NO 35 FALL 2009

ADVANTAGE STEEL

ALLSTREAM CENTRE: TEACHING AN OLD AUTOMOTIVE BUILDING A NEW GREEN TRICK

STUDENTS PLAY WITH TENSION: THE 2008/09 SSEF ARCHITECTURAL STUDENT DESIGN COMPETITION

FULL HOUSE: THE ASCE-AISC NATIONAL STUDENT STEEL BRIDGE COMPETITION

ELLIPTICAL HOLLOW SECTIONS PART ONE: PROPERTIES AND APPLICATIONS

ALBERTA AND ONTARIO 2009 STEEL DESIGN AWARDS

cisc icca

CANADIAN INSTITUTE OF STEEL CONSTRUCTION

SDS/2 DESIGN DATA

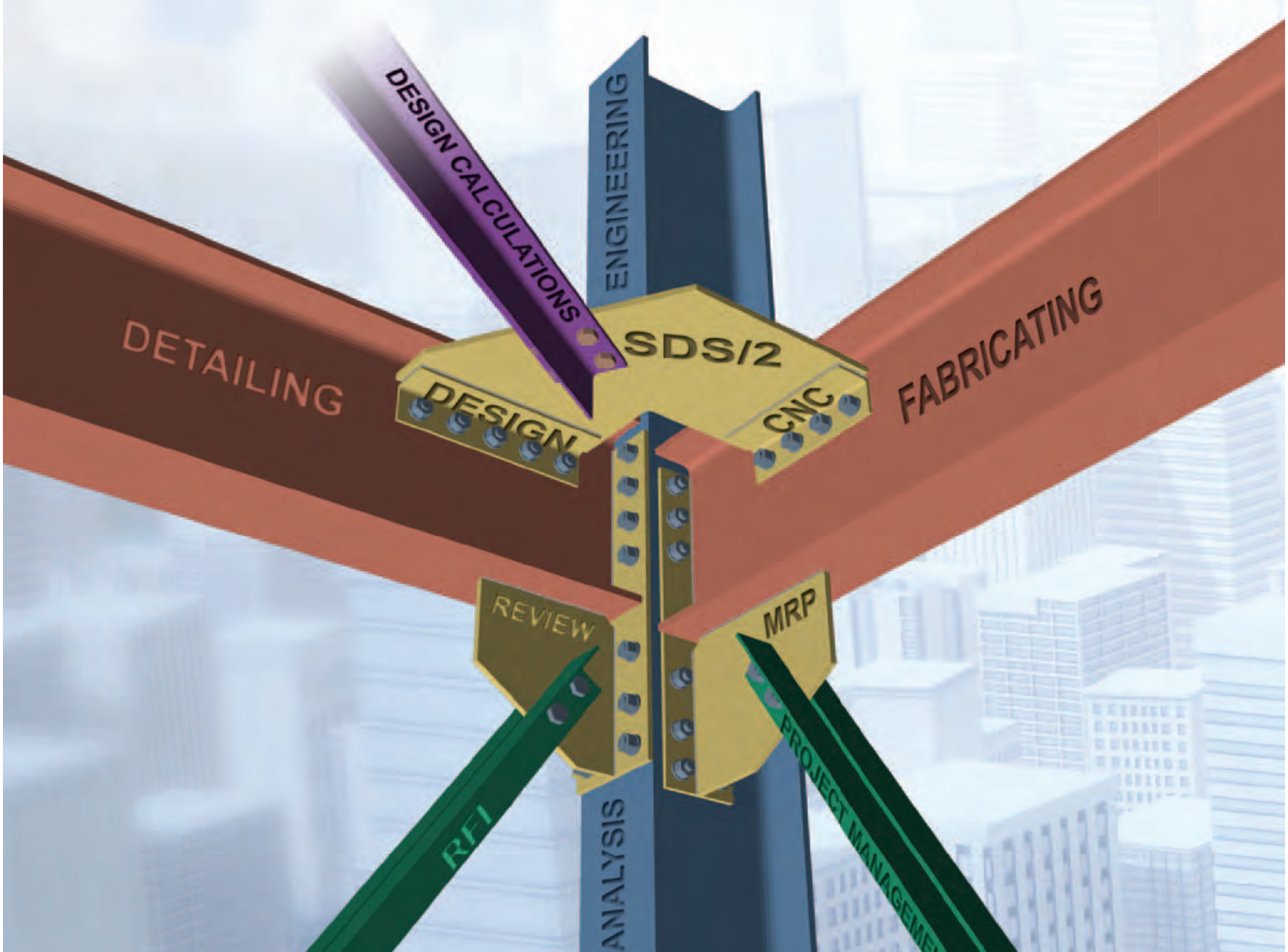
BUILDING INTELLIGENT CONNECTIONS.

Connecting Through SDS/2

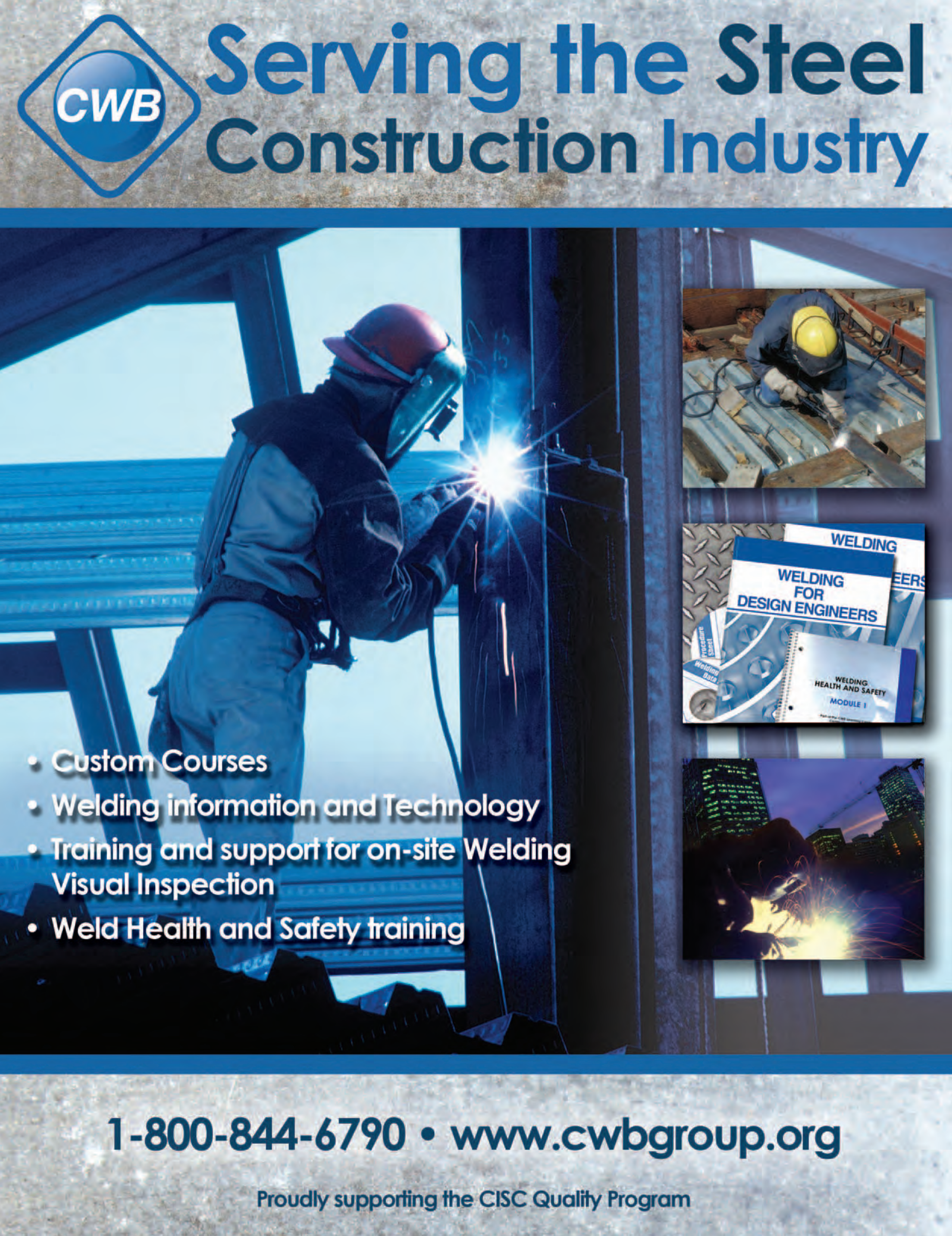
Building intelligent connections is more than beams, columns and bolts. It's seamlessly integrating your project delivery and connecting project partners — it's the essence of BIM.

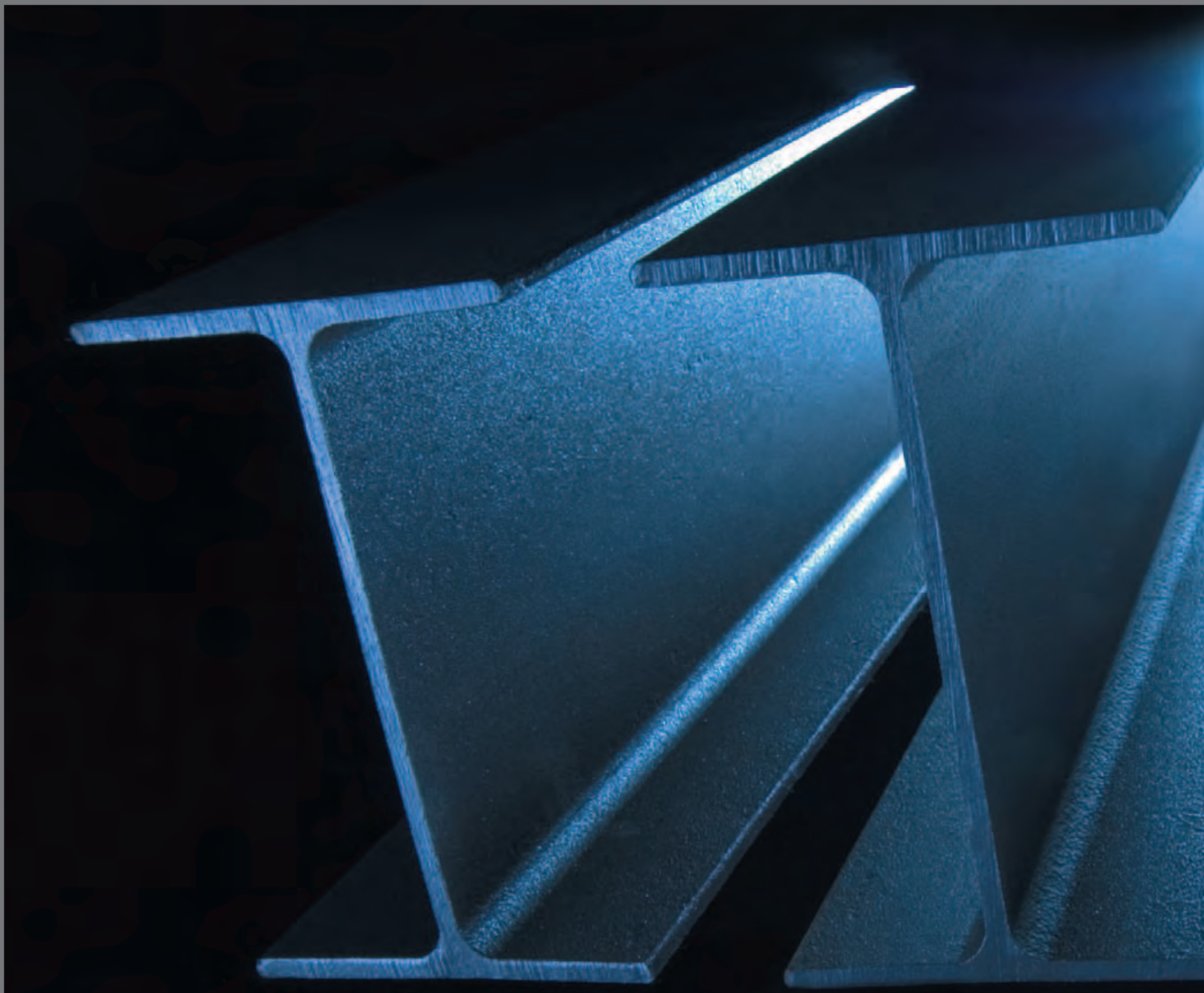
SDS/2 provides you with a superior BIM tool by connecting with many commonly used steel software products. You can share information from all disciplines: architecture, engineering, piping and HVAC, detailing, fabricating, erecting, and much more. Whether you are importing a model or exporting information for CNC or conflict resolution, SDS/2 provides trustworthy model data, from start to finish.

Become a BIM expert in time for your next project. Visit sds2.com or call 866.435.6366 to learn how you can connect through SDS/2 to start building intelligent connections in your projects today.



www.magnus-mr.ca | 866.435.6366 | 450.435.4665 | e-mail: info@magnus-mr.ca


CWB
Serving the Steel Construction Industry
WELDING FOR DESIGN ENGINEERS
WELDING HEALTH AND SAFETY
MODULE 1
• Custom Courses
• Welding information and Technology
• Training and support for on-site Welding Visual Inspection
• Weld Health and Safety training
1-800-844-6790 • www.cwbgroup.org
Proudly supporting the CISC Quality Program



FROM THE EDITOR

The Canadian Institute of Steel Construction and our related foundation the Structural Steel Education Foundation supports and develops numerous learning initiatives and programs for University Students across Canada. *Full House* takes an inside look at the dynamics during last May's Bridge Competition in Las Vegas. *Tension*, highlights the annual SSEF Architectural Competition. It is wonderful to see, that with the generous support of the members of the CISC and SSEF, Canada's education system is producing world class engineers and architects able to compete on an international stage.

Built in the 1929, Toronto's Automotive Building was a beautiful Art Deco icon. However, it was time to bring the landmark into the 21st century as the state-of-the-art Allstream Conference Centre. There was a major hurdle; the designers' vision of a grand hall with no columns. Sustainable steel to the rescue! The new long-span steel roof structure is part of the green solution certifying the revitalized building LEED Silver.

The image above of the new Go Transit, Streetsville Bus Facility received an Ontario, Green Buildings, Award of Merit. It is another example of sustainable steel's contribution to the greening of modern construction. Our cover image of Calgary's spectacular Water Centre is the recipient of 2009 Alberta, Architectural Award. As always our summary of these awards is an interesting read.

Seismic Corner examines Ductility and Notch-toughness of Structure Steel. While *For Green's Sake* examines recent advances in steel production – probably the most environmental product made.

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 CANADA
3760 14th Avenue, Suite 200
Markham, Ontario, Canada L3R 3T7
Phone 905-946-0864 ext. 109
Email ewhalen@cisc-icca.ca

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

ADVANTAGE STEEL NUMBER 35 FALL 2009

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 Water Centre | photo by Robert Lemermeyer

PHOTO ON THIS PAGE:
Go Transit, Streetsville Bus Facility| *RJC Ralf Altenkirch*

SEISMIC CORNER
DUCTILITY AND NOTCH-TOUGHNESS OF STRUCTURAL STEEL

Alfred F. Wong, P.Eng.

The energy-dissipating elements in seismic-force-resisting systems must endure stable inelastic cyclic deformation when subjected to the design ground motions. In steel systems that are designed in accordance with capacity-design principles, these elements may be frame members, in-fill plates in plate walls, connection gusset plates or other parts of the system (See Clause 27 of CSA S16-01 and Seismic Corner article in Issue No. 33).

DUCTILITY

In order to ensure adequate post-yield behaviour, these elements should be made of steel products that possess the characteristics below:

1) Good ductility (≥ 20% longitudinal elongation in a 50 mm gauge length) and
2) A large amount of strain-hardening (yield-stress-to-tensile-strength ratio ≤ 0.85).

Clause 27 of CSA Standard S16-01 provides specific requirements for the material used in the energy-dissipating elements. By referencing Clauses 5.1.3 and 8.6 (a) and restricting the steel grades to those having a specified minimum yield stress, F_y, not greater than 350 MPa, Clause 27.1.5.1 explicitly recognizes all weldable grades of steel in CSA G40.21 having F_y not greater than 350 MPa and ASTM A992. These steels meet the above-mentioned elongation requirement because they are required to pass mill tests including minimum elongation limits (stipulated in the CSA or ASTM standard) ranging from 21% to 23%. Also, the F_y-to-F_u ratios of all these steels are less than 0.85 ($0.61 \le F_y/F_u \le 0.78$). Use of other grades of steel requires demonstration that the energy-dissipating elements can sustain the high post-yield strains needed to achieve the performance assumed in the design. It should be noted that ASTM A992 Specification provides an additional assurance by restricting the maximum mill-test yield-strength-to-tensile-strength ratio to 0.85 and A992 is now the most common grade of steel for wide-flange shapes in Canada.

Steel products, in compliance with Clauses 5.1.3 and 8.6 (a) and having F_y greater than 350 MPa but not exceeding 480 MPa, are permitted for use as columns where inelastic hinging is expected at the base only, such as fixed-base columns in moment-resisting frames.

NOTCH-TOUGHNESS

Because structures experience significant strain rate effect when subjected to a strong earthquake steel notch-toughness is also desirable, especially for heavy rolled sections and thick plate elements. Clause 27.1.5.2 stipulates a minimum average Charpy V-notch impact test value of 27 joules at 20°C for rolled shapes with flanges 40 millimetres and thicker and plates over 51 millimetres in thickness that are used in energy dissipating elements for buildings with specified short-period spectral acceleration ratios, $I_E F_a S_a(0.2)$, greater than 0.55. This requirement also applies to welded members anywhere in the seismic-force-resisting system. The impact tests should conform to the pertinent requirements in CSA G40.20. Clause 27.1.5.2 also specifies the test frequency and the location in the cross-section of rolled shape where the test specimen is taken from. Research studies conducted in the U.S. demonstrated that lighter rolled sections and thinner plates, benefited from sufficient thickness reduction in the production rolling process, generally possess notch-toughness exceeding the above-mentioned minimum requirement. It should be noted that the minimum notch-toughness required for this application is less demanding in comparison with requirements established in CSA Standards G40.20 /G40.21 for notch-tough steels. For example, Charpy V-notch test requirements for 350WT steel in Categories 1, 2, 3 and 4 are 27 joules at 0°C, -20°C, -30°C and -45°C respectively.

SUMMARY

Structural grades of steel for shapes and plates that are most commonly used, such as ASTM A992 and CSA G40.21 300W and 350W products, meet the ductility requirements for seismic design applications. They are also considered adequate for low seismicity applications without test verification for notch-toughness, regardless of thickness or size.

For higher seismicity applications, thick plates and relatively heavy sections used in energy-dissipating elements and welded parts of the seismic-force-resisting system require a moderate notch-toughness to be verified by tests. It should be noted that the use of thick plates and heavy sections as energy-dissipating elements can usually be avoided except for large structures. They may be necessary for use as columns with welded parts or connections in mid-rise and high-rise buildings. Because thick plates and heavy sections are usually purchased directly from the mills the purchaser includes these moderate Charpy V-notch test requirements in the mill order specification.

Photo: Benson Steel

The Allstream Centre under construction

ALLSTREAM CENTRE:
TEACHING AN OLD AUTOMOTIVE BUILDING A NEW GREEN TRICK

MUCH OF A 1929 AUTOMOTIVE BUILDING WAS REUSED TO SERVE A NEW PURPOSE AS A MEETING PLACE. MERGING THE OLD WITH THE NEW WAS A CHALLENGE TO THE DESIGN TEAM. A NEW LONG-SPAN STEEL ROOF STRUCTURE WAS PART OF THE GREEN SOLUTION LEADING TO LEED SILVER.

Michelle Ponto

Encompassing 160,000 square feet and costing $46.8 million, the redevelopment of Toronto's Automotive Building at Exhibition Place was no light task. The project involved transforming a space that was originally created to showcase Canada's first auto show in 1929 to a state-of-the-art conference centre. At the same time, the team needed to preserve the Art Deco styling of the building, while meeting LEED (Leadership in Energy and Environmental Design) requirements.

"Having this building target LEED certification was not an after-thought. It was something that we intended to do," said Laura Purdy, who represents the owners of the centre. "Once the centre is complete, it will be the first conference centre in Canada to attain LEED Silver status."

Exhibition Place spans 192 acres and is owned by the City of Toronto. The site is comprised of a number of historical buildings and is a popular place for conventions, exhibitions, and special events. Exhibition Place already had a strong environmental standard before the redevelopment of the Allstream Centre. Existing programs range from wind turbines and geothermal heating, to water conservation efforts.

"There is a current trend in the industry to embrace green buildings. The green movement simply reinforced our decision to build to LEED Silver," said Purdy. "From an architectural point of view, we wanted to restore many of the historic features, modernize them and move them forward into the future as a LEED Silver conference centre." The original façade was maintained and restored. Heritage elements, such as the entrance lobbies in the interior space were restored, but one of the new additions was the need for a ballroom on the main floor with pre-function space.

SUPPORTING A COLUMN-FREE BALLROOM

One of the challenges with the building was that the existing structure had a series of columns that ran through the centre and supported the roof. Transforming the main floor space into a ballroom meant developing a solution that would eliminate the central columns. However, coming up with a column-free solution while trying to reuse the existing structure was not simple. The ballroom was planned to be nearly 44,000 square feet (151 ft x 290 ft) , making it the largest ballroom in Toronto. NORR Limited, the project's architectural and engineering firm, considered several alternatives to keep the vintage 1929 roof. The central part of the vintage roof had an area of 180 ft x 330 ft In the short direction, the typical structural system consists of two pitched trusses each spanning 90 feet: one runs from the perimeter to the centre of the high roof, and the other truss from the centre to the perimeter.

"Basically, each pitched truss generated a bay of 90 ft x 30 ft, for a total of 2 x 11 bays in the long direction. You ended up with 10 columns down the centre of the room," said Anthony Di Stefano, Director of Engineering Services at NORR.

"There was an interior option where we would eliminate eight existing columns and introduce a new column in the centre of the nine bays. But then we would have had to support two 135 foot spans with twin 42 inch deep girders," said Di Stefano. This option not only left a centre column, but it also created a bulkhead that was problematic down the middle of the room as it lowered the ceiling space. It also created a left and a right side to the ballroom space, and caused sightline obstructions.

A second option involved an exterior system by creating a deep truss between the two pitches of the roof. This solution would create a 300 foot long, 25 foot deep truss in the valley of the two pitched roofs. "We would then hang the roof below at the existing column locations via structural steel hangers. By tensioning these hangers we would then transfer the load of the existing roof off of the columns below and into the new truss above. Once unloaded the existing columns below could be removed," said Di Stefano. This solution created a grand open space without the bulkhead in the middle. The main disadvantage was that it introduced a deep exterior truss which was expensive to erect. It was also visually obstructive on top of the roof, which went against the building's historic mandate.

In the end, NORR suggested removing the historic pitched roof region completely. Fortunately, all the steel components were recovered for recycling.

One of the options that was considered to attempt to reuse the existing pitched trusses was to remove the 10 central columns and add a mega-truss on top of the structure. This option was not retained as the mega-truss proved to be too imposing and too difficult to install.

The top image shows the roof before removal. The bottom image is the result after the long-span joists were installed. The depth of the new roof integrates well with the existing structure.

IMPLEMENTING THE RIGHT SOLUTION

In the original building, there were 22 bays of 90 ft x 30 ft. In the option Di Stefano and the team implemented, there would be one bay of 151 ft x 290 ft providing flexibility and prolonging the life of the building.

"We first thought we could replace the present structural system with a traditional joist and girder truss solution. We studied this and discovered that it created a ceiling height that was slightly less than what we wanted," said Di Stefano. "After looking over everything, we decided to use long span steel joists instead." The team put in 11 foot deep trusses, at roof level, along the perimeter of the new ballroom and introduced horizontal cross bracing in selective bays. This resulted in a column-free ballroom. The 151 foot span was infilled with 39 long-span steel joists at approximately 7 feet on centre.

"The owner's team decided that due to the long spans, steel was the only viable structural solution," said president and CEO, Stephen Benson of Benson Steel. Using steel joists was the most feasible option to ensure the project could be completed within budget, time constraints and historical limitations that the team had to work within.

"There were significant loads from partition walls in the middle third of the building. These created a deflection that needed to be monitored during erection to satisfy partition tolerances," said Benson. This was one of the few times long-span joists, that were this long, had been used in this capacity in Canada.

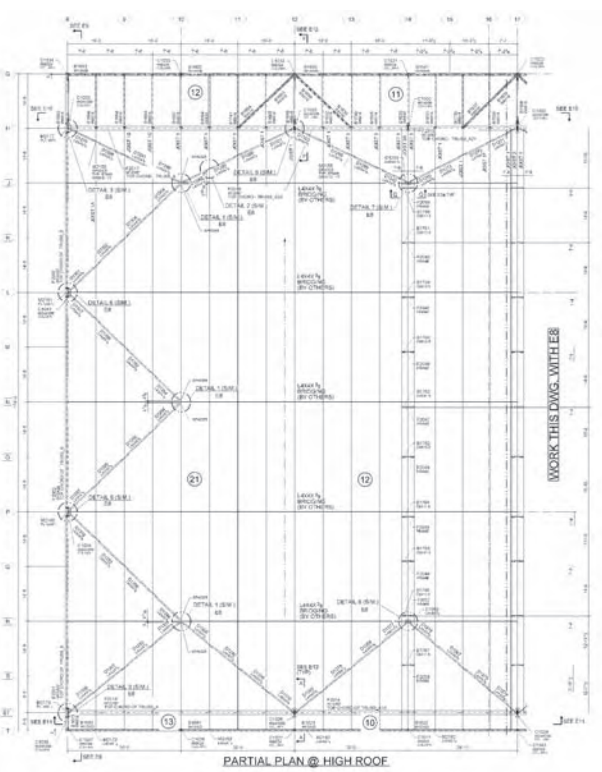
Erection of the trusses on site.

"To erect the long-span joists, additional coordination was needed on site to ensure safety and quality was at its maximum," said Benson. The project involved 490 tons of structural steel, 435 tons of long-span joists assembled with 10,120 bolts (3/4" and 1" A325 TC fasteners).

"This was a challenging job to detail in dealing with the existing structure and the new design" said Benson. The Tekla model developed by Pro Draft allowed an early 3D view of the final structure which assisted the project team in detecting potential conflicts.

GOING LEED GREEN WITH STEEL

LEED operates on a point system. Points are earned for each attribute that the system considers to be environmentally beneficial. The Allstream Centre's target is a LEED Silver certification with 33-38 points. The centre achieved some points for keeping portions of the existing building and revitalizing the structure. The special steel roof structure also allowed them to get more points towards LEED status. "Wide flange shapes contain about 93% of recycled content which also helps," said Benson.



Partial plan of the high roof showing the horizontal bracing and the 151 ft long-span joists spaced at approximately 7'4".

The redeveloped building incorporated heat recovery on HVAC systems, natural daylight, a cistern for rainwater harvesting, low consumption plumbing fixtures, condensing boilers, active air quality monitoring system, occupancy sensor lighting, as well as energy saving windows.

When possible, "we choose the team based on our LEED goal." NORR, Vanbots Construction and Benson Steel all had previous experience with LEED buildings so they understood the system. "We also used a LEED consultant to ensure all the LEED requirements were met," said Purdy.

Much effort was spent trying to reuse the old vintage roof structure. In the end, providing a column-free space with an efficient and relatively discrete long-span steel structure proved to be the best sustainable fit. In the end, it's all about finding a coherent balance between economical, social and environmental criteria.

PROJECT SUMMARY

OWNER **Direct Energy Centre, Allstream Centre**
ARCHITECT **NORR Limited Architects and Engineers**
STRUCTURAL ENGINEER **NORR Limited Architects and Engineers**
GENERAL CONTRACTOR **Vanbots Construction Corporation**
CISC STEEL FABRICATOR **Benson Steel**
CISC STEEL DETAILER **Pro Draft Inc.**

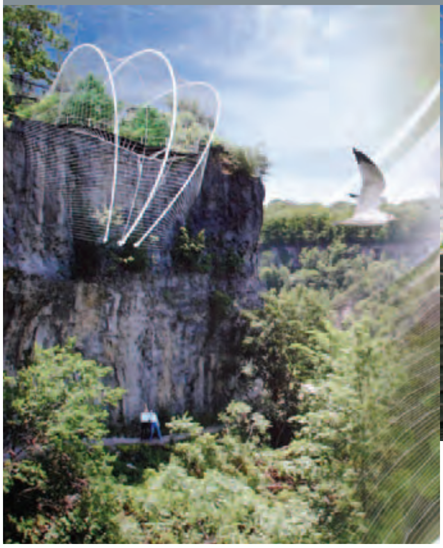
RECYCLED CONTENT CALCULATION RECAP

There are basically two processes for making steel. The integrated mill produces steel with the BOF (Basic Oxygen Furnace) while the mini-mill's process is based on the EAF (Electric Arc Furnace). The BOF uses 25% recycled steel (up to 35%) and the EAF is fed 90% recycled steel (up to nearly 100%). Adding the post-consumer and half the pre-consumer recycled contents will generally provide a 15-20% LEED value for a BOF and 75-90% for an EAF. Most North American hot-rolled shapes are produced using the EAF while much of the cold-formed steel comes from coil or plate generally produced via the BOF route. All North American W-shapes, for example, are EAF products. Note that both BOF and EAF processes are needed for a global sustainable environment.

Steel Recycling Institute - There is a specific section addressed to architects and engineers, for dealing with LEED requirements.
> www.recycle-steel.org/leed.html

The fact sheet is of particular interest. It contains typical break-downs of post-consumer and pre-consumer recycled content of steel as a function of the process (BOF or EAF). Hence, once you have associated the product to the process, you can base your calculations on these global statistics. You can also make your calculations based on letters provided by the mills directly. For more information, visit
> www.cisc-icca.ca/sustainability

Feather in The Glen Bird Sanctuary, 2009 Award Winner, Matt Schmid, University of Waterloo



STUDENTS PLAY WITH TENSION: THE 2008/09 SSEF ARCHITECTURAL STUDENT DESIGN COMPETITION

Loraine Fowlow, University of Calgary

The eighth annual SSEF Architectural Student Design Competition was launched once again this year, and the Foundation received 66 entries from students studying architecture across Canada. As in the previous seven years, the primary intention of this competition is to provide Canadian architectural students with a unique opportunity to embark on a design process that brings to together concept and reality, through the use of steel structure and detailing.

This year's competition was somewhat different from previous years', however. Instead of asking students to design a particular typology, such as a pedestrian bridge, students were asked instead to explore the potential in steel of a simple physical fact: tension. The competition brief explained:

"Students are invited not only to explore tension as it may be expressed in form, surfaces, members, and connections; they are also invited to engage in the exploration of tension as part of a structural dialogue that may occur between tension and compression as that results in the structural resolution of architectural form. While they may range from utilitarian to exquisite in their execution, all responses must, nonetheless, come to terms with one simple problem: the clear application of tension to achieve a harmonious structural solution."

The winning project was designed by **Matt Schmid** of the University of Waterloo, for his project entitled, "Feather in the Glen", supervised by Professor Philip Beesley. The entry description reads:

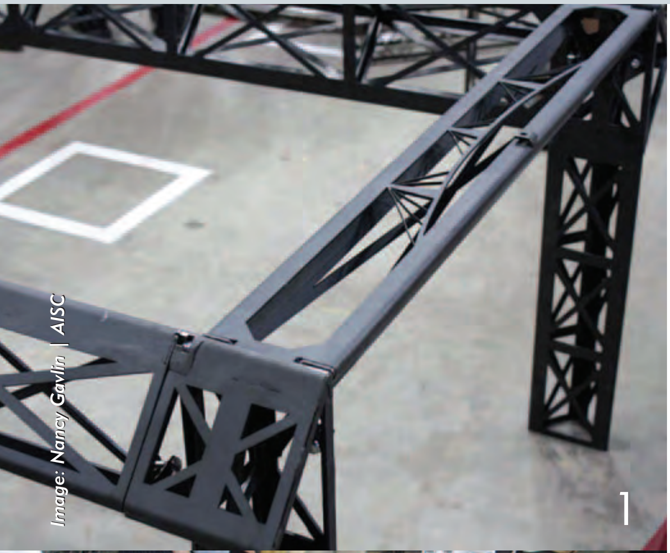
"The Feather in the Glen Bird Sanctuary is a large and extremely light structure achieved through a complex interdependence between tension and compression members in its structural system. Hollow steel sections span large distances made possible by the use of hundreds of tension cables that provide a high degree of lateral stability and stiffness to the sections. The loads acting on the structure are reduced to their essential lines and picked up with a minimal use of the material. The interdependence of such a system consisting of a single material demonstrates the incredible versatility of steel. The steel cables also defy their one-dimensional nature as they integrate structure and form. Their lines are swept through space by close repetition to form complex three dimensional implied surfaces."

Juror Chris Adach commented that, "The project yearns to be composed of steel elements, whereas no other product could solve the design problem as efficiently or as elegantly. The creative use of steel as a building block is clearly demonstrated. While aviaries are not new concepts, the unique position and application of site integrated elements pushes the envelope of function and aesthetics drawing the interest of participants. The form of the structure is appropriate for its intended use and site location chosen. This creates a harmony with the adjacent landscape integrating a transitional flow of open site and enclosure."

An Award of Merit was given to **Jonathan Cummings** from the University of Toronto, for his project entitled, "Counter Balance." Jonathan's Faculty Sponsor was Professor David Bowick.

This year's judging panel consisted of **Chris Adach**, M & G Steel; **Carol Kleinfeldt**, Kleinfeldt Mychajlowycz Architects; **Neb Erakovic**, Halcrow Yolles; and, **Roger Pavan**, Pavan Architects. Many thanks to the jury for their hard work and excellent choices.

For more information, visit the website at www.ssef-ffca.ca



1 - Just their first Nationals, Team Laval earned a 1st in Economy and 2nd in Construction Speed with these unique, folded-plate elements and integrated connections.

2 - The elegant design and details that won 1st in Display for Team ÉTS.

3 - The seasoned and confident Lakehead Team staged for construction and ultimately a 2nd in Economy, 3rd in Construction Speed and 3rd in Display.

FULL HOUSE

Geoff Weisenberger

CONDENSED AND REPRINTED FROM THE JULY 2009 ISSUE OF MODERN STEEL CONSTRUCTION

Away from the chaos and revelry of the Strip, a different type of intensity was on display on a recent May weekend in Las Vegas. While everyone else was in town on vacation, college students—around 550 of them—were doing something constructive. More specifically, they were building steel bridges.

The occasion for such prolific, focused activity in such a leisure-oriented locale was the National Student Steel Bridge Competition (NSSBC), which took place at the University of Nevada, Las Vegas' Thomas and Mack Center.

In all, 46 teams of university-level civil engineering students from Canada and the U.S. assembled, displayed, and tested their creations in the annual contest. The teams are narrowed down from nearly 200 teams that participate in 18 regional competitions.

"At this level, they really know what they're doing," said John Parucki, who has been the head judge of the competition for the past 15 years. "We get the cream of the crop every year, and they get to compete against each other. You can't get any more real world than this."

NSSBC started as a regional competition in the American Midwest in the mid-1980s and grew into a national competition by 1992. Three teams at this year's competition built their bridges in under four minutes, and several others weren't too far behind; the majority of the field finished in under 15 minutes.

But construction speed is only one of six categories in which the bridges are judged. Stiffness, lightness, economy, display, and efficiency are also assessed, and the best combined score across all six categories wins. Every year, the design parameters change slightly to meet the Problem Statement, which this year called for teams to create a scale model of an attractive and functional replacement for a century-old highway bridge spanning a scenic river. In past competitions, above-deck steelwork was part of the program, but this year everything had to remain below the deck. Also, this year's bridges were required to be 20 ft long and capable of carrying 2,500 lb.

PREP WORK

Students design and build the bridges themselves and begin the whole process months in advance. The assembly is practiced over and over until it is perfected; in many cases, teams will assemble their bridges more than 100 times.

In some cases, the design changes at the last minute—before the regional competition and sometimes even between the conference and national competitions. "We actually had our bridge built a month before regionals, then decided to scrap the entire truss and throw it away," noted Eric Gunderson, North Dakota State University's co captain; NDSU has won the competition five times in the last 10 years. "We designed and fabricated a new truss for regionals in less than two weeks. It took us two bridges to get it right, but in the end we got what we wanted."

IT'S ON

The two-day competition began on Friday, which involved the most arbitrary segment, the display judging. The Rules Committee — made up of 10 volunteers from the steel industry and academia —made their rounds and decisions on which entries they found most aesthetically pleasing.

Walking amongst the entries was like walking through a museum of bridge design. The sheer variety of colours, styles, and designs was amazing, especially given the parameters to which the teams must adhere. Bridges were constructed with a variety of framing types, including joists, trusses, box trusses, HSS, or any combination thereof.

FROM MUSEUM TO RACETRACK

While Friday offered an opportunity to look over the bridges at a leisurely pace and observe the students in a somewhat relaxed setting, Saturday was a different story and featured the most exciting part of the competition: the timed construction of the bridges. Students raced back and forth between their material staging areas and the bridges in an effort to beat the clock.

Here's how it works: Teams are compiled of 10-20 members, although only four or five get to build. The judges—there are almost 50, many of them local and all involved in the steel industry in some form or fashion—referee all areas of the competition except for the aesthetics portion.

When the bridge is complete, the clock stops. This year's fastest time was delivered by State University of New York (SUNY) Canton, which came in at just over three minutes. However, in some ways, the clock doesn't stop with the construction portion. Additional time may be added due to penalties given during the load test, much like a hurdler being penalized for knocking down a hurdle even if he crosses the finish line first. Violations include items such as a nut falling off its bolt during transport to the load testing area or a nut not being fully engaged.

SURVEYING STRENGTH

Following the construction portion, teams put their bridge's strength to the test at the load stations, where lateral and vertical load testing is performed. Safety supports are placed below the bridge, should one happen to collapse. For the lateral test, a load of 75 lb is placed on one side of the bridge and a "sway target" is established on the other side, then a 50-lb lateral pull is applied at the sway target and the sway is measured. Sway must not exceed 1 in., or the bridge does not pass the test.

Vertical load testing begins by having the team members place two decking units near opposite ends of the bridge and adding 100 lb to each of them. From here, 1,150 lb is added to one unit. Two targets are established longitudinally at the center of the decking unit, on either side of the bridge. Downward vertical deflection is measured at both targets. Next, 1,150 lb is placed on the other decking unit. There's only one target at this end. (It too is established longitudinally at the center of the decking unit, but only on one side.) The absolute value of vertical deflection at this target that occurs from when the load is added to the first unit to when it is added to this one, is measured.

WEIGHING IN

The last step for the bridge is to undergo a weight test. Simply put, the lightest bridge wins this category. Weight also plays into the final category, structural efficiency; aggregate deflection from the vertical load test also factors into this category.

FINAL RESULTS

In the end, the sum is the whole of its parts. Sacrifices in one area might lead to advantages in others. While timing and cost are important, "Being able to construct the design—that's what's most valuable," said NSSBC judging veteran T. Bartlett Quimby, an associate vice provost at the University of Alaska Anchorage.

SUNY College of Technology at Canton, after placing first in two categories last year, won the overall competition this year. NDSU took second, while Lakehead University came in third. While it's certainly nice to win, the competition is really about preparing future engineers for the real world.

CANADIAN TEAMS

CISC and SSEF became National Sponsors of the ASCE-AISC National Student Bridge Competition in 2008. However, support of Canadian teams dates back to the early 1990's and continues today.

The Canadian Teams final standings in the 2009 ASCE-AISC National Student Bridge Competition.

Overall out of 47 teams:

- Lakehead University – 3rd
- École de Technologie Supérieure – 20th
- Université Laval – 22nd

Congratulations to all!

Coeur Défense atrium, Paris, France
Architect : J.P. Viguier

Honda Exhibit, Festival of Speed 2005, Goodwood, Sussex, England
Architect: Gerry Judah ; Engineer: NRM Bobrowski

ELLIPTICAL HOLLOW SECTIONS THREE-PART SERIES PART ONE: PROPERTIES AND APPLICATIONS

Jeffrey A. Packer

Elliptical Hollow Sections are the newest members of the family of manufactured steel tubes. Being different, these tubes just look modern and they offer additional scope for visual expression.

Elliptical Hollow Sections (EHS) began initially with Circular Hollow Sections (CHS) and then expanded to include Square and Rectangular Hollow Sections (SHS and RHS, respectively). EHS have been produced in Europe since 1994. The use of this product has steadily grown, with architects employing EHS in many structures utilizing Architecturally Exposed Structural Steel (AESS). The principal application of EHS initially was as structural supporting members for glass roofs and glass façades, such as the Coeur Défense atrium. In this building the EHS strong axis for bending is oriented towards the imposed load. If viewed through a glazed wall a minimal member width is then seen.

THE PRODUCT

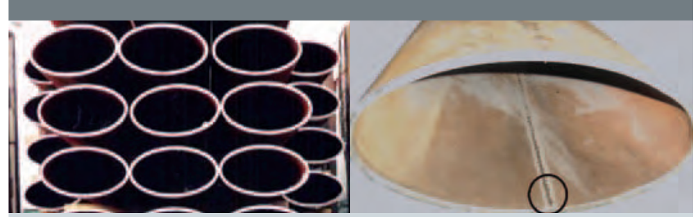
All EHS are produced, with major-to-minor axis dimensions of 2:1, as hot finished hollow structurals. They are produced as continuously welded sections, joined by high frequency induction welding and finished to final shape at extremely high (normalizing) temperatures, with the outside weld bead removed but the inside weld bead typically left in place. Due to the hot finishing process EHS have a fine grain structure, uniform mechanical properties, excellent weldability, negligible residual stress, are suitable for hot-dip galvanizing and are applicable for dynamic loading situations. As a mark of their acceptance into the community of hollow sections, the most recent European production standard for hot finished structural hollow sections includes EHS in the scope.

APPLICATIONS

Architects have found novelty in using EHS for columns in Europe – and also in Canada too. The Legends Centre in Oshawa Ontario, as well as the Electronic Arts stair in Vancouver, have both won CISC Steel Design Awards. Another project specifying EHS at the moment is the CANMET Materials Testing Laboratory at the McMaster Innovation Park in Hamilton, Ontario, designed by Diamond + Schmitt (Architects) and Read Jones Christoffersen

PROPERTIES

EHS are hot finished hollow structural section produced to EN 10210 (CEN 2006a, 2006b. They are available in the grade S355J2H which has a minimum yield strength of 355 MPa up to 16mm wall thickness (the current limit of availability) and a Charpy impact resistance of 27 Joules at -20° C. Being manufactured only by the hot finishing process, EHS thus meet CAN/CSA-G40.20-04/G40.21-04 Grade 350WT Class H Category 2 (CSA 2004) or ASTM A501 Grade B (ASTM 2007) in North America.



Elliptical Hollow Sections are produced with an aspect ration of 1 to 2. The weld bead is present on the inside only.

(Structural Engineers). These members will be exposed, skewed columns in the central atrium, with an elliptical-shaped steel stair wrapping around them. EHS have also been used in bridges such as the Society Bridge in Scotland, as an alternative section for enhancing the visual appeal. EHS also appear in novel steel "sculptures" or works-of-art such as the Honda Exhibit at the "Festival of Speed" in England. It is possible to fill EHS with concrete and to even obtain stainless steel oval sections. Concrete-filling results in 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 in compression.

Their use is new but the novelty is unlikely to wear off as more architects start to specify EHS in Architecturally Exposed Structural Steel applications. This first article is an introduction to the product. The next two articles will deal with Member Design and Connection Design. Stay tuned!


Society Bridge, Braemar, Scotland

JEFFREY A. PACKER IS BAHEN/TANENBAUM PROFESSOR OF CIVIL ENGINEERING AT THE UNIVERSITY OF TORONTO

PRODUCERS

EHS are produced by Tubeurop in France (which became a part of Arcelor Tubes, which in turn became a part of Grupo Condesa, headquartered in Spain). Their product sizes range from 120 x 60 x 3.2 up to 480 x 240 x 14.2 (**www.condesa.com**). Other producers in Europe now include Corus Tubes in the U.K. where the product range, marketed as Celsius® 355 Ovals (OHS), is standardized on six tube sizes ranging from 150 x 75 x 4.0 to 500 x 250 x 16 (**www.corusconstruction.com**). This supplier even has a North American agent (**Brad Fletcher**: **brad.fletcher@corusgroup.com; Tel**: **847-592-3712**) to handle imports. Another manufacturer in Europe is Ancofer Stahlhandel GmbH (**www.ancofer.de**) in Germany, with the same product range as Condesa.

ALBERTA AND ONTARIO 2009 STEEL DESIGN AWARDS

ALBERTA REGION DESIGN AWARDS

ARCHITECTURAL AWARD
Winner
The Water Centre

OWNER: City of Calgary
ARCHITECT: Sturgess Architecture / Manasc Isaac Architects
STRUCTURAL ENGINEER: Read Jones Christoffersen Ltd.
GENERAL CONTRACTOR: Dominion Construction

While the design of the building makes a dramatic architectural statement in steel, that's only half the story. The Water Centre is also the first and largest civic office building to exceed Calgary's minimum LEED Silver standard. The building provides the City's Water Resources and Water Services division's approximately 775 professional staff and field personnel with open office stations, meeting and quiet rooms, conference facilities and crew changing areas.

ENGINEERING AWARD
Winner
Calgary Courts Centre

OWNER: Government of Alberta
ARCHITECT: Kasian Architects
STRUCTURAL ENGINEER: Stantec Consulting Ltd.
GENERAL CONTRACTOR: CANA Management Ltd.
CISC STEEL FABRICATORS: Triangle Steel Ltd.

The 27-storey glass and steel atrium connects two concrete towers – 21 stories tall and 25 stories tall. "The height of the atrium was a big challenge," says engineer Pang Ng, of Stantec. "It was the first complex of its kind of this size in Western Canada, if not in North America." The central glass atrium is an architectural metaphor for the concept that justice must be transparent to all.

INDUSTRIAL AWARD
Winner
ASU Cold Box – OPTI Canada

OWNER: Air Liquide Process & Construction
STRUCTURAL ENGINEERS: SDK et associes
CISC STEEL FABRICATORS: WF Welding & Overhead Cranes Ltd.

The completed ASU cold box is an air-tight structural steel rectangular box measuring 8.5 metres by 10 metres by 64 metres high. It is made up of approximately 12,700 pieces (excluding bolts), is fully clad with flat steel plates, and weighs about 333 tonnes.

STEEL EDGE AWARD
Winner
Capital Health Centre

OWNER: Alberta Health Services
ARCHITECT: Dub Architects
STRUCTURAL ENGINEERS: Protostatix Engineering Consultants Inc.
GENERAL CONTRACTOR: Aman Building Corporation
CISC STEEL FABRICATORS: Collins Industries Ltd.

The new entry to the building features a dramatic cantilevered steel and glass canopy that gives the impression of an open raft floating above the interior and exterior spaces. The design maintains the same footprint as the original structure but uses a single span, allowing for a vast column-free space. The steel frame also allows generous natural light to penetrate the atrium between the towers.

SUSTAINABILITY AWARD
Winner
University of Alberta – Triffo Hall

OWNER: University of Alberta
ARCHITECT: Johns Group2 Architecture Engineering Ltd.
STRUCTURAL ENGINEERS: Read Jones Christoffersen Ltd.
GENERAL CONTRACTOR: Binder Construction Limited

The renovation of Triffo Hall on the University of Alberta campus is an example of the adage that what was old is new again. Built primarily of steel in 1915, it is the first project at the University to be registered with LEED. The new design features a two-storey interior "street" that runs the length of the building along the brick wall. Punctures through the second floor allow this "street" to be flooded with natural light.

Photo courtesy of Deutsch Associates Architects/Photographer Jessie Shotwell

ONTARIO REGION DESIGN AWARDS

ARCHITECTURAL AWARD

Award of Excellence

Camilla and Peter Dalglish Atrium, Royal Botanical Gardens

OWNER: Royal Botanical Gardens
ARCHITECT: Diamond + Schmitt Architects
STRUCTURAL ENGINEERS: Halcrow Yolles
GENERAL CONTRACTOR: Ira McDonald Construction
CISC STEEL FABRICATORS: Central Steel Fabricators Ltd.
PROJECT MANAGER: MHPM Project Managers Inc.

This delicate new facility serves as both the literal and conceptual gateway to the botanical garden of the 21st century. Structural steel framing allows the structure to achieve long spans utilizing slender members resulting in a glass enclosed building that visually recalls a greenhouse and permits an abundance of natural light to filter through the sky light.

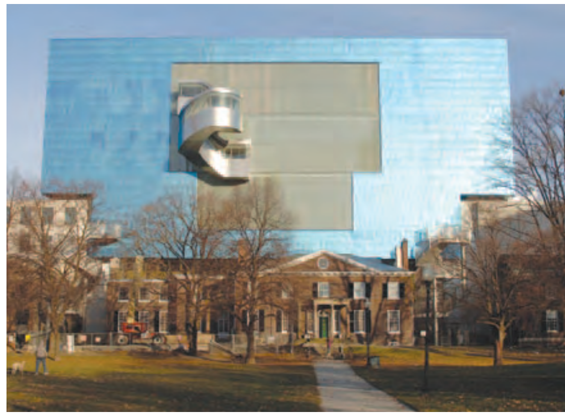
ENGINEERING AWARD

Award of Excellence

Clyde Avenue Bridge Rapid Replacement

OWNER: Ministry of Transportation Ontario
STRUCTURAL ENGINEERS: McCormick Rankin Corporation
GENERAL CONTRACTOR: Dufferin Construction Company
CISC STEEL FABRICATORS: Central Welding and Iron Works Group
ENGINEERED HEAVY LIFTS: Mammoet Canada Eastern Ltd.

Conventional replacement of bridges has a tremendous impact on the travelling public with lane closures. Accordingly, it was decided that five twin-underpass bridges must be replaced overnight with all lanes on Highway 417 opened by noon the following day. This was the first application of bridge replacement / widening involving rapid replacement technology for a major freeway bridge in Canada.



Award of Merit

Art Gallery of Ontario, Transformation

OWNER: Gallery of Ontario
ARCHITECT: Gehry International
STRUCTURAL ENGINEERS: Halcrow Yolles
GENERAL CONTRACTOR: Ellis Don
CISC STEEL DETAILER: Benson Steel Ltd.
CISC STEEL ERECTOR: Benson Steel Ltd.
CISC STEEL FABRICATORS OF MAIN STRUCTURE: Benson Steel Ltd.
CISC STEEL FABRICATORS OF STAIR STRUCTURE: Mariani Metal Fabricators Ltd

Award of Merit

Lakefield College School Hadden Hall

OWNER: Lakefield College School
ARCHITECT: Diamond and Schmitt Architects Inc.
STRUCTURAL ENGINEERS: Blackwell Bowick Partnership Ltd.
GENERAL CONTRACTOR: Percon Construction
CISC STEEL FABRICATORS: Mirage Steel Limited

GREEN BUILDINGS AWARD

Award of Merit

GO Transit Streetsville Bus Facility

OWNER: GO Transit
ARCHITECT: Strasman Architects Inc.
STRUCTURAL ENGINEERS: Read Jones Christoffersen Ltd.
GENERAL CONTRACTOR: Buttcon Limited
CISC STEEL FABRICATORS: Skyhawk Steel Construction Ltd.

PROJECTS CONVERTED TO STEEL AWARD

Award of Merit

Replacement of Sioux Narrows Bridge

OWNER: Ontario Ministry of Transportation
STRUCTURAL ENGINEERS: McCormick Rankin Corporation (MRC)
GENERAL CONTRACTOR: MLA Northern Contracting Ltd.
CISC STEEL DETAILER: KGS Group – Steel Detailing Division
CISC STEEL FABRICATORS: Capitol Welding Ltd.

Award of Merit

Orlando Speculative Industrial Warehouse

OWNER: Orlando Corporation
ARCHITECT: Orlando Corporation
STRUCTURAL ENGINEER: William Leung & Associates Ltd.
LEED AND ENERGY EFFICIENCY CONSULTANTS: Enermodal Engineering
GENERAL CONTRACTOR: Orlando Corporation
CISC STEEL DETAILER: Telco Steel Works
CISC STEEL ERECTOR: KC Welding Limited
CISC STEEL FABRICATORS: Telco Steel Works Ltd.

FOR GREEN'S SAKE

The steel construction industry has implemented several initiatives to reduce its environmental footprint. In this space, we will provide brief overviews of the many ways in which the steel construction industry is going green. Your questions can be sent to Sylvie Boulanger, Director, Sustainable Development, Canadian Steel Construction Council at sboulanger@cisc-icca.ca.

Image: ArcelorMittal

Steelmaking

A BRIDGE TO THE FUTURE

Will Koroluk

When thinking about sustainability in construction, it's often necessary to step right outside the project so you can see things not visible from the inside—the non-construction aspects that often contribute an important part of this thing we call sustainability.

We're learning to consider such elements as the environmental cost of mining, manufacture and transportation of materials used on a construction job. Thanks to life-cycle costing, we're learning to consider the future economic and environmental costs of building operations, maintenance and repair. We've learned to consider the costs and benefits from dismantling a building, and take this aspect of a project into account early.

Indeed, "designing for deconstruction" is an important part of some projects. But there are other costs as well, costs we hear little about. If a completed project is likely to generate a lot of traffic, there is a cost involved there, as well—perhaps in the form of interchange or intersection alterations, maybe widening an arterial road or upgrading paving on some surrounding streets. Additional pressure on storm and sanitary sewers must be factored in, and added to the total cost if necessary. If a project means more automobile or truck use, we have to consider more than traffic patterns; we must consider additional exhaust emissions and their deleterious effect on the environment.

Taking all of these things into consideration means that the real total cost of a \$50 million office building is a great deal more than \$50 million. And understanding and allowing for those additional costs must be a part of any project that is billed as "sustainable."

One of the first places to start is the structure itself—a building, a road, a bridge. New designs and materials are an important part. Consider bridges; the modern cable-stayed bridges that are slowly becoming more common for longer spans, are by their nature, steel-intensive.

The longest such bridge in North America is the Cooper River Bridge connecting Charleston and Mt. Pleasant, South Carolina. The figures for it are impressive. It is 471 metres long. Each of its two diamond towers stands 175 metres tall. Adding the steel girders, the steel boxes anchoring the towers, the steel deck pans, and reinforcing steel a total of 45,000 tonnes of steel were used.

The bridge replaces two obsolete structures, and shortens both travel times and distances. Driving from Mt. Pleasant to Charleston used to take 30 minutes to travel 39 kilometres. Using the new bridge has reduced travel to just 14 minutes to cover 11.6 kilometres. That, of course, lightens the environmental load of all those commutes, and the World Steel Association wanted to know by how much. So it undertook a case study of the bridge to measure the greenhouse gas impacts, from manufacture of the steel right through to the projected end of the bridge's life, 100 years in the future.

The study found that 69,200 vehicles use the bridge on an average day. So if the average vehicle meets U.S. standard of 11.7 km/l, the average fuel savings are slightly in excess of 59 million litres per year. Implicit in that is a saving during the bridge's lifetime of 16.7 million tonnes of carbon dioxide and equivalents (CO_{2eq}). That assumes both average fuel consumption and continuation of automotive design as it presently stands.That's 167,000 tonnes a year saved in tailpipe emissions.

But there were already environmental savings, even before the bridge opened. The construction industry is the biggest single consumer of steel today—about half of all world production, and a lot of it is placed in bridges, where for more than 150 years, steel has been the most important element.

New bridge designs have evolved, as have new construction technologies and new, high-performance steels. There wasn't much difference in the amounts of steel used in the old and new bridges. The old structures used 41,000 tonnes, only about 4,000 tonnes less than the new bridge built 76 years later. The real difference, though, was in energy used and greenhouse gases emitted.

Looking back just 25 years, the process of making steel in the United States consumed 37.8 gigajoules of energy per tonne. By 2005, more advanced technology and increased use of scrap caused that figure to shrink to just 11.5 gigajoules per tonne. That's a pretty dramatic improvement in energy efficiency, and it meant, for the steel in the new bridge, a payoff of 230,000 tonnes of CO_{2eq} saved. The payoffs continued. The 18,970 tonnes of steel contained in the old main span was cut from the cantilever sections, shipped to a steel mill and recycled. Thereby saving 33,460 tonnes of CO_2, when compared with producing new steel from iron ore.

And what became of roughly 20,000 tonnes of old steel that was still left? It was taken a short distance out into the sea and sunk, to form an artificial reef to encourage the growth of marine life, and protect part of the shoreline at the mouth of the Cooper River.

The strength and durability of steel meant that the old bridges, designed to last for 50 years, actually lasted 76 years before replacement was necessary. Because of new steels and new designs, the new bridge has an expected life of 100 years. That's an improvement of 33 per cent over the bridges it replaced. Over that time, it is expected to keep 17 million tonnes of CO_{2eq} from being released into the atmosphere, demonstrating how, step by step, the steel industry is working to achieve ever-greater levels of sustainability.

We need it—for green's sake.

NEWS AND EVENTS

CISC AT THE 2009 MANITOBA CONSTRUCTION CAREER EXPO

The Central Region participated with our Sustainability booth. The display gave students the opportunity to put together a small structural steel structure. It was a resounding success with many high school students participating. The event was held at Winnipeg's Red River Exhibition Park on May 12, 2009. This was the first-ever Manitoba Construction Career expo and was designed to encourage high school students to learn more about the unlimited career opportunities in the construction industry.

SAB CANADIAN GREEN BUILDING AWARDS INCLUDES CISC DESIGN AWARD RECIPIENTS

Of the six 2009 SAB (Sustainable Architecture & Building) awards, two are previous recipients of CISC Steel Design Awards.

Community Centre Pointe-Valaine in Otterburn Park, Quebec was a 2008 Green Buildings Winner in Quebec (*Advantage Steel* #34).

Triffo Hall, University of Alberta, won the 2009 Sustainability Award in Alberta (*Advantage Steel, this issue*).

Congratulations to all involved!

CONGRATULATIONS TO GLOTMAN SIMPSON

The Institution of Structural Engineers has announced the shortlist for the 2009 Structural Awards, the international industry's most prestigious awards. The awards recognise excellence in structural engineering globally. Glotman Simpson is on the shortlist in the "Award for Arts or Entertainment Structures" for their work on the Vancouver Convention Centre Expansion (see *Advantage Steel*, Summer 2009). This is a well-deserved recognition!

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/CSAS16.1-05 "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.

Halifax, NS	September 22, 2009
Toronto, ON	September 23, 2009
Winnipeg, ON	September 29, 2009
Edmonton, ON	September 30, 2009
Vancouver, ON	October 1, 2009

The 2005 National Building Code of Canada introduces very substantial technical changes, and to reconcile the new NBCC requirements, CSA issued S16S1-05, Supplement #1 to CAN/CSA-S16-01 (CSA S16). All of these changes necessitate a fresh look at the underlying framing decisions to be made by designers. In response, CISC is offering two one-day courses intended to provide an understanding of the design theory and the rationale behind code provisions as well as the application of specific Code formulae and requirements.

Steel-Framed Commercial Building Design

This course will be offered once again in major centres across Canada and will focus on practical and economical solutions for framing a six-storey building. Practical steel framing concepts and integration with architectural and mechanical features will be discussed. The course notes will include design solutions for the wind-resisting system as well as typical members and components of the gravity frame.

Toronto, ON	October 14, 2009
Vancouver, ON	November 26, 2009
Saskatoon, SK*	November 25, 2009 *with seismic

Seismic Design of Steel-Framed Buildings

This high-demand course will be offered in seismically active centres in Canada again and will cover the design of various categories of braced frames and moment frames to the requirements of NBCC 2005 and CSA S16-01 (S16S1-05) incorporating design examples for buildings ranging from one to ten storeys in height.

Toronto, ON	October 15, 2009
Vancouver, ON	November 27, 2009

Steel Bridge Design, Fabrication and Construction

This course covers the design, fabrication and construction of steel bridges based on the Canadian Highway Bridge Design Code, CAN/CAS-S6-2000. The course is intended to provide understanding on design theory and the rationale behind Code provisions as well as the application of specific Code formulae and requirements. The practical and economical aspects of fabrication, erection, choice of material and their impact on design will also be emphasized.

Changes and new provisions introduced in S6-2000, pertaining to load applications, analysis, design, fabrication and construction of steel bridges will be highlighted. The presentation and the Course Notes include four design examples illustrating extensive design calculations for I-girders and box girders of straight and curved configurations. The course material and discussions will reflect code provisions, including Design of Horizontally Curved Girders, Construction Requirements for Structural Steel, Durability Requirements, Simplified Live Load Analysis, Fatigue Considerations, etc

Calgary, AB	October 26 & 27, 2009
Vancouver, BC	October 28 & 29, 2009
Halifax, NS	November 2 & 3, 2009
Toronto, ON	November 4 & 5, 2009

NEW MEMBERS

At the June meeting in Winnipeg the CISC Board of Directors elected the following organizations as new members.

FABRICATOR

Bar None Metalworks Ltd.
43851 Progress Way, Chilliwack BC V2R 0E6
Tel: 604 701 6070 Fax: 604 701 6080

C_ore Metal Inc.
2964 Bristol Circle, Oakville ON L6H 6G4
Tel: 905 829 8588 Fax: 905 829 9588

Leder Steel Limited
826 Proctor Wynd, Edmonton AB T5T 6J3
Tel: 780 962 9040 Fax: 780 962 8045

Refac Industrial Contractors Inc.
120 Sinasae St. East, Harrow ON N0R 1G0
Tel: 519 738 3507 Fax: 519 738 3230

DETAILER

Dtech Enterprises Inc.
1-1365 Johnston Road, White Rock BC V4B 3Z3
Tel: 604 536 6572 Fax: 604 536 6573

SUPPLIER

Agway Metals Inc.
170 Delta Park Blvd., Brampton ON L6T 5T6
Tel: 905 799 7535 Fax: 1 866 579 2276

EVENTS

33rd IABSE Symposium on Sustainable Infrastructure: Environment Friendly, Safe
September 9 – 11, 2009 Bangkok, Thailand
www.iabse.org/conferences

IABSE Symposium Creating and Renewing Urban Structures
September 14 – 19, 2008 Chicago, U.S.A
www.iabse.org/conferences

Green Building Festival / IIDEX / NeoCon Canada
September 24 – 25, 2009 Toronto, ON
www.iidexneocon.com

AISC Annual Meeting
September 24, 2009 Braselton, Georgia, U.S.A
www.aisc.org/event

SMMH 2009
(Structures for Mining and related Materials Handling)
November 9 – 12, 2009 Sun City, South Africa
www.smmh-conference.co.za

FABTECH International & AWS Welding Show
November 15 - 18, 2009 Chicago, U.S.A
www.aws.org/show

Contech
November 25, 2009 Montreal, QC
www.contech.qc.ca

Construct Canada
December 2 – 4, 2009 Toronto, ON
www.constructcanada.com

NASCC
The Steel Conference
May 12 – 15, 2010 Orlando, U.S.A.
www.aisc.org

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

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

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

REGIONAL ACTIVITIES

Quebec Region Design Awards and Symposium
November 18, 2009, Montreal

BC Region Steel Design Awards
November 19, 2009, Vancouver

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

Canam Canada, A Division of Canam Group Inc. **S,J**
* Moncton, NB
506 857 3164
www.canam.ws

Cherubini Metal Works Limited **S, P**
Dartmouth, NS 902 468 5630
* Mount Pearl, NF 709 745 8060
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
* Summerside, PE 902 536 9201
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 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/Iron Works Inc. **S**
St-Bruno, QC 450 441 5484
www.bkiron.com

Canam Canada, une division de Groupe Canam Inc. **S, J**
Ville de St-Georges, QC 418 228 8031
www.canam-poutrelle.ws
Boucherville, QC 450 641 4000
* Saint-Gédéon, QC 418 582 3331
www.canam.ws

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

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

FASLRS Métaux Ouvrés F.G. **S**
Saint-Léonard, QC 514 852 6467
www.fgmetal.com

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

Jean Yves Fortin Soudure Inc. **S**
Montmagny, QC 418 248 7904

Lainco Inc.
Terrebonne, QC 450 965 6010

Les Aciers Fax inc
Charlesbourg, QC 418 841 7771

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

Les Constructions Beauce-Atlas Inc. **S**
Ste-Marie de Beauce, QC 418 387 4872
* Montréal, QC 514 942 7763
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.
Donnaconna, QC 418 285 4499
www.metalperreault.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
* Montréal, QC 450 923 9511
www.deltajoists.com

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. /
Structal - Bridges, A Division of Canam Group Inc. **S, P**
Québec, QC 418 683 2561
www.structalponts.ws

Structures Yamaska Inc. **S**
Saint-Césaire, QC 450 469 4020

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

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

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

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

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

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

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

Canam Canada, A Division of Canam Group Inc. **J**
Mississauga, ON 905 671 3460
www.canam-steeljoist.ws

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

Cooksville Steel Limited **S**
Kitchener, ON 519 893 7646
Mississauga, ON 905 277 9538
www.cooksvillesteel.com

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

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


CANAM

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

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

Nickel City Steel Ltd. S, P
Lively, ON 705 692 1982
www.nickelcitysteel.com

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

Noront Steel (1981) Limited S, P
Copper Cliff, ON 705 692 3683
www.norontsteel.com

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

Paradise Steel Fab. Ltd.
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.
Bolton, ON 905 857 9404

Rapid Steel Fabrication Co. Inc. S
Erin, ON 519 833 4698
www.rapidsteel.com

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

Skyhawk Steel Construction Limited S
Brampton, ON 905 458 0606
www.skyhawksteel.com

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

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

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

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

Victoria Steel Corporation S
Oldcastle, ON 519 737 6151

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

CENTRAL

Abesco Ltd. S
Winnipeg, MB 204 667 3981

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

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

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

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

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

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

Omega Joists Inc. J
* Winnipeg, MB 204 237 3528
www.omegajoists.com

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

Supreme Steel Ltd. 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

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

Capital Steel Inc.
Edmonton, AB 780 463 9177

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

Empire Iron Works Ltd. [Edmonton] 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

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

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

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

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

Omega Joists Inc. J
Nisku, AB 780 955 3390
* Calgary, AB 403 250 7871
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.
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 Steel Ltd. S, P
Edmonton, AB 780 483 3278
www.supremesteel.com

Supreme Steel Ltd., Bridge Division S, P
Edmonton, AB 780 467 2266
www.supremesteel.com

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

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

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

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

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

BRITISH COLUMBIA

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

Canam Canada, A Division of Canam Group Inc. S, J
* Coquitlam, BC 604 583 9760

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

Dynamic Structures S, P
Port Coquitlam, BC 604 941 9481
www.empireds.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.
Delta, BC 604 940 4769

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.
Langley, BC 604 888 1812
www.macform.org

Omega Joists Inc. J
* Surrey, BC 604 596 1747
www.omegajoists.com

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

9009 - 7403 Québec Inc. B
Lachenaie, QC 450 654 0270

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

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

Acklam Drafting Service
Tecumseh, ON 519 979 1674

ACL Structural Consultants Ltd. B
Sylvan Lake, AB 403 887 5300
www.acl-corp.com

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
Edmonton, AB 780 461 3550
www.caddalta.com

Cadmax Detailing Inc./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.
Levis, QC 418 835 5140
www.structuredca.com

Detailed Design Drafting Services Ltd. B
Parksville, BC 250 248 4871
www.detaileddesign.com

Draft-Tech Inc.
Windsor, ON 519 977 8585

Dtech Enterprises Inc.
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./
Haché Services Techniques Ltée B, P
Caraquet, NB 506 727 7800

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

International Steel Detailing Ltd. B
Nanaimo, BC 250 758 6060
www.intersteel.ca

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

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

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

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

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

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

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

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

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

Maximum Steel Detailing Inc. B
Langley, BC 604 514 1474

M-Tec Drafting Services Inc. B
Sherwood Park, AB 780 467 0903
www.mtecinc.ca

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

SDI Structural Drafting Inc. B, Br, P
Edmonton, AB 780 463 2140
www.sdiinc.ca

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

TDS Industrial Services Ltd. B, P
Prince George, BC 250 561 1646
www.tdsindustrial.com

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

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

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

ASSOCIATE ERECTOR

E.S. Fox Limited B
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.
Terrebonne, QC 450 965 7360

ASSOCIATE SUPPLIER

A/D Fire Protection Systems Inc.
Laval, QC 450 661 0006
www.adfire.com

Acier Altitube Inc. / Altitube Steel 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, plates

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 sections

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

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

Atlantic Industries Limited
Dorchester, NB 450 464 2111
galvanizing

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
Wheelbrating, blasting, glass bead services, epoxy coatings enamels, zinc rich primers, metalizing, plastic flame coating

Blastech Corporation
Brantford, ON 519 756 8222
www.blastech.com
Abrasive blasting, glass bead blasting application of liquid coatings, baked on coatings and powder coatings of metalizing

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

Bolair Fluid Handling Systems
Halton Hills , ON 905 564 2231
www.bolair.ca
Paint spray equipment & accessories, ie: horses,valves, filters, spray guns, etc.

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
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]
Edmonton, AB 780 481 3941
www.fisherludlow.com
Welded steel/aluminum/stainless steel grating, "Grip Span" and "Shur Grip" safety grating

Fisher & Ludlow, A Division of Harris Steel Limited [Surrey]
Surrey, BC 604 888 0911
www.fisherludlow.com
Welded steel/aluminum/stainless steel grating, "Grip Span" and "Shur Grip" safety grating

Fisher & Ludlow, division d'acier Harris Ltée [Longueuil]
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 / Globec Machinery
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
www.ikgindustries.com

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

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

La Compagnie Américaine de Fer et Métaux Inc. / American Iron & Metal 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

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 consumables

Magnus Inc.
Ste-Therese, QC 866 435 6366
www.magnus-nr.ca
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
http://www.pacificboltmfg.ca/
Steel fasteners, structural bolts, anchor bolts, tie rods

Peinture Internationale (une division de Akzo Nobel Peintures Ltée) / International Paints (A Division of Akzo Nobel Coating Ltd.)
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 Tubing

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

S.N.F. Québec Métal Recyclé (FNF) Inc / S.N.F. Québec Metal Recycling (FNF) Inc.
Laval, QC 514 323 0333
www.snf.ca
Ferrous and nonferrous metal recycling

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

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

Terraprobe Testing Ltd.
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 Company
Bolton, ON 905 857 6601
Sandblasting; protective coatings, metallizing

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

VARSTEEL Ltd. [Delta]
Delta, BC 604 946 2717
www.varsteel.ca
Beam, angle, channel, HSS plate, Sheet, Grating, expanded metal, pipe, flats, rounds, etc.

VARSTEEL Ltd. [Lethbridge]
Lethbridge, AB 403 320 1953
www.varsteel.ca
Beam, angle, channel, HSS plate, Sheet, Grating, expanded metal, pipe, flats, rounds, etc

VICWEST Corporation [Edmonton]
Edmonton, AB 780 454 4477
www.vicwest.com
Steel Metal Floor/roof deck, wall and roof cladding

VICWEST Corporation [Moncton]
Moncton, NB 506 857 0057
www.vicwest.com
Steel Metal Floor/roof deck, wall and roof cladding

VICWEST Corporation [Oakville]
Oakville, ON 905 825 2252
www.vicwest.com
Steel Metal Floor/roof deck, wall and roof cladding

VICWEST Corporation [Surrey]
Surrey, BC 604 590 2220
www.vicwest.com
Steel Metal Floor/roof deck, wall and roof cladding

VICWEST Corporation [Winnipeg]
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

Western Studwelding Supply
Edmonon, AB 780 434 3362

Wilkinson Steel and Metals, A Division of Premetalco Inc. [Edmonton]
Edmonton, AB 780 434 8441
www.wilkinsonsteel.com
Misc. structural shapes, hot rolled bars and plates. Structurals-angles, flats, beams, channel, plate

Wilkinson Steel and Metals, A Division of Premetalco Inc. [Vancouver]
Vancouver, BC 604 324 6611
www.wilkinsonsteel.com
Misc. structural shapes, hot rolled bars and plates. Structurals-angles, flats, beams, channel, plate

MILL

Atlas Tube Canada ULC
Harrow, ON 519 738 5000
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.algoma.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 (Western) Inc.
Abbotsford, BC 604 852 9664
www.dymin-steel.com

Dymin Steel Inc.
Brampton, ON 905 840 0808
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

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

Evraz Inc. NA
Portland, OR 503 240 5240
www.osm.com

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

AFFILIATE

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

INDIVIDUAL

Alan J. McGill, P.Eng., Port Alberni BC	250 724 3400
Alex Fulop, Vaughan ON	905 760 7663
Alfredo Mastrodicasa, P.Eng., Woodbridge ON	905 856 2530
Andrew W. Metten, P.Eng., Struct.Eng., Vancouver BC	604 688 9861
Arno Dyck, P.Eng., Calgary AB	403 255 6040
Avrid Meland, P.Eng., Calgary AB	403 716 8158
Barry F. Laviolette, P.Eng., Edmonton AB	780 454 0884
Bernard Gérin-Lajoie, Outremont QC	514 279 4821
Bertrand Proulx, ing., Shawinigan QC	819 537 5771
Bhupender S. Khoral, P.Eng., Ottawa ON	613 739 7482
Bijoy G. Saha, P.Eng., Fredericton NB	506 452 9000
Brian McClure, Nanaimo BC	250 713 9875
Bruno Chouinard, Montreal QC	514 846 4000
Chell K. Yee, Edmonton AB	780 488 5636
Chet Liu, Chatam ON	514 351 9612
Christian Audet, ing., Sherbrooke QC	819 434 1832
Ciro Martoni, ing., Montréal QC	514 340 0046
Claude Pasquin, ing., Montreal QC	514 282 8100
Clint S. Low, P.Eng., Vancouver BC	604 688 9861
Constantino Loutas, P.Eng., Edmonton AB	780 423 5855
Curtis Feeg, Calgary AB	403 540 0677
Dan S. Rapinda, P.Eng., Winnipeg MB	204 488 6674
Daniel A. Estabrooks, P.Eng., Saint John NB	506 674 1810
Daniel Girard, Chambly QC	450 447 3055
Danis St-Laurent, Dieppe NB	506 382 9353
Dave R.M. Vrkljan, Calgary AB	403 251 2578
David Howard, P.Eng., Burlington ON	905 632 9040
Deborah VanSlyke, P.Eng., Fredericton NB	506 452 8480
Dominique Bauer, ing., Montréal QC	514 389 9844
Don R. Ireland, P.Eng., Brampton ON	905 846 9514
Dwain A. Babiak, P.Eng., Calgary AB	403 338 5826
Ely E. Kazakoff, P.Eng., Kelowna BC	250 860 3225
Francis Pare, Trois-Rivieres QC	819 373 1145
Francis J. Gerrits, Barrie ON	705 737 3303
François Charest, ing., Repentigny QC	450 581 8070
Franz Knoll, ing., Montréal QC	514 878 3021
Frédéric Côté, ing., Sherbrooke QC	819 565 3385
Gary L. Hodgson, P.Eng., Niagara Falls ON	905 357 6406
Geneviève Demers, Trois-Rivieres QC	819 375 1691
George Casoli, P.Eng., Richmond BC	604 273 7737
Gérard Pilon, ing., Valleyfield QC	450 373 9999
Gérard Vallière, ing., Laval QC	450 688 4970
Glenn J. McMillan, London ON	519 453 1480
Gordon D. Bowman, P.Eng., Gloucester ON	613 742 7130
Gordon J. Boneschansker, P.Eng., Fredericton NB	506 452 7000
Hamidreza Razaghi, Edmonton AB	780 989 7120
J.H.R. Vierhuis, P.Eng., Willowdale ON	416 497 8600
Jacques Pharand, Montreal QC	514 872 5466
James M. Giffin, P.Eng., Amherst NS	902 667 3300
James R. Malo, Thunder Bay ON	807 345 5582
Jason Mewis, P.Eng., Saskatoon SK	306 978 7730
Jean-Marc Dugre, Sherbrooke QC	819 864 0609
Jean-Paul Giffard, ing., Saint-Jean-Chrysostome QC	418 839 7937
Jean-Pierre Dandois, St. Bruno QC	514 592 1164
Jeff Leibgott, ing., Montreal QC	514 933 6621
Joël Rhéaume, ing., Beauport QC	418 660 5858
Jonathan Atkins, P.Eng., Toronto ON	416 489 7888
Joseph M. Sarkor, P.Eng., Kelowna BC	250 868 1413
Ken Zwicker, P.Eng., St. Albert AB	780 458 6964
Leonard Basaraba, Vancouver BC	604 664 5409
Louis Crépeau, M Ing., Montréal QC	514 931 1080
M. Declan Whelan, P.Eng., Hamilton ON	905 523 1988
M. Eric Boucher, ing., Québec QC	418 871 8103
M.P. (Michel) Comeau, Halifax NS	902 429 5454
Marc LeBlanc, P.Eng., Dieppe NB	506 382 5550
Marc-Andre Comeau, ing., Salaberry-de-Valleyfield QC	450 371 8585
Mark K. Moland, P.Eng., Lepreau NB	506 659 6388
Mark McFadden, Chatam ON	514 351 9612
Mehrak Razzvi, P.Eng., North Vancouver BC	604 988 7131
Michael F. Bartlett, P.Eng., London ON	519 661 3659
Mike L. Trader, P.Eng., Hamilton ON	905 381 3231
Mirek Neumann, P.Eng., Mississauga ON	905 823 7134
Movses R. Gulesserian, P.Eng., North York ON	416 391 1230
Nathan Priest, P.Eng., Prince William NB	506 575 1222
Nayef El-Tabbah, Joliette QC	450 759 1213
Nazmi Lawen, P.Eng., Charlottetown PE	902 368 2300
Neil A. Paolini, P.Eng., Etobicoke ON	416 249 4651
Paul Slater, Kitchener ON	519 743 6500
Philip A. McConnell, Edmonton AB	780 450 8005
Pierre Laplante, ing., Sainte Foy QC	418 651 8984
R. Mark Lasby, P.Eng., Vancouver BC	604 629 9525
R. Paul Ransom, P.Eng., Burlington ON	905 693 9628
Ralph E. Southward, P.Eng., Burlington ON	905 639 7455
Ralph W. Hildenbrandt, Calgary AB	403 245 5501
Rein A. Matiisen, P.Eng., Calgary AB	403 338 5804
Renaud Lapointe, ing., Drummondville QC	819 474 1448
René Laviolette, ing., Lévis QC	418 304 1405
Richard Frehlich, P.Eng., Calgary AB	403 281 1005
Robert Girard, Chicoutimi QC	418 549 9687
Robert Stolz, P.Eng., Medicine Hat AB	403 526 6761
Roberto Filippi, ing., Montreal QC	514 881 9197
Ron Kekich, Markham ON	905 474 2355
Ryan Bakay, Calgary AB	403 289 2912
Salvatore Leo, Kirkland QC	514 334 1234
Serge Tremblay, ing., Quebec QC	418 878 3218
Serge Vézina, ing., Laval QC	514 281 1010
Simon Claude, Ing., Montreal QC	514 525 8655
Sohail Samdani, Mississauga ON	905 614 4412
Steve Lécuyer, ing., Montréal QC	514 333 5151
Stig Skarborn, P.Eng., Fredericton NB	506 452 1804
Thor A. Tandy, P.Eng., Victoria BC	250 384 9115
Tiberiu Pepelea, ing., Trois-Rivières QC	819 372 4543
Wilfred Siu, P.Eng., Edmonton AB	780 451 1905
William (Bill) Rypstra, P.Eng., Georgetown ON	905 877 3240
William C.K. Leung, P.Eng., Woodbridge ON	905 851 9535
William J. Alcock, P.Eng., North Vancouver BC	604 986 0663

COMPANY

Adjeleian Allen Rubeli Ltd., Ottawa ON	613 232 5786
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., Longueueil QC	514 281 1033
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
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., Richelieu 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
Totten Sims Hubicki Associates, Whitby ON	905 668 9363
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

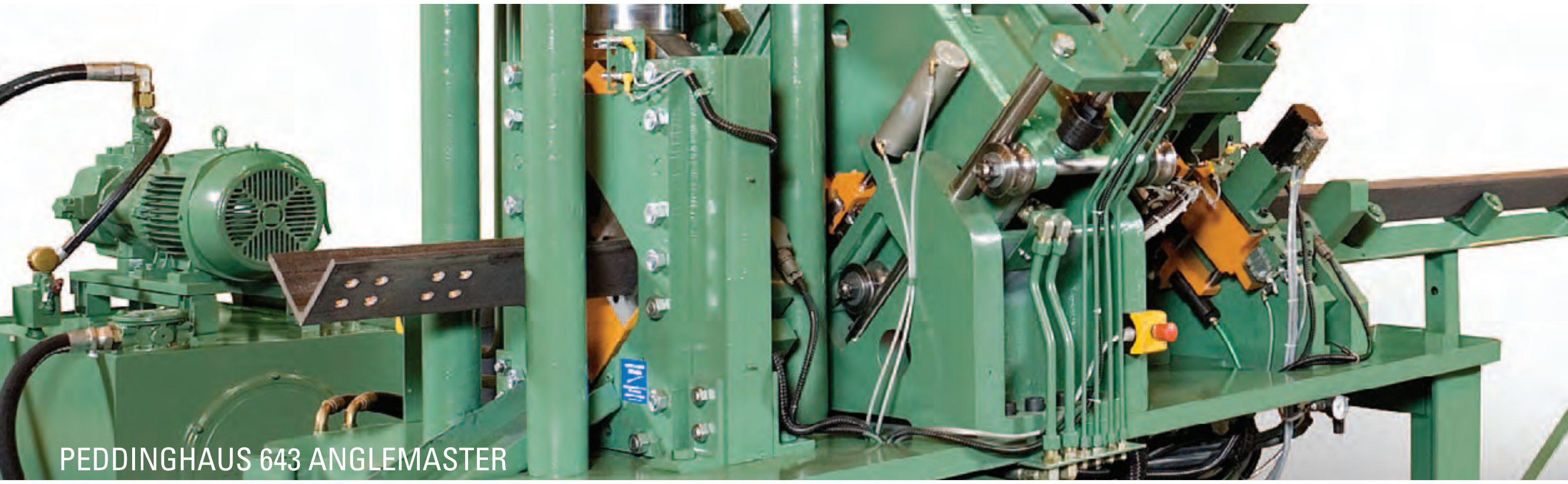
TECHNCIAL - INDIVIDUAL

Angelo M. Ricciuto, Concord ON	905 669 6303
George Graham, C.E.T., Winnipeg MB	204 943 7501
Ronald W. Rollins, Burnaby BC	604 453 4057

Working for you through technology

PEDDINGHAUS FPB 1800/3

FICEP 1101 DZ CNC DRILL LINE


PEDDINGHAUS 643 ANGLEMASTER

Benson Steel has invested in the latest technology to service our clients faster and more economically. We look forward to serving you.

BENSON STEEL

ISO 9001 Registered by QUASAR | CISC | CWB CERTIFIED CSA W47.1

72 Commercial Road, Bolton, Ontario, Canada L7E 1K4 Tel: 905-857-0684 Fax: 905-857-4005

www.bensonsteel.com