the high flexibility of the hollow section walls, and recently some tests on welded EHS-to-EHS connections have been performed. Bortolotti et al. and Pietrapertosa and Jaspart undertook the first laboratory tests, in Belgium, on truss-type N- and X- connections, with EHS branches welded to the wide side of the EHS chord, followed by numerical modelling of the same connections. Choo et al. in Singapore extended the finite element modelling of EHS-to-EHS X-connections by studying branches welded to both the wide and narrow sides of the chord, and with the branch also oriented in both orthogonal directions for each chord orientation.

A recent study in Canada on EHS connections consisted of branch plates and through plates (both longitudinal and transverse) welded to both the wide and narrow sides of an EHS chord member (Willibald et al.), as shown in Figure 2. In the analysis of these tests, the notion of using "equivalent CHS" or "equivalent RHS" dimensions for transforming elliptical shapes was attempted. The design of CHS and RHS welded connections is now based on over 40 years of international research, so the prospect of repeating this research volume for EHS members is daunting – hence the quest to relate the design of welded EHS-to-EHS connections to other well-established design procedures for hollow steel sections.

FUTURE RESEARCH

Interest in EHS behaviour in compression has also now extended to concrete-filled sections (Yang et al.; Zhao and Packer) and even stainless steel oval sections (Theofanous et al.). As might be expected, it has been shown that concrete-filled EHS provide much greater axial load capacity, and greater ductility, compared to empty EHS; a feature that can be employed with EHS columns perhaps, if the upper size range proves insufficient. Research on welded EHS-to-EHS connections is still continuing at the University of Toronto; this is currently focussed on truss-type T- and X-connections (Figure 3) and is being performed by Ms. Tarana Haque. So, architects may soon be venturing into exotic elliptical tube trusses and even bolder AESS statements.


Figure 1: Gusset plate-to-slotted EHS connection under axial tension – slot end open (University of Toronto)

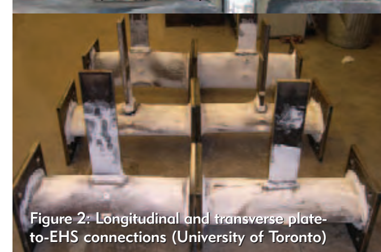


Figure 2: Longitudinal and transverse plate-to-EHS connections (University of Toronto)

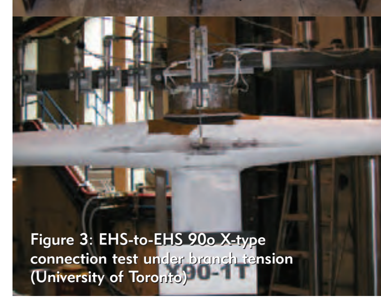


Figure 3: EHS-to-EHS 90o X-type connection test under branch tension (University of Toronto)

ACKNOWLEDGEMENTS

Financial support for the study of Elliptical Hollow Sections has been provided by the **Steel Structures Education Foundation** (SSEF), the Comité International pour le Développement et l'Étude de la Construction Tubulaire (CIDECT), and the Natural Sciences and Engineering Research Council of Canada (NSERC).

The full list of References and the complete Table of Engineering Properties for the 46 EHS shapes are available on the CISC website: **www.cisc-icca.ca/publications/advantagesteel/36**

Jeffrey A. Packer is Bahen/Tanenbaum Professor of Civil Engineering at the University of Toronto.

CISC CERTIFICATION –
THE STRUCTURAL STEEL INDUSTRY CONTROLS QUALITY

The CISC announced in March its plan to offer a Canadian structural steel quality certification program. Ed Whalen, President of the CISC stated that this program meets a specific need within Canada. "Not all projects demand this level of proof of control, however the move towards quality systems within the construction industry is now becoming common place".

"Through the leadership of the CISC, the steel industry is responding to a need. The steel industry is now moving towards quality programs where other industries have done so years ago", Mr. Whalen said. "We are seeing it all around the world. In Europe with EN 1090 and in the US with the AISC Certification, structural steel specific quality programs are now being developed and mandated."

The CISC Certification program will consist of two voluntary audited programs:

1) Steel Structures; and

2) Steel Bridges

The main components of CISC Certification:

1) The program is third party audited annually by Standards Council of Canada (SCC) accredited registrars or CISC approved industry specific auditing companies.

2) Certified companies will be posted on the CISC Website.

3) The quality programs will adopt the core principles of ISO 9001.

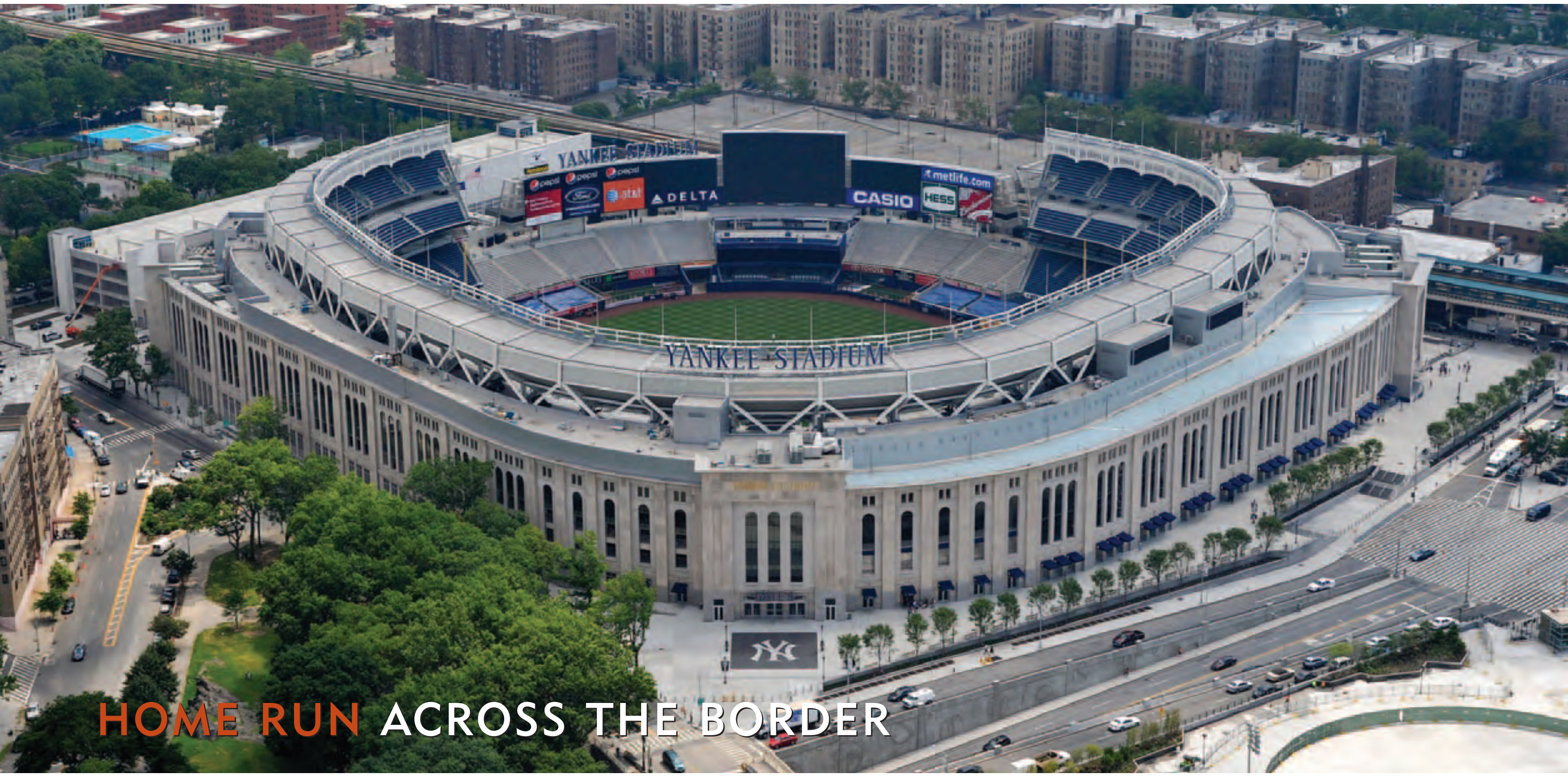
4) It requires structural steel specific procedures and practices to comply with the CSA S16, W47.1, W59, and/or CSA S6.

5) It requires specific procedures and practices to comply with the CISC Code of Standard Practice.

For 80 years, the Canadian Institute of Steel Construction has provided leadership in the steel fabrication industry with elite fabricators able to meet the challenges of any project while adding value to the construction team. Their experience, knowledgeable professionals, systems, and state of the art equipment make our members the fabricators of choice.

CISC Certification now provides the steel fabricator and the owner a tool to ensure understanding of the project scope, quality, and a successful project. The benefit for the fabricator typically results in lower costs and the ability to become more competitive. It's a win-win for everyone.


OUTERSHIELD 71
SUPREME



HOME RUN ACROSS THE BORDER

Ginette Gélineau

Since 1993, Canam Group, headquartered in Quebec, and its business unit Structal-Heavy Steel Construction (Structal) have participated in the construction of 54 stadiums and arenas in North America, 20 of them home to Major League teams. But 2006 was the year Structal hit a home run that started a series of consecutive victories, with the construction of many stadiums and arenas in New York, New Jersey, Pennsylvania, Oregon, Florida and British Colombia. This home run came about with the awarding of the contract to build the steel structure for Yankee Stadium, a 51,800-seat baseball stadium that is very similar in design to the original facility built in 1923. The new stadium, which opened in time for the 2009 baseball season, saw the Yankees win their 27th World Series championship against the Philadelphia Phillies.

STRIKING FEATURES

The new building has two striking features – the legendary frieze adorning the stadium's perimeter and the Great Hall with a majestic simplicity that inspires awe.

THE FRIEZE

Both a symbolic and historic element, the copper frieze which adorned the old stadium was reproduced, but the new one is made of steel and coated with zinc to protect it from rusting. More than just a decorative element, the frieze is part of a system of cantilevers holding up the upper deck and the lighting system on the roof.

The frieze is 446.5 metres long and composed of units each weighing 13 tons between the supporting frames. It is formed from a steel plate 16 mm thick, in which the arc shapes and openings were cut out with a laser. The raised patterns were created from 200 x 150 mm hollow structural sections (HSS).

Installation of a section of the frieze, a symbolic element to the Yankees fan base

THE GREAT HALL

The Great Hall covers 93,000 m^2 and features a seven-storey-high ceiling. Fans passing through this main entry space can admire the twenty or so banners of past and present Yankees superstars. The banners are framed with architecturally exposed steel, composed of tubular pieces welded from plates and connected to the ceiling and the upper part of the walls.

The Grand Hall's perimeter wall is supported by box columns acting as a perimeter moment frame, with the perimeter frame tied back to the main structure with built-up exposed box girders.

STRUCTURAL DESIGN

Yankee Stadium has five seating levels: Field, Main, Suite, Upper and Grandstand. Intended to maximize the seating space and offer unobstructed views at the Suite and Upper Levels, the structural design called for cantilevers extending up to 15.2 metres, supported behind the last Main Level columns. Steel was naturally the material of choice for this prestigious project. Concrete construction was only used for the Field and Main Levels.

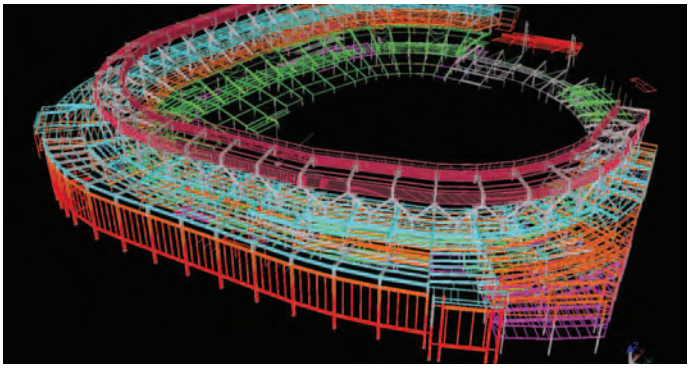
"A project of this magnitude necessarily involves its share of challenges, with or without a hybrid structural concept," explains Serge Dussault, vice-president of engineering at Structal. "Because the lower levels are built of concrete, the major structural steel pieces had to be connected to the concrete walls by means of large embedded steel plates. Since the construction tolerances of concrete are much looser than those of steel structures, we had to use connections that could adjust quickly to highly variable site conditions," he adds.

USE OF 3D BUILDING INFORMATION MODELING

According to Michael J. Squarzini, P.E., LEED AP, senior engineer with Thornton Tomasetti, since work progressed at an accelerated pace, the use of 3D building information modeling was critical to detecting clashes between the various trades and allowed the team to achieve project-wide coordination and keep the project on schedule.

Ensuring that half of the structural components remained exposed and part of the project's architectural structure posed a challenge, because the changing geometry along the stadium's radial axes required many single-use connections that had to meet high aesthetic standards.

"The 3D model became an indispensable tool for reviewing the connections, particularly the frieze connections, since the frieze is both an ornamental and structural element of the new stadium," Squarzini adds.



3-D model used at different stages of construction

RECOGNITION AND STEEL DESIGN AWARD

Yankee Stadium received an Honorable Mention at the 2009 CISC Steel Design Awards for successfully tackling many technical challenges associated with the steel-framed structure.

At the Quebec Steel Symposium, which preceded the CISC Steel Design Awards, Yankee Stadium was one of the finalists in the annual competition and, as the members of the Structal team proudly learned, won the People's Choice Award.

Yankee Stadium also made a great impression on our American neighbours as evidenced when the project was recognized as Overall Project of the Year by *New York Construction magazine*.

"As a structural steel contractor," states Luc Pelland, president of Structal, "we play a vital role in all the steps needed to achieve successful project integration. Our customers know they can count on our proven expertise and our commitment to serve them well."

OWNERS: New York Yankees
ARCHITECTURAL FIRM: Populous (formerly HOK Sport)
ENGINEERING FIRM: Thornton Tomasetti
GENERAL CONTRACTOR: Turner Construction
STRUCTURAL STEEL CONTRACTORS: Koch Skanska/Structal-Heavy Steel Construction

3D MODELS AND DRAWINGS: Technyx, Cadmax
STEEL FABRICATOR: Canam Group
TONNAGE: 13,000 tons
FABRICATION PLANTS: St. Gédéon de Beauce, QC
Quebec City, QC

CISC SPONSORED STUDENT TEAMS EXCEL AT NOVA SCOTIA CANSTRUCTION®

Alan Lock

CANstruction Nova Scotia a Feed Nova Scotia community event, helps fight hunger in a way that is both educational and fun. It is an opportunity to showcase remarkable talent from the region. For the last five years CISC has been a proud sponsor of teams from Dalhousie University in the annual Nova Scotia CANstruction event. During this period the CISC sponsored Dalhousie Civil Engineering teams have constructed winning structures for a total of seven awards.

Teams of architects, engineers, designers and students mentored by professionals, compete to design and build structures made entirely from full cans of food. The cans used may only be held together using scotch tape, cardboard and rubber bands if necessary to form the structures. Imaginations run wild as participants are challenged to use their knowledge and skills to stack cans into structurally sound objects, often exploring unchartered territories in engineering and architectural design. Thanks to the creative genius of the teams, fantastic "CanSculptures" gradually emerge from what at first looks like organized chaos. The entries are judged by a panel of community leaders and local professionals. Winners are chosen in each of the six different categories. The Award Categories being:

- Best Meal
- Structural Ingenuity
- Best Use of Labels
- Jurors Favourite
- Honourable Mention
- People's Choice Award for each location (as chosen by the public)

The resulting "CanSculptures" are displayed for several days in various public places. At the close of the competition, all of the canned food used in the structures is donated to Feed Nova Scotia for distribution to its many member agencies - including food banks, shelters, soup kitchens and school lunch programs. In 2009, Feed Nova Scotia received 18,476 kg of food (33,653 cans) from CANstruction Nova Scotia participants. 17 teams participated, raising approximately $41,000 to help feed hungry people throughout the province.

Photos of the winning entries are sent to an international judging competition in the United States, where they compete with the best structures from over 147 cities throughout the world. In 2005, the Dalhousie civil engineering teams entry "The Two-faced Grecian Vase" mentored by Dr. Liu, received an honourable mention in the International CANstruction competition held in Los Angeles.

All of the CISC sponsored past entries in the competition have highlighted diverse, complex and intriguing designs; a few of these entries are shown below.

2009 – DEFYING GRAVITY, DEFYING HUNGER

Award – Structural Ingenuity

The team left to right:
Stacy Murray, Tracy Walker, John Bergese, Sandra Soon, Professor Yi Liu, Minqing Deng, Whitney Surgenor

The introduction from the team explains their purpose. "The 'gravity-defying' can-sculpture is our way of helping to eradicate hunger's painful and persistent effects in our society. With your very kind monetary contributions you 'can' all join in with us as partners in 'can-sculpturing' to help defying hunger". The fun and the challenge of building these complex shapes has been the "drawing card" for the students, some being involved on previous year's teams, while at least one past team member took part in three competitions.

Dr. Liu spoke of her involvement, "I just wanted to have a great structure and I think that we have achieved that and most importantly the students had a great time".

2007 – THE CURL

Awards – Structural Ingenuity
– People's choice

The Curl
You may not have heard of all the curls of the world,
That arise in demand over our great global land;
A little child's curls with their ruffles and whorls,
Put joy in our hearts much more than a grand;

We will not forget the young children with curls,
And the hurt hunger causes in their little world

Yi Liu, Associate Professor, Civil Engineering

Team members included students **Josh DeYoung, Alan Grant, Sandra Soon, Lynsey Poushay, Sabine Chantel, Susan Tibbo, Julie Briand, and Dane George**

In 2007, the Dalhousie engineering students defied gravity and expectations with an uncanny contribution to CANstruction Nova Scotia. Mentored by Associate Professor Yi Liu, the civil engineering team won the structural ingenuity award and the Halifax Shopping Centre people's choice award for their contribution, "The Curl," was assembled using 2,000 cans of tuna. Nineteen teams participated in the exhibitions, which were held at different shopping centres in the province. Shoppers knelt on the floor to try and figure out how the cans were held in place for "The Curl." Although somewhat unassuming, the structure was appreciated for its flowing lines and the complexity of its design.

It was an intense project for the busy students and professor. "It gives the students a sense of awareness of the needs within the community, and their responsibilities toward helping to solve problems in society, in this case, hunger," says Dr. Liu. "Feed Nova Scotia is a good cause, and we all have fun as a team. This competition also pushes us to think of structural designs we would never be able to work on in the normal course of our education and careers.

2005 – I AM AMPHORA, THE TWO-FACED GRECIAN VASE

Awards – Honourable Mention Award

– Honourable Mention in the 'International CANstruction Competition, held in Los Angeles.

(The only Canadian winner at this level to date)

I am a Grecian vase from way back in antiquity,
My ears, my foot, my neck, and my mouth,
Are all the parts my makers named for me.
But I am a little proud, I most honestly do say,
I show my faces on all sides and they are not made of clay.
My only foot is on the ground and spread a little all around,
That helps me stand and then my body grows,
As your gaze moves upwards from my toes.
My body is a shell you know, that's made of stacked up cans,
A feat that isn't easy if you've ever balanced on your hands.
Then my lipped mouth is supported by my pretty neck,
A cantilevered lip around my mouth that really caused us heck.
I was a trial of love and labour by Dal students for all you to see,
You can find all my faces, but not the one inside of me!

Team members included students **Korapin Chaotakoongite, Neal Cody, Tyler Chapman, Marcia Smith, Matt Himmelman, along with Professor Yi Liu, Jeff Clair and Mark MacDonald.**

This ingenious event showcases the remarkable talent and creativity within the community, as well as aiding in the fight against hunger. All team members involved have benefited from the sharing of ideas in the original designs and constructability of these structures under the constraints of the competition. The CISC Atlantic Region continues to be proud to share in the development of young engineering minds of the future.


NUCOR-YAMATO
STEEL

BRITISH COLUMBIA AND QUEBEC
2009 STEEL DESIGN AWARDS

BRITISH COLUMBIA REGION AWARDS

ARCHITECTURAL AWARD
Award of Excellence
Robson Square Domes

ARCHITECT: Hughes Condon Marler Architects & Clive Grout Architects
STRUCTURAL ENGINEER: Read Jones Christoffersen Ltd.
OWNER: The Ministry of Labour's & Citizen's Services
GENERAL CONTRACTOR: Ledcor Constructors Special Projects
FABRICATOR: George Third & Son Ltd.
STEEL DETAILER: George Third & Son Ltd.
STEEL ERECTOR: KWH constructors

The Robson Square Sunken Plaza and Ice Rink Revitalization Project consisted of a new, extended ice skating rink, and two new "elliptical" stainless steel domes to replace the previous circular domes. In order to support the new domes, the existing supporting cantilevered concrete beams required substantial upgrading. Challenges were found in tightly fitting an "elliptical" dome into the existing "semi-circular" concrete supporting structure. The geometry of the dome is very intricate and required very precise detailing in order to have all the connections work. To make detailing and fabrication more efficient, the ring beam geometry was approximated by two different radii. Secondary tee ribs and tee on 6.625" diameter members were all straight and segmented. The 3-D model built using the X-Steel Program enabled precise detailing of all members for fabrication.

Each piece of the dome was preassembled in shop to ensure a good fit during installation at site. Because of the shear size and weight of each dome, it was spliced into 4 sections before being shipped to site. The total weight of stainless steel for the project was 144,000 lbs. Once at site, each dome was successfully erected within 8 hours. Final fitting, welding and polishing needed to be completed on time in order to allow for the glazier to drop the glass panels onto the stainless steel dome.

ARCHITECTURAL AWARD
Award of Merit
Central Valley Greenway Bridge

ARCHITECT: Patkau Architects Inc.
STRUCTURAL ENGINEER: Delcan
OWNER: City of Burnaby
GENERAL CONTRACTOR: Smith Bros. & Wilson (BC) Ltd.
FABRICATOR: George Third & Son Ltd.
STEEL DETAILER: International Steel Detailing
STEEL ERECTOR: KWH constructors

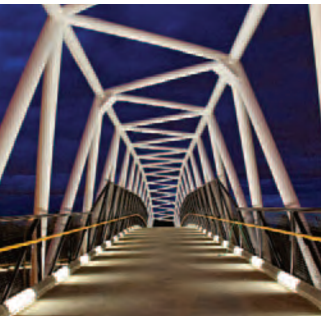
ENGINEERING AWARD
Award of Excellence
Richmond Speed Skating Oval

STRUCTURAL ENGINEER: Fast + Epp Engineers
ARCHITECT: Cannon Design
OWNER: City of Richmond
PROJECT DIRECTORS: MHPM Project managers
GENERAL CONTRACTOR: Dominion Fairmile Construction
FABRICATOR: George Third & Son Ltd.
STEEL DETAILER: Tru-Line Drafting
CONSTRUCTION ENGINEERING: Somerset Engineering
STEEL ERECTOR: KWH Constructors

The arches for the Olympic Oval are the longest spanning hybrid steel-wood arches in the world. Spanning 100 meters, the arches are formed in a hollow triangular shape 2.1 meters high. A 10mm thick steel blade strengthens each arch on the bottom edge and metaphorically references the speed skating function. On the top side, W150 steel beams and 25mm thick steel plates strengthen the arch. The steel beams rise off of the wood slabs at both ends to create a raised roof and cantilever overhangs. A special steel jig was fabricated in order to bend and warp the wood and steel components to the correct geometry. The arches were constructed in 25 meter segments and field spliced with bolts, welding, and epoxy glue. The unusual design and tight arch tolerances required significant in situ fine tuning of erection procedures. The arches were temporarily and permanently stabilized by longitudinally oriented rows of HSS 300 x 300 that are curved to match the roof shape and moment spliced over the arches to prevent lateral torsional buckling of the arches. Tall gable end walls and lateral bracing in the east-west direction consist of structural steel framing. Custom steel castings were designed and manufactured for the yellow cedar struts supporting the cantilever overhang. The building has often been cast as a design featuring pine beetle wood, however the key to spanning the enormous 100 meter span was the combination of steel and wood to create a stunning and striking architecture.

KRENTZ AWARD
Winner
Vancouver Convention Center

OWNER: PAVCO/VCCEP Ltd.
ARCHITECTS: LMN Architects, Musson Cattell Mackey Partnership, DA Architects + Planners
ENGINEER: Glotman Simpson Consulting Engineers
GENERAL CONTRACTOR: PCL Constructors Westcoast Inc.





cisc icca
BRITISH COLUMBIA

Lifetime Achievement Award

presented to

Mr. William Baird P.Eng.

In recognition of a lifetime dedicated to the advancement and understanding of steel structures in BC and in Canada through his unparalleled devotion to expanding the knowledge of the steel industry for the benefit of society, the industry and associated professions.

Presented by the BC Regional Committee of the Canadian Institute of Steel Construction
November 2009


Left to right - Robson Square Domes, Central Valley Greenway Bridge, Richmond Speed Skating Oval, Vancouver Convention Center, Lifetime Achievement, Canron Aisle 6 Re-use.

STEEL FABRICATOR & ERECTOR: Canron Western Constructors Ltd.
STEEL DETAILER: Dowco Consultants Ltd.

The key solution for planning the structure turned out to be steel trusses for the full depth of floor levels and in a number of cases, multiple floor levels together with long span floor framing and roof framing. Steel joists provided a key part of the puzzle carrying heavy loads over long spans and easily integrated with the truss framing of the support walls. 10 foot deep trusses over the ballroom create a span between key bearing points that run down through the building onto the marine deck and onto the steel pipe piled foundations. Being able to span the distances necessary to reach key bearing points provided overall efficiencies that only the joists could provide.

Atop the sloping and irregularly shaped roofs is a living green roof, the largest of its kind in North America to date. Only with the use of steel roof joists could the structure have been as economical and quick to construct. With joists over the ballroom spanning to 120ft, the challenge of supporting the green roof was solved. Floors with a combination of composite beam and joist provided an efficient solution where vibration sensitivity was high and the depth available to mechanical and structure was very limited. The choice of a joist system helped the project maintain its budget and erection time-lines. Careful selection of systems helped contribute to the targeted LEED Gold Status.

LIFETIME ACHIEVEMENT

Winner
Mr. William Baird, P.Eng,

The Lifetime Achievement Award was presented to Mr. William (Bill) Baird, P.Eng, in recognition of a lifetime dedicated to the advancement and understanding of steel structures in BC and in Canada.

SUSTAINABILITY AWARD

Award of Excellence
Canron Aisle 6 Re-use

OWNER: Canron Western Constructors Ltd. (A Supreme Group Company)
ENGINEER: Janto Engineering
DETAILER, ERECTOR: Supreme Steel Ltd.

HISTORY In 1974, Canron added a pre-engineered building "Aisle 6" to its Vancouver plant for fabricating bridges and large structures. After Canron moved out of its False Creek facility, the main plant was torn down in 1998, with the exception of Aisle 6—which stood for a further 15 years before being dismantled.

THE 3 R's – REDUCE, REUSE, RECYCLE In 2006, Aisle 6 was dismantled and shipped to Edmonton to be reused at the new Acheson plant. The main structural members as well as the original crane girders were reused and subsequently blasted, inspected and repainted. Both the two 20 Ton hoists and existing 20 Ton crane, along with the end trucks, were dismantled, refurbished, inspected and reused.

OLD BECOMES NEW The relocation of Canron's Aisle 6 to Edmonton has been a success for the Supreme Group of Companies. Costs were kept to a minimum because we were able to reuse an existing structure. Another advantage of reusing Aisle 6 was not having to design the Acheson plant from the ground up. This saved a significant amount of time for the company. It also reflects Canron's and Supreme Group's continuous commitment to sustainability in steel construction. The Acheson plant demonstrates how versatile and durable steel can be and how something old can be given new life.

QUEBEC REGION DESIGN AWARDS

COMMERCIAL / INSTITUTIONAL PROJECTS

Winner
Félix Leclerc Library Expansion, Quebec City

Jury Mention: For a balanced expression of the space including both the rigour and a harmonious integration between steel, wood and glass.

ARCHITECT: Anne Carrier Architect
STRUCTURAL ENGINEER: EMS Engineering
GENERAL CONTRACTOR: Constructions Pierre Blouin
OWNER: Ville de Québec
STRUCTURE MANUFACTURER: Quirion Métal Inc.

In the new section of the Val-Belar Library, in Quebec City steel is visible on the inside just as much as the outside. The steel structure of the existing building, built in 1987, had to come up to the standards, particularly seismic. A ductile steel plate shear wall has been incorporated. This technique was used for the first time in Quebec City. Since the beginning of the project, it was intended to give an architectural expression to the structure. The veil of structural wood is supported by the steel beams which fill up the space and then disappear before the large bay windows that look onto the park. All the glass walls also contain a steel structure which holds the mullions. The elegance of the steel and the thinness of the wood decking give lightness to the roof. On the back, an oculus was pierced above a masterpiece.

Left to right - Lebourgneuf Complex, Rapid Replacement of the Island Park Overpass Bridge, Nelson Mandela Bay Stadium, South Africa, Yankee Stadium,

COMMERCIAL / INSTITUTIONAL PROJECTS

Honourable Mention

Gatineau Sports Center

Jury Mention: For clarity of the concept adapted to the space and the landscape where steel meets concept criteria simply and efficiently.

ARCHITECT: Lapointe Magne et Associés
STRUCTURAL ENGINEER: Nicolet Chartrand Knoll ltée
GENERAL CONTRACTOR: Decarel inc.
OWNER: Ville de Gatineau
STRUCTURE MANUFACTURER: Structures Yamaska inc., Poutrelles Delta inc.

COMMERCIAL / INSTITUTIONAL PROJECTS

Honourable Mention

Lebourgneuf Complex, Québec City

Jury Mention: For the audacious integration of four ductile steel plate shear walls and their independent incorporation into the particular architectural design of the building.

ARCHITECT: Moreau & Beaudoin Architects
STRUCTURAL ENGINEER: EMS Engineering
GENERAL CONTRACTOR: Construction Richard Arsenault
OWNER: Lebourgneuf Complex inc.
STRUCTURE MANUFACTURER: Sturo Métal inc., Canam Canada

INDUSTRIAL PROJECTS / BRIDGES

Winner

Rapid Replacement of the Island Park Overpass Bridge, Ottawa

Jury Mention: For an extraordinary action strategy using the innovative prefabrication of steel structure and a rapid erection which reduced greenhouse gases emissions by 97%.

STRUCTURAL ENGINEER: McCormick Rankin
GENERAL CONTRACTOR: Dufferin Construction
OWNER: Ontario Ministry of Transportation
STRUCTURE MANUFACTURER AND DETAILER: Structal-ponts, div. Groupe Canam
INSTALLER: Montage d'Acier International inc.
TRANSPORTER: Mammoet Canada Eastern Ltd

To proceed with replacement of two twin bridges built with concrete slab on steel beams in 1959 on Highway 417 in Ottawa, an innovative solution was applied for the first time in Canada. The existing structures were removed and replaced using "self-propelled modular transporters"(SPMT). An adjacent site was used as a precast area for the two new structures. For the first time in North America, semi-integral abutments would be used. The use of steel shims was required to ensure that 100% of girder load is carried by the bearing devices. According to the Ontario Ministry of Transportation, the use of this extraordinary technique in bridge reconstruction resulted in the cost savings of $2.4 M compared with the standard, the work duration was reduced from 2 years to less than 17 hours. It also led to a 97% greenhouse gas emission reduction.

NON-QUEBEC PROJECTS

Winner

Nelson Mandela Bay Stadium, South Africa

Jury Mention: For its modern and elegant structural design, whose finesse of details makes the most of steel values.

ARCHITECT: GMP Architect Structural
ENGINEER: Schlaich Bergermann and Partners
GENERAL CONTRACTOR: Birdair Inc.
OWNER: Nelson Mandela Bay Municipality
DETAILER: Dessins Cadmax

Five new stadiums had to be built in South Africa in anticipation of the 2010 Soccer World Cup, the Nelson Mandela Bay Stadium in Port Elizabeth was one of them. This stadium is characterized by its spectacular location next to North End Lake. Its roof is a unique design which is no less spectacular than its location. It is made of Teflon-coated fibreglass and supported by 36 steel frames of cantilever trusses. Due to its flexibility, resistance and overall cost, this ''airy'' roof with both green and futuristic accents required the use of about 2500 tons of steel. The roof's construction has presented a major challenge, mainly due to geometric complexity of the structure. As many as 4200 assembly drawings had been required for the structure's erection.

Honourable Mention

Yankee Stadium, New York, NY

Jury Mention: For successful handling of various technical challenges related to an outstanding steel structure for an irregular and complex concept.

ARCHITECT: HOK Sport
STRUCTURAL ENGINEER: Thornton Tomasetti
GENERAL CONTRACTOR: Turner Construction
OWNER: New York Yankees
STRUCTURE MANUFACTURER AND DETAILER: Structal-construction métallique lourde, div. Groupe Canam Structure
DETAILER: Dessins Cadmax

Garage Legendre and STM Collision Centre, Yobé-Trépanier Residence, Lionel Daunais Public Market

Honourable Mention
Fenway Park, repairs 2009, Boston, MA

Jury Mention: For the complexity of renovation work highlighting values of steel that contributes to the heritage preservation where each detail in itself is a technical and architectural challenge.

ARCHITECT: D'Agostino Izzo Quirk Architects, Inc.
STRUCTURAL ENGINEER: McNamara / Salvia Inc.
GENERAL CONTRACTOR: William A. Berry & Son, Inc
OWNER: Club de Baseball des Red Sox de Boston
STRUCTURE MANUFACTURER: Supermétal Structures inc.
DETAILER ENTREPRENEUR: Techdess inc.

GREEN BUILDINGS

Winner
Garage Legendre and STM Collision Centre, Montréal

Jury Mention: For its potential in reducing of the urban heat islands and the integration of a lasting, efficient and aesthetic steel structure.

ARCHITECT: Provencher Roy + Associés architects
STRUCTURAL ENGINEER: Pasquin St-Jean ingénieurs-conseils
GENERAL CONTRACTOR: Pomerleau inc.
OWNER: Société de transport de Montréal
STRUCTURE MANUFACTURER: Quirion Métal inc., Canam Canada
DETAILER: Genifab inc.

For the Garage Legendre expansion and new Collision Centre of the Montréal Transport Society, the priority has been given to noble materials of Quebec origin with low emissions and recycled content. An ecologically-based approach has been chosen: water recycling, plant walls, 950 square metres of green roof, 500 square metres of solar wall, rainwater retention pond with plants. The exterior of this MTS flagship project is composed of lath textured panels. Steel has been chosen for the structure due to the long clear spans according to the traffic lanes distribution needed to accommodate the new fleet of MTS articulated buses, in addition to the rapid structure erection.

YOUNG ARCHITECTS/ENGINEERS

Winner
Patrick Laurin – Aedicul, Montreal Airport, Dorval

Jury Mention: For its care about details and a successful steel integration in a complex set of architectural constraints and construction tolerances.

JUNIOR ENGINEER: Patrick Laurin, SNC-Lavalin
SPONSORS: Raymond Bleau, SNC-Lavalin; Alain Déom, Nicolet Chartrand Knoll ltée Structure
MANUFACTURER: Michel Ménard, Structures Yamaska

RESIDENTIAL PROJECTS/RENOVATIONS

Winner
Yobé-Trépanier Residence, Chelsea

Jury Mention: For the audacious expression of a cantilevered steel structure and an artful expression of the steel beams apparent in a residential context.

ARCHITECT: Croft Pelletier Architectes
STRUCTURAL ENGINEER: EMS Ingénierie
GENERAL CONTRACTOR: Construction Pierbel
OWNER: Valérie Yobé et Marc Trépanier

Settled on a Chelsea hill in front of the Gatineau River, the new family residence of 225 m^2 was designed on three floors to minimize its land use. The two significant cantilevers created by opposite shiftings of the first and third levels reinforce the distinction between the three components, corresponding to as many functions (work, public life, private life). Magnificently integrated, the steel structure is present in every room, including the bedrooms. Even the central staircase is composed of a steel structure, structural wood decking and lumbers. This material was also chosen because of its architectural qualities, since the intermediate level is wrapped by corrugated steel and panels. The lightness of this level, as opposed to the bottom mass of concrete and the volume of superimposed wood, is entirely due to this unusual use of steel in the residential sector.

JURORS' FAVOURITE

Honourable Mention
Lionel Daunais Public Market, Boucherville

Jury Mention: For its modern language, the lightness of structure, the elegance of the rigid steel frame and apparent column hinges.

ARCHITECT: Sylvie Perrault Architectes
STRUCTURAL ENGINEER: Sylvain Parr et Associés
GENERAL CONTRACTOR: Les entreprises Claude Chagnon inc.
OWNER: Ville de Boucherville

NEWS AND EVENTS

WAIWARD STEEL FABRICATORS LTD. ACKNOWLEDGED AS ONE OF CANADA'S 50 BEST MANAGED COMPANIES

Waiward Steel has received recognition as one of Canada's Best Managed Companies. The firm first received this award in 2004.

Established in 1993, Canada's 50 Best Managed Companies is the country's leading business awards program, recognizing excellence in Canadian owned and managed companies with revenues over $10 million. Every year, hundreds of entrepreneurial companies compete for this designation in a rigorous and independent process that evaluates the calibre of their management abilities and practices. The program sponsors are Deloitte, CIBC Commercial Banking, National Post, and Queen's School of Business.

For more information please go to the web site.
www.canadas50best.com

One more year of obtaining this recognition and Waiward will become a member of the program's Platinum Club, a rare, well-deserved honour.

Congratulations to all!

CISC AND SSEF ANNUAL CONVENTION

The CISC and SSEF Annual Convention will be held from June 9th to 12th, 2010 in the scenic Kananaskis area of Alberta! We look forward to an exciting time for all of our members throughout the 4-day convention. This year's convention is filled with educational seminars, marketing discussions and several wonderful and informative speaker seminars, providing opportunities for you to learn the latest in steel industry ideas, trends and research initiatives during daily business and marketing meetings.

Also, this will be the first year where we celebrate the CISC National Steel Design Awards, where Regional Steel Design Award recipients will be judged and recognized on a National Level. Overall, a great evening that offers all attendees the opportunity to network with old colleagues, while making new contacts.

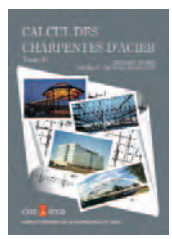
CISC ONTARIO REGION WILL EXHIBIT AT THE INTERNATIONAL BRIDGE CONFERENCE

The Ontario Region will be among the exhibitors at the 8th International Conference on Short & Medium Span Bridges, August 3 – 6, 2010. They will be located in booth 19. As you enter the exhibition hall, the booth will be down the right aisle – beside our colleagues from AISC. If you are attending the conference, do stop by and say hello! The conference will take place at the Sheraton on the Falls Hotel, 5875 Falls Avenue, Niagara Falls, ON.

NEW PUBLICATIONS

Handbook of Steel Construction, 10th Edition 2010

The 10th Edition of the CISC Handbook of Steel Construction will be released in June 2010! It is intended to be used in conjunction with the National Building Code of Canada 2010. Parts 1 and 2 feature the new CSA Standard S16-09 "Design of Steel Structures" and the CISC Commentary, respectively. Design tables for eccentric loads on weld groups in Part 3 have been revised to incorporate recent research. Parts 4 and 5 contain information on compression and flexural members. In Part 6, section properties and dimensions data are provided for currently produced rolled and welded shapes. The CISC Code of Standard Practice, 7th Edition, leads the information found in Part 7 and features new guidelines on architecturally exposed structural steel and digital modelling.



Calcul des charpentes d'acier, Tome II
Beaulieu, Picard, Tremblay, Grondin, Massicotte
(Published in French)

This new volume is the second in a series of three books on the design of steel structures, with the first being published in 2003. Intended especially for graduate students, this second volume also constitutes a unique reference for practicing structural engineers. Practical design is emphasized throughout the book, which is illustrated with many numerical examples. Calculation formulas are based mainly on recent Canadian codes and standards, although the text often refers also to relevant international standards and scientific publications. The book consists of five chapters: *Steel and Its Properties – Supplementary Topics*, *Composite Beams*, *Plate Girders*, *Connection Design – Supplementary Topics*, *Brittle Fracture and Fatigue*.

INFORMATION RESOURCE FOR ARCHITECTS, ENGINEERS AND OTHER PROFESSIONALS

The Project Analysis Division (PAD)

As the national organization representing the structural steel, open-web steel joist and platework fabricating industries, the Canadian Institute of Steel Construction promotes safe, efficient and sustainable use of steel in construction. The Institute's Project Analysis Division, recognized as the Canadian source for information pertaining to design, costing and construction of steel structures, has routinely assisted structural consultants and other professionals for over four decades.

Whether you are in the search for the most suitable solution for a building or a bridge structure, do not hesitate to contact the Project Analysis Division for industry assistance.

Alfred Wong and his staff in PAD can be reached at:
Canadian Institute of Steel Construction
3760, 14th Avenue, Suite 200, Markham, ON L3R 3T7
Tel: 905.946.0864 x 110 | Fax: 905.946.8574
afwong@cisc-icca.ca

CONTINUING EDUCATION COURSES

Industrial Building Design

The course illustrates the limit states design of a single-storey industrial building. It refers extensively to the National Building Code of Canada 2005 (NBC 2005) and to CAN/CSA S16.1-05 "Limit States Design of Steel Structures" including the S16.1-05 Supplement, with emphasis on the applicability to typical Industrial buildings. In addition, there are references to the CISC Crane-Supporting Steel Structures: Design Guide, 2nd Edition and various AISC publications.

The example industrial building comprises common structural steel components used in roof and wall framing, such as roof trusses, crane runway beams, segmented columns, wall systems and standing seam roof systems. The building also serves to illustrate the design of a steel braced frame to resist wind and seismic loads, in accordance with NBC 2005 and S16-01. The course examines various design and construction topics, including; loads and load combinations, companion action approach, notional loads, vibration and fatigue, diaphragms, connections, foundations, coatings and corrosion considerations, low temperature toughness, rehabilitation, fire considerations and construction issues.

Toronto, ON	September 21, 2010
Edmonton, AB	September 22, 2010
Vancouver, BC	September 23, 2010

Bolting and Welding For Design Engineers

This popular course is designed to provide an introduction to the basics of bolting and welding of steel structures with emphasis on practical and economical solutions. Although not a connection design course per se, participants will come away with a solid understanding of the materials, products, specifications, installation, field challenges and design methodologies for connecting structural steel components.

Thunder Bay, ON	October 5, 2010
Toronto, ON	October 6, 2010
Saskatoon, SK	October 7, 2010
Calgary, AB	October 19, 2010
Kelowna, BC	October 20, 2010
Victoria, BC	October 21, 2010

Continuing education courses in development include:

- Inside the Steel handbook – Content and use of the new 10th Edition of the CISC Handbook of Steel Construction
- Practical aspects of steel construction and simple connections
- Design of connections in steel seismic force resisting systems
- Steel Bridges Design, Fabrication and Construction – Update to CSA S6-10 standard, plus a general refresh of the course material and a strengthening of fatigue and fracture topics

Please check the web site for updates: www.cisc-icca.ca/courses

CODES & STANDARDS REVIEW

Common Codes and Standards for Design and Construction of Steel Structures

Current Status and Future Publication Targets

code/standard/supplement/commentary	current edition	next edition/revision	publication target
National Building Code of Canada (NBC)	NBC 2005	NBC 2010	late 2010
NBC Structural Commentaries (Part 4 of Div. B)	NBC 2005 Str. Comm.	NBC 2010 Str. Comm.	late 2011
CSA S16 Design of Steel Structures	CSA S16-09	CSA S16-14	2014
CISC Commentary on CSA S16 (Part 2 of CISC Handbook of Steel Construction[1])	CISC Handbook 10th Edition[1] (2010/06/01)	CISC Handbook 10th Edition - 2nd Printing	2011
CSA S6 Canadian Highway Bridge Design Code	CAN/CSA S6-06	CSA S6-14	2014
- Supplements to CSA S6	CSA S6-0651 (2010)		
		CSA S6-0652	2011
CSA S6.1 Commentary on Canadian Highway Bridge Design Code	CSA S6.1-06	CSA S6.1-14	2014
- Supplements to CSA S6.1	CSA S6.1-0651 (2010)		
		CSA S6.1-0652	2011
CSA G40.20/G40.21 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel	G40.20-04/G40.21-04 (R2009)[2]	*TBA*	*TBA*
CSA W59 Welded Steel Construction (Metal Arc Welding)	CSA W59-03 (R2008)[3]	CSA W59-11	2011
CSA W47.1 Certification of Companies for Fusion Welding of Steel	CSA W47.1-09	CSA W47.1-14	2014
CSA S136 North American Specification for the Design of Cold-Formed Steel Structural Members	CAN/CSA S136-07	CSA S136-15	2015
CSA S136.1 Commentary on CSA S136	CSA S136.1-07	CSA S136.1-15	2015

[1] *CISC Handbook of Steel Construction - 10th Edition includes CSA S16-09, its Commentary, CISC Code of Standard Practice - 7th Edition, and design and detailing aids in accordance with CSA S16-09* [2] *Reaffirmed in 2009* [3] *Reaffirmed in 2008*

NEW MEMBERS

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

FABRICATOR

Quest Steel Inc,
6089 Shawson Drive, Mississauga, ON L5T 1E4
Tel: 905 564 7446 | Fax: 905 795 0983

JV Driver Fabricators Inc.
706, 25 Avenue, Nisku, AB T9E 0G6
Tel: 780 955 1746 | Fax: 780 955 8975
www.jvdriver.com

Times Iron Works Inc.
1845 Sandstone Manor Unit 24, Pickering, ON L1W 3X9
Tel: 905 831 5111 | Fax: 905 831 5181

ERECTOR

Niagara Rigging & Erecting Company Ltd.
1409 Progressive Ave., Niagara on the Lake, ON L0S 1J0
Tel: 289 296 4594 | Fax: 289 296 4594

DETAILER

A-1 Detailing and Engineering Ltd.,
10 Pinder Road, Nackawic, NB E6G 1W3
Tel: 506 575 1222 | Fax: 506 575 1223

SUPPLIER

Solutions Consortech inc.,
6300 Auteuil, Bureau 505, Brossard, QC J4Z 3P2
Tel: 450 676 1555 | Fax: 450 676 8851
www.consortech.com

EVENTS

2010 CISC / SSEF Annual Convention
June 9 – 12, 2010 Kananaskis, AB

4th International Conference on Steel and Composite Structures
July 21 – 23, 2010 Sydney, Australia | www.iceaustralia.com

2010 Earthquake Conference
July 25 - 29, 2010, Toronto, Ontario | www.eeri.org

8th International Conference on Short & Medium Span Bridges
August 3 – 6, 2010 Niagara Falls, ON
www.bridgeconference2010.com

Steel Day
September 24, 2010
Various locations across Canada | www.steelday.ca

The Pacific Structural Steel Conference 2010
October 19 – 22, 2010 Beijing, China | www.pssc2010.com

International Symposium on Tubular Structures
December 15 – 17, 2010 Hong Kong, China
www.hku.hk/civil/ISTS13

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

ATLANTIC

Atcon Construction Ltd. Br
Miramichi, NB 506 627 1220
www.atcongroup.com

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

QUEBEC

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

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

Groupe Canam Inc. S, J
Boucherville, QC 450 641 4000
Ville de St-Georges, QC 418 228 8031
www.canam-poutrelle.ws

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 - ponts, une division de Groupe Canam Inc. S, P
Québec, QC 418 683 2561
www.structalponts.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
tecnometal.ca

ONTARIO

Groupe Canam Inc. S, J
Mississauga, ON 905 671 3460
www.canam-steeljoist.ws

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

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
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

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

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

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

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

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

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

Groupe Canam Inc. S, J
Calgary, AB 403 252 7591
www.canam-steeljoist.ws

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

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

Makloc Builders Inc. B
Nisku, AB 780 955 2951

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
Leduc, AB 780 980 4830
www.supermetal.com

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

Dessins Cadmax 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

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
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

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

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

Workpoint Steel Detailing Ltd. S
Surrey, BC 604 574 2221

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
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

Blastech Corporation
Brantford, ON 519 756 8222
www.blastech.com
Abrasive blasting, glass bead

Borden Metal Products (Canada) Limited
Beeton, ON 905 729 2229
www.bordengratings.com
Aluminum, Stainless Steel, Steel Grating

Brunswick Steel
Winnipeg, MB 204 224 1472
www.brunswicksteel.com
Steel-Structures plate bars hss

Cloverdale Paint Inc.
Edmonton, AB 780 453 5700
www.cloverdalepaint.com
Specialty hi-performance industrial coatings and paint products

Commercial Sandblasting & Painting Ltd.
Saskatoon, SK 306 931 2820
Sandblasting and protective coating applications

Corrcoat Services Inc., Sandblasters and Coaters
Surrey, BC 604 881 1268
www.corrcoat.ca
Sandblasters & Coaters

Custom Plate & Profiles
Delta, BC 604 524 8000
www.customplate.net
Cut to size steel plate in various grades to 12" thick. Stock size sheets of plate to 12"

Daam Galvanizing Inc.
Edmonton, AB 780 468 6868
www.daamgalvanizing.com
Hot dip galvanizing

Devoe Coatings
Edmonton, AB 780 454 4900
www.devoecoatings.com
Coating, paint

DryTec Trans-Canada
Terrebonne, QC 450 965 0200
www.drytec.ca
Grating, metallizing, paint

EBCO Metal Finishing L.P.
Richmond, BC 604 244 1500
www.ebcometalfinishing.com
Hot dip galvanizing

EDVAN Industries Inc.
Nisku, AB 780 955 7915
www.edvancan.com
Shear & form of steel plates & coil supply of safety grating-grip strut, pert-o-grip, traction, tread

Endura Manufacturing Co. Ltd.
Edmonton, AB 780 451 4242
www.endura.ca
Paint and Coating materials

Fisher & Ludlow, A Division of Harris Steel Limited
Edmonton, AB 780 481 3941
Surrey, BC 604 888 0911
Pointe Aux Trembles, QC 514 640 5085
www.fisherludlow.com
Welded steel/ aluminum/stainless steel grating, "Grip Span" and "Shur Grip" safety grating

Frank's Sandblasting & Painting
Nisku, AB 780 955 2633

General Paint / Ameron Protective Coatings
Vancouver, BC 604 253 3131
www.generalpaint.com
Shop primers, protective coatings, paint

Globec Machineries
Québec, QC 418 864 4446
www.globec-machinery.com

ICI Devoe Coatings
Vancouver, BC 604 299 1399
www.devoecoatings.com

IKG Industries
Newmarket, ON 905 953 7779
ikgindustries.com

J & M Sandblasting & Painting
Oshawa, ON 905 436 6582
www.jmsandblasting.com
Sandblasting and protective coatings applications

Kubes Steel Inc.
Stoney Creek, ON 905 643 1229
www.kubesteel.com

La Compagnie Américaine de Fer et Métaux Inc.
East Montréal, QC 514 494 2000
www.scrapmetal.net

La Corporation Corbec
Lachine, QC 514 364 4000
www.corbecgalv.com
Supplier of hot dip galvanizing only

Laboratoire D'Essai Mequaltech
Montreal, QC 514 593 5755
www.mequaltech.com
Non-destructive testing, metallurgical analysis,welding expert

Les Industries Méta-For inc.
Terrebonne, QC 450 477 6322
www.meta-for.ca

Lincoln Electric Company of Canada LP
Toronto, ON 416 421 2600
www.lincolnelectric.com
Welding equipment and welding

Magnus Inc.
Ste-Therese, QC 866 435 6366
SDS/2 Design Software

Marmon/Keystones Canada Inc.
Leduc, AB 780 986 2600
www.marmonkeystone.com
Hollow structural Sections, A106 Seamless Pipes

Midway Wheelabrating Ltd.
Abbotsford, BC 604 855 7650
www.midwaywheelabrating.com
Wheelbrating, sandblasting, industrial coatings

Moore Brothers Transport Ltd.
Brampton, ON 905 840 9872
www.moorebrothers.ca

Pacific Bolt Manufacturing Ltd.
New Westminster, BC 604 524 2658
www.pacbolt.com
Steel fasteners, structural bolts, anchor bolts, tie rods

Peinture Internationale (une division de Akzo Nobel Peintures Ltée)
Dorval, QC 514 631 8686
www.international-coatings.com
Protective coatings, corrosion-resistant paints

Price Steel Ltd.
Edmonton, AB 780 447 9999
www.pricesteel.com

Pure Metal Galvanizing, Division of PMT Industries Limited
Rexdale, ON 416 675 3352
www.puremetal.com
Custom "Hot Dip" Zinc Galvanizing; Picking and Oiling

Red River Galvanizing Inc.
Winnipeg, MB 204 889 1861
www.redrivergalvanizing.com
Supplier of hot dip galvanizing only

Reliable Tube (Edmonton) Ltd.
Acheson, AB 780 962 0130
www.reliable-tube.com
HSS Tubing, ERW Tubing, CDSSM

Reliable Tube Inc.
Langley, BC 604 857 9861
www.reliabletube.com
Hollow Structural Steel Tube

Samuel, Son & Co. Limited
Winnipeg, MB 204 985 6600
www.samuel.com
Structural Sections incl. Bar

Selectone Paints Limited
Weston, ON 416 742 8881
www.selectonepaints.ca
Paint primers, fast dry enamels, coatings

Silver City Galvanizing Inc.
Delta, BC 604 524 1182
Custom "hot dip Zinc Galvanizing: Picking and Oiling

Solutions Consortech inc. **B, Br**
Brossard, QC 450 676 1555
www.consortech.com
logiciels autodesk et services professionels sur ces logiciels

Terraprobe Inc.
Brampton, ON 905 796 2650
www.terraprobe.ca
Structural steel inspections

The Sherwin-Williams Company
Ville d'Aujou, QC 514 356 1684
www.sherwin.com
Specialty industrial coatings

Tri-Krete Coatings Inc.
Bolton, ON 905 857 6601
www.tri-kretecoatings.com
Painting/Protective Coatings, Abrasive Blasting(Sandblasting), Protective Coatings/Metal Finishing

Tuyaux et Matériel de Fondation Ltée
St. Hubert, QC 450 445 0050
www.pipe-piling.com
Hot Roll-Wide-Flange-Bearing Pile Beams

VARSTEEL Ltd.
Delta, BC 604 946 2717
Lethbridge, AB 403 320 1953
www.varsteel.ca
Beam, angle, channel, HSS plate, Sheet, Grating, expanded metal, pipe flats, rounds etc.

VICWEST Corporation
Edmonton, AB 780 454 4477
Moncton, NB 506 857 0057
Oakville, ON 905 825 2252
Surrey, BC 604 590 2220
Winnipeg, MB 204 669 9500
www.vicwest.com
Steel Metal Floor/roof deck, wall and roof cladding

Vixman Construction Ltd.
Milton, ON 905 875 2822
www.vixman.com
Roof and Floor Deck

Waxman Industrial Services Corp.
Brantford, ON 866 294 1699
www.waxmanindustrial.ca

Western Industrial Services Ltd. (WISL)
Winnipeg, MB 204 956 9475
www.wisl.ca
Abrasive Blasting & Painting Services

MILL

Atlas Tube Canada ULC
Harrow, ON 519 738 5000
Buffalo, NY 519 536 1114
www.atlastube.com

Essar Steel Algoma Inc.
Sault Ste. Marie, ON 705 945 2351
Burlington, ON 905 331 3400
Calgary, AB 403 263 4102
www.essarsteelalgoma.com

Gerdau Ameristeel Corporation
Whitby, ON 905 668 8811
www.gerdauameristeel.com

SSAB Enterprises, LLC
Lisle, IL 630 810 4800
www.ssab.com

SERVICE CENTRE

A.J. Forsyth, A Division of Russel Metals Inc.
Delta, BC 604 525 0544
www.russelmetals.com

Acier Leroux Boucherville, Division de Métaux Russel Inc.
Boucherville, QC 450 641 2280
www.leroux-steel.com

Acier Pacifique Inc
Laval, QC 514 384 4690
www.pacificsteel.ca

Dymin Steel Inc.
Abbotsford, BC 604 852 9664
Brampton, ON 905 840 0808
Nisku, AB 780 979 0454
www.dymin-steel.com

Metalium Inc.
Laval, QC 450 963 0411
www.metalium.com

Russel Metals Inc.
Edmonton, AB 780 439 2051
Lakeside, NS 902 876 7861
Mississauga, ON 905 819 7777
Winnipeg, MB 204 772 0321
www.russelmetals.com

Salit Steel (Division of Myer Salit Limited)
Niagara Falls, ON 905 354 5691
www.salitsteel.com

Wilkinson Steel and Metals, A Division of Premetalco Inc.
Edmonton, AB 780 434 8441
Vancouver, BC 604 324 6611
www.wilkinsonsteel.com
Misc. structural shapes, hot rolled bars and plates. Strucurals-angles, flats, beams, channel, plate

York-Ennis, A Division of Russel Metals Inc.
Mississauga, ON 905 819 7297
Port Robinson, ON 905 384 9700
www.russelmetals.com

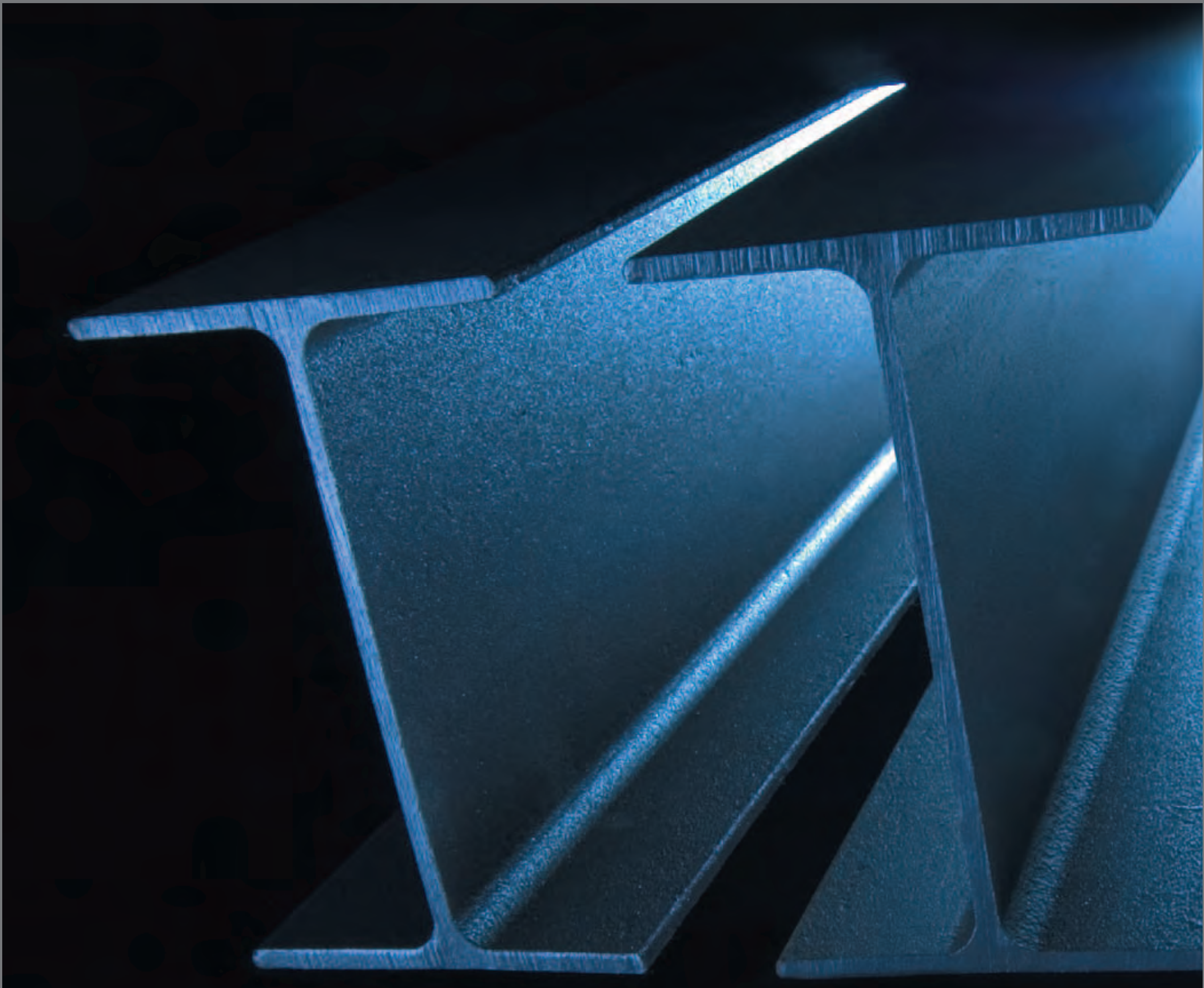
HONORARY

ArcelorMittal International Canada
Contrecoeur, QC 450 587 8600
www.arcelormittal.com

Nucor-Yamato Steel Company
Blytheville, AR 870 762 5500
www.nucoryamato.com

AFFILIATE

CWB Group
Mississauga, ON 905 542 1312
www.cwbgroup.org

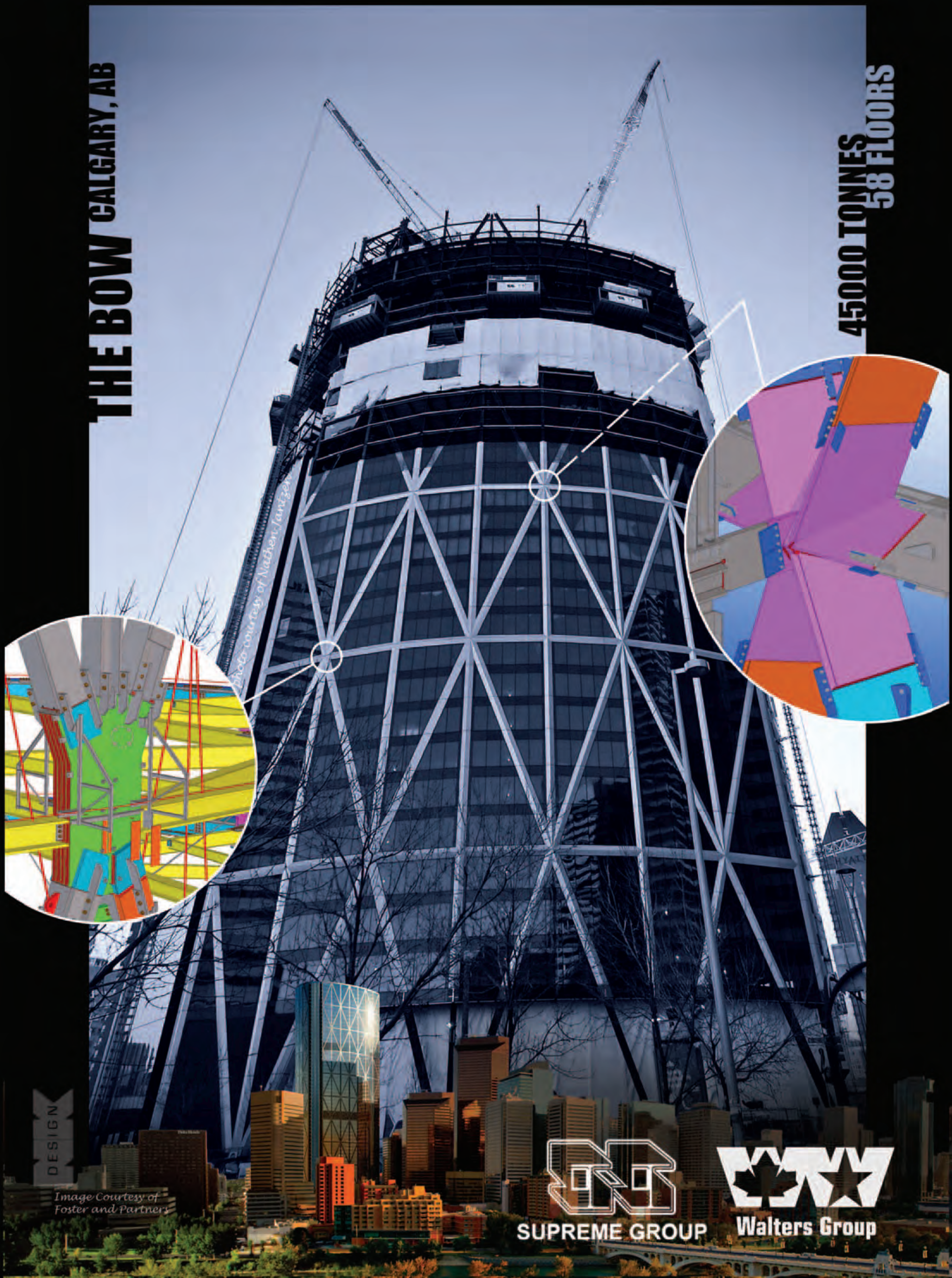


COMPANY

Adjeleian Allen Rubeli Ltd., Ottawa, ON	613 232 5786
AECOM, Whitby, ON	905 668 4021
Allnorth Consultants Ltd., Grande Prairie, AB	780 538 2070
Arcon Engineering Consult. Ltd., Willowdale, ON	416 491 2525
Associated Engineering (B.C.) Ltd., Burnaby, BC	604 293 1411
Axys Consultants inc., Sainte-Marie de Beauce, QC	418 387 7739
Baird, Bettney & Associates Ltd., Surrey, BC	604 574 2221
Blackwell Bowick Partnership Ltd., Toronto, ON	416 593 5300
BPR Bâtiment Inc., Quebec, QC	418 871 8151
BPTEC - DWN Engineering Ltd., Edmonton, AB	780 436 5376
Brenik Engineering Inc., Concord, ON	905 660 7732
Bureau d'études spécialisées inc., Montréal, QC	514 393 1500
Byrne Engineering Inc., Burlington, ON	905 632 8044
Carruthers & Wallace (A Trow Company), Toronto, ON	416 789 2600
CIMA+, Québec, QC	418 623 3373
Cohos Evamy, Edmonton, AB	780 429 1580
CPE Structural Consultants Ltd., Toronto, ON	416 447 8555
CWMM Consulting Engineers Ltd., Vancouver, BC	604 731 6584
D'Aronco, Pineau, Hébert, Varin, Laval, QC	450 969 2250
Dessau inc., Gatineau, QC	819 777 2727
Dessau inc., Saint-Romuald, QC	418 839 6034
Dorlan Engineering Consultants Inc., Mississauga, ON	905 671 4377
E.C. & Associates Ltd., Markham, ON	905 477 9377
Finelli Engineering Inc., Burlington, ON	905 639 5555
Gauthier Consultants, Longueuil, QC	450 674 5548
GENIVAR Consultants, Markham, ON	905 475 7270
Genivar Consultants Ltd. Partnership, Burnaby, BC	604 294 5800
Giffels Associates Limited/IBI Group, Etobicoke, ON	416 679 1930
Glotman Simpson Consulting Engineers, Vancouver, BC	604 734 8822
Group Eight Engineering Limited, Hamilton, ON	905 525 6069
Group2 Architecture Engineering Ltd., Red Deer, AB	403 340 2200
Haddad, Morgan and Associates Ltd., Windsor, ON	519 973 1177
Halcrow Yolles, Toronto, ON	416 363 8123
Halsall Associates Limited, Toronto, ON	416 487 5256
Hastings & Aziz Limited, Consulting Engineers, London, ON	519 439 0161
Herold Engineering Limited, Nanaimo, BC	250 751 8558
Hillside Consulting Engineers Ltd., Fredericton, NB	506 454 4455
IRC McCavour Engineering Group Inc., Mississauga, ON	905 607 7244
K D Ketchen & Associates Ltd., Kelowna, BC	250 769 9335
Krahn Engineering Ltd., Abbotsford, BC	604 853 8831
Leekor Engineering Inc., Ottawa, ON	613 234 0886
Les Consultants GEMEC Inc., Montreal, QC	514 331 5480
Magnate Engineering and Design Inc., Brampton, ON	905 799 8220
Morrison Hershfield Ltd., North York, ON	416 499 3110
MPa Groupe-Conseil Inc., Carignan, QC	450 447 4537
N.A. Engineering Associates Inc., Stratford, ON	519 273 3205
Pow Technologies, Div. of PPA Engineering Technologies Inc., Ingersoll, ON	519 425 5000
Quinn Dressel Associates, Toronto, ON	416 961 8294
R.J. Burnside & Associates Limited, Collingwood, ON	705 446 0515
Read Jones Christoffersen Ltd., Toronto, ON	416 977 5335
Roche ltee, Groupe-Conseil, Quebec, QC	418 654 9600
RSW Inc, Québec, QC	418 648 9512
Saia, Deslauries, Kadanoff, Leconte, Brisebois, Blais, Montréal, QC	514 938 5995
Schorn Consultants Ltd., Waterloo, ON	519 884 4840
SNC Lavalin Inc., Montréal, QC	514 393 1000
Stantec Consulting Ltd., Mississauga, ON	905 858 4424
Stephenson Engineering Ltd., Toronto, ON	416 635 9970
Tecsult/Aecom inc., Montreal, QC	514 331 5480
The Walter Fedy Partnership, Kitchener, ON	519 576 2150
UMA Engineering Ltd., Mississauga, ON	905 238 0007
Valron Structural Engineers - Steel Detailers, Moncton, NB	506 856 9601
VanBoxmeer & Stranges Engineering Ltd., London, ON	519 433 4661
Weiler Smith Bowers, Burnaby, BC	604 294 3753
Westmar Consultants Inc., North Vancouver, BC	604 985 6488

INDIVIDUAL

William J. Alcock, P.Eng., North Vancouver, BC	604 986 0663
Jonathan Atkins, P.Eng., Toronto, ON	416 489 7888
Christian Audet, ing., Sherbrooke, QC	819 434 1832
Dwain A. Babiak, P.Eng., Calgary, AB	403 338 5826
Douglas Bach, Truro, NS	902 895 1507
Michael F. Bartlett, P.Eng., London, ON	519 661 2111
Leonard Basaraba, Vancouver, BC	604 664 5409
Dominique Bauer, ing., Montréal, QC	514 389 9844
Gordon J. Boneschansker, P.Eng., Fredericton, NB	506 452 7000
M. Eric Boucher, ing., Québec, QC	418 871 8103
Gordon D. Bowman, P.Eng., Gloucester, ON	613 742 7130
George Casoli, P.Eng., Richmond, BC	604 273 7737
François Charest, ing., Repentigny, QC	450 581 8070
Simon Claude, ing, Montreal, QC	514 525 8655
M.P. (Michel) Comeau, Halifax, NS	902 429 5454
Marc-Andre Comeau, ing., Salaberry-de-Valleyfield, QC	450 371 8585
Frédéric Côté, ing., Sherbrooke, QC	819 565 3385
Louis Crépeau, M Ing., Montréal, QC	514 931 1080
Jean-Pierre Dandois, St. Bruno, QC	514 592 1164
Jean-Marc Dugre, Sherbrooke, QC	819 864 0609
Arno Dyck, P.Eng., Calgary, AB	403 255 6040
Daniel A. Estabrooks, P.Eng., Saint John, NB	506 674 1810
Curtis Feeg, Calgary, AB	403 540 0677
Richard Frehlich, P.Eng., Calgary, AB	403 281 1005
Alex Fulop, Vaughan, ON	905 760 7663
Bernard Gérin-Lajoie, Outremont, QC	514 279 4821
Francis J. Gerrits, Barrie, ON	705 737 3303
Jean-Paul Giffard, ing., Saint-Jean-Chrysostome, QC	418 839 7937
James M. Giffin, P.Eng., Amherst, NS	902 667 3300
Daniel Girard, Chambly, QC	450 447 3055
Robert Girard, Chicoutimi, QC	418 549 9687
Movses R. Gulesserian, P.Eng., North York, ON	416 391 1230
Ralph W. Hildenbrandt, Calgary, AB	403 245 5501
Gary L. Hodgson, P.Eng., Niagara Falls, ON	905 357 6406
David Howard, P.Eng., Burlington, ON	905 632 9040
Don R. Ireland, P.Eng., Brampton, ON	905 846 9514
Ely E. Kazakoff, P.Eng., Kelowna, BC	250 860 3225
Ron Kekich, Markham, ON	905 474 2355
Bhupender S. Khoral, P.Eng., Ottawa, ON	613 739 7482
Franz Knoll, ing., Montréal, QC	514 878 3021
Pierre Laplante, ing., Sainte Foy, QC	418 651 8984
R. Mark Lasby, P.Eng., Vancouver, BC	604 629 9525
Barry F. Laviolette, P.Eng., Edmonton, AB	780 454 0884
René Laviolette, ing., Lévis, QC	418 304 1405
Nazmi Lawen, P.Eng., Charlottetown, PE	902 368 2300
Marc LeBlanc, P.Eng., Dieppe, NB	506 382 5550
Steve Lécuyer, ing., Montréal, QC	514 333 5151
Jeff Leibgott, ing., Montreal, QC	514 933 6621
Salvatore Leo, Kirkland, QC	514 334 1234
William C.K. Leung, P.Eng., Woodbridge, ON	905 851 9535
Chet Liu, Chatam, ON	514 351 9612
Constantino Loutas, P.Eng., Edmonton, AB	780 423 5855
Clint S. Low, P.Eng., Vancouver, BC	604 688 9861
James R. Malo, Thunder Bay, ON	807 345 5582
Ciro Martoni, ing., Montréal, QC	514 340 0046
Alfredo Mastrodicasa, P.Eng., Woodbridge, ON	905 856 2530
Rein A. Matiisen, P.Eng., Calgary, AB	403 338 5804
Brian McClure, Nanaimo, BC	250 713 9875
Philip A. McConnell, Edmonton, AB	780 450 8005
Mark McFadden, Chatam, ON	514 351 9612
Alan J. McGill, P.Eng., Port Alberni, BC	250 724 3400
Glenn J. McMillan, London, ON	519 453 1480
Avrid Meland, P.Eng., Calgary, AB	403 716 8158
Andrew W. Metten, P.Eng., Struct.Eng., Vancouver, BC	604 688 9861
Jason Mewis, P.Eng., Saskatoon, SK	306 978 7730
Mark K. Moland, P.Eng., Lepreau, NB	506 659 6388
Mirek Neumann, P.Eng., Mississauga, ON	905 823 7134
Neil A. Paolini, P.Eng., Etobicoke, ON	416 249 4651
Francis Pare, Trois-Rivieres, QC	819 373 1145
Serge Parent, Oakville, ON	905 808 0344
Claude Pasquin, ing., Montreal, QC	514 282 8100
Tiberiu Pepelea, ing., Trois-Rivières, QC	819 372 4543
Jacques Pharand, Montreal, QC	514 872 5466
Gérard Pilon, ing, Valleyfield, QC	450 373 9999
Bertrand Proulx, ing, Shawinigan, QC	819 537 5771
R. Paul Ransom, P.Eng., Burlington, ON	905 693 9628
Dan S. Rapinda, P.Eng., Winnipeg, MB	204 488 6674
Hamidreza Razaghi, Edmonton, AB	780 989 7120
Mehrak Razzvi, P.Eng., North Vancouver, BC	604 988 7131
Joël Rhéaume, ing., Beauport, QC	418 660 5858
Bijoy G. Saha, P.Eng., Fredericton, NB	506 452 9000
Joseph M. Sarkor, P.Eng., Kelowna, BC	250 868 1413
Wilfred Siu, P.Eng., Edmonton, AB	780 451 1905
Stig Skarborn, P.Eng., Fredericton, NB	506 452 1804
Paul Slater, Kitchener, ON	519 743 6500
Ralph E. Southward, P.Eng., Burlington, ON	905 639 7455
Danis St-Laurent, Dieppe, NB	506 382 9353
Robert Stolz, P.Eng., Medicine Hat, AB	403 526 6761
Thor A. Tandy, P.Eng., Victoria, BC	250 384 9115
Mike L. Trader, P.Eng., Hamilton, ON	905 381 3231
Serge Tremblay, ing., Quebec, QC	418 878 3218
Daniel E. Turner, Montreal, QC	514 344 1865
Deborah VanSlyke, P.Eng., Fredericton, NB	506 452 8480
Serge Vézina, ing., Laval, QC	514 281 1010
J.H.R. Vierhuis, P.Eng., Willowdale, ON	416 497 8600
Dave R.M. Vrkljan, Calgary, AB	403 251 2578
M. Declan Whelan, P.Eng., Hamilton, ON	905 523 1988
Chell K. Yee, Edmonton, AB	780 488 5636
Ken Zwicker, P.Eng., St. Albert, AB	780 458 6964
George Graham, C.E.T., Winnipeg, MB	204 943 7501
Bill McPherson, Campbell River, BC	250 923 1737
Angelo M. Ricciuto, Concord, ON	905 669 6303
Ronald W. Rollins, Burnaby, BC	604 453 4057


THE BOW CALGARY, AB
45000 TONNES
58 FLOORS
DESIGN
Image Courtesy of
Foster and Partners
SUPREME GROUP
Walters Group