NO 30 WINTER 2007

ADVANTAGE STEEL

STEEL AND OTHER MATERIALS PART TWO – STEEL AND WOOD

DREAM GARDEN NEEDS STEEL SUPPORT

THE STEEL-PLATE SHEAR WALLS OF LES BRISES DU FLEUVE V

ALBERTA AND ONTARIO 2007 DESIGN AWARDS

SCHOLARSHIPS AND AWARDS SUMMARY

cisc icca

CANADIAN INSTITUTE OF STEEL CONSTRUCTION

FROM THE EDITOR

In Part Two of our series on steel used with other materials, John Leckie explores Steel and Wood, a mix of two very different materials. Used together for many decades, this mixed construction, with its challenging interface, uses steel to deliver extraordinary results as our West Coast members have demonstrated. Five of the twelve stations on the Vancouver SkyTrain Millennium Line make use of some combination of wood and steel.

Steel to the rescue! On page 15 Frédéric Simonnot describes how stee-plate shear walls have been used to salvage a concrete condominium building. With a minimum of disruption to residents, and using a minimum amount of interior space, steel plate walls brought the building up to the seismic requirements of the building code.

Our overview of this year's Alberta and Ontario Design Awards demonstrates some of the dynamic steel construction occurring in these two locales. The picture above of the Calgary LRT 7th Avenue refurbishment is a particularly elegant example of steel form following function.

Toronto's Covenant House, Canada's largest shelter for homeless youth, is using steel to support a green roof over their agency. This should reduce heating and cooling costs while providing a source of fresh herbs and vegetables for use in cooking classes. On page 13 discover how you may contribute to this worthwhile endeavour.

Also, our regular columns Ask Dr. Sylvie, Seismic Corner, and What's Cool, What's Hot, What's New are sure to be of interest. In addition, many upcoming events are also listed.

Michael I. Gilmor, P.Eng.
President CISC

IN THIS ISSUE

Ask Dr. Sylvie 6
Seismic Corner - *Charles Albert* 7
Steel and Other Materials Part Two – Steel and Wood - *John Leckie* 8
Dream Garden Needs Steel Support - *Rose Cino & Peter Kula* 13
The Steel-Plate Shear Walls of Les Brises du Fleuve V - *Frédéric Simonnot* 15
Alberta and Ontario 2007 Design Awards 20
Scholarships and Awards Summary 24
What's Cool, What's Hot, What's New 29
CISC Members 32

HEAD OFFICE
300-201 Consumers Road Willowdale, Ontario M2J 4G8
Phone 416-491-4552 Fax 416-491-6461 Email: info@cisc-icca.ca

ONTARIO REGION
300-201 Consumers Road
Willowdale, Ontario M2J 4G8
Phone 416-491-4552 ext. 106
Email sjohn@cisc-icca.ca

QUÉBEC REGIONAL OFFICE
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 REGIONAL OFFICE
14172 - 28A Avenue
Surrey, British Columbia V4P 2H8
Phone 604-538-7594 or 1-8ONLYSTEEL Fax 604-538-7539
Email ptimler@cisc-icca.ca

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

ADVANTAGE STEEL NUMBER 30 WINTER 2007

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 **416-491-4552**, Fax **416-491-6461**

CHAIRMAN Don Oborowsky, *Waiward Steel Fabricators Ltd.*
EDITOR Michael I. Gilmor, P.Eng.
ASSISTANT TO THE EDITOR Rob White, BFA
EDITING/TECH ADVISOR Sylvie Boulanger, P.Eng. Ph.D
PUBLISHER Richard Soren - *Design Print Media*
Tel 416-465-6600
E-mail designprint@sympatico.ca
DESIGN & FORMATTING Katherine Lalonde - *KLDESIGN*
E-mail katherine@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
201 Consumers Road, Suite 300
Willowdale, Ontario, Canada M2J 4G8

COVER PHOTO:
Brentwood Skytrain Station, Vancouver
Architect: Busby + Associates
Engineer: Fast + Epp
Fabricator: George Third & Son
Photo: Nic Lehoux

PHOTO ON THIS PAGE:
7th Avenue LRT Refurbishment
Lawrence de Pape

photo: Normand Cadorette

Sylvie Boulanger, P.Eng. Ph.D. - Ask Dr. Sylvie is a column for Advantage Steel aimed at readers seeking technical information on steel structures. Questions are welcome on all aspects of design and construction of steel buildings and bridges. Suggested solutions may not necessarily apply to a particular structure or application, and are not intended to replace the expertise of a professional engineer, architect or other licensed professional. Questions for Dr. Sylvie, or comments on previous questions, may be submitted by e-mail to ***sboulanger@cisc-icca.ca.***

ASK DR. SYLVIE

STEEL AT ELEVATED TEMPERATURES

We are proposing an investigation to ascertain the repairs required at a plastics facility after a fire. Is there information or documents that can help us evaluate the adequacy of this facility? – B.R.C.

"If it is still straight after exposure to fire — the steel is OK". That is a statement that has been around the industry for ages. And if it isn't straight, moderate to even significant deformation is usually not a sign of modified mechanical or metallurgical properties. Your worries should occur only if you can identify that some members have been exposed to fire exceeding 650°C (1200°F). At or just below that temperature, steel loses 50% of its strength but its metallurgical profile does not change. Remember how steel is made! Interestingly, firms familiar with steel production and fabrication procedures have often repaired or straightened fire damaged steel. They know that during a fire, metallurgical changes are predominantly temporary (although some may be permanent). In fact, "rehabilitation or replacement of [noticeably deformed] members is usually dependent on expediency, economics or overcoming the human psychological rejection of what appears to be damaged steel" writes Raymond Tide, not on lack of strength.

My colleague George Frater, our fire engineering resource, gets questions related to the behaviour of steel at high temperatures often. He usually provides four references to help the enquirer:

- A 13-page Engineering Journal (EJ) article (1998: Q1) entitled "Integrity of Structural Steel After Exposure to Fire" by Raymond Tide, Senior Consultant at Wiss, Janney, Elstner Associates, available from the AISC website: www.aisc.org/ej
- A publication by British Steel (now Corus) entitled "The Reinstatement of Fire Damaged Steel and Iron Framed Structures" whose main conclusions are accessible at: www.corusconstruction.com/en/design_and_innovation/structural_design/fire/fire_damage_assesment/
- Part 8.6 of the Manual for Railway Engineering, Chapter 15 (Steel Structures), by AREMA (American Railway Engineering and Maintenance-of-Way Association) which deals with "Guidelines for Evaluating Fire Damaged Steel Railway Bridges" available from the AREMA website but very expensive: www.arema.org
- Appendix A of a book entitled "The Principles of Fire Investigation" written by Roy A. Cooke & Rodger H. Ide. The appendix deals with "Estimation of Temperature Attained" and provides "tempering colours" of oxide layers formed on steel due to elevated temperatures. The book is published by IFE (Institution of Fire Engineers) and is available for purchase from amazon.com or from their own website: www.ife.org.uk

The EJ article is a must for your library. Raymond Tide shares his knowledge in an exemplary manner. I read through it and found many answers to my questions. Let me paraphrase or quote some chunks of information that I think you might find useful but remember to go to the source for more detail and proper referencing:

Material - Because of their relatively low carbon and other alloying content, structural steels usually regain close to 100 percent of their pre-heated properties provided the steel temperature does not exceed approximately 720°C (1330°F). AISC, AASHTO and AREMA have all adopted 650°C (1200°F) as a threshold. Not so surprisingly, this is true independent of steel grade.

Members - Steel expansion is temperature dependent and as the temperature of the steel increases, an unrestrained member will elongate. A member fully restrained in the axial direction will develop axial stresses as the temperature increases. Either a member has significant room for unrestricted expansion or significant compressive forces will develop when restrained. Buckling is likely to occur when the temperature is in the 650-750°C (1200–1400°F) range because of the reduced F_y, and E under these conditions.

Bolts - High-strength bolts warrant a separate mention because of their special manufacturing requirements. Experimental work and post-fire examination of bolts removed from a building indicate that, with one exception, exposure to fire does not alter high-strength bolt properties. After the bolt cools to ambient temperatures, the original bolt strength is essentially regained.

Welds - Weld metal exposed to elevated fire temperatures can be treated the same as the adjoining base metal when examining the metallurgical aspects. The temperature increase resulting from a fire is comparable to post-weld heat treatment.

Creep - Large deflections due to creep are a consideration if the elevated temperature and load are sustained for a period of time. However, stress levels and fire duration in most building occupancies do not result in appreciable creep deflection due to the limited fire load and exposure time. Estimates of creep can be determined from published research data (see references in EJ article by Tide). Although if some creep occurs, its effect on an essentially straight member is unlikely to be significant or affect the performance of a refurbished building.

Assessment - Many procedures are available to assess structural steel integrity after fire exposure, including visual observations, non-destructive testing and destructive testing (removing samples). See EJ article for more detail. I've run out of space in my column!

BRACING AT TOP FLANGE OR WEB

I am designing a curved box-girder bridge. Could you tell me if it is better to attach the "top flange lateral bracing" to the top flange or to the web? – N.V.

As you know, CAN/CSA-S6-06 lets you do either but the answer is "the web" and is independent of the fact that the bridge is curved. According to David Stringer, a consultant with many years of bridge engineering experience with Dominion-Bridge and Canron, the top lateral bracing of box-girders is usually attached to the web for the following reasons:

1) Fillet welds rather than groove welds may be used for the horizontal gusset plates.

2) By keeping the lateral bracing approximately 250 mm below the top flange, space is available for the formwork for the concrete deck.

The location of the lateral gusset plates should coincide with the location of an intermediate stiffener or a cross frame so that a load path is available to transfer bracing forces to the flanges of the box-girder. Where necessary for fatigue reasons, a large radius must be provided to the lateral gusset plate to improve the fatigue detail.

Satisfied? I hope so. I was very convinced.

Curved steel box-girder bridges are aesthetically pleasing and functionally effective, particularly at highway interchanges with curved alignments. Hence, I'm pleased to see you design box-girders in the context you have to deal with: strong curvature (R=120m), long spans (47m-53m-36m) and challenging but decent site access in an urban environment. I see the inside depth of the girder is 1.65m which is sufficient for maintenance reasons. We know the ministries of transport do not like them if they are too shallow. I'm sure you are having fun dealing with the seismic provisions. In general, you should find the curved box-girder design (example 4) in the CISC Bridge Design Notes very useful. To obtain a copy of the notes: www.cisc-icca.ca/publications/educational/bridgecourse/

TORSIONAL CONSTANT

How is the torsional constant J calculated for W sections, C sections, rectangular and round HSS? – L.P.

Have we got an answer for you. Whether you want to calculate the St. Venant torsional constant, the warping torsional constant, the shear centre, the monosymmetry constant, the shear constant and properties of open cross sections or closed cross sections, Charles Albert has this link to help enquirers: www.cisc-icca.ca/resources/tech/updates/torsionprop

SEISMIC CORNER - HOW TO USE CONVENTIONAL CONSTRUCTION

Charles Albert, P.Eng.

Conventional Construction is an advantageous design option for many low-rise buildings in regions of low seismic hazard. This structural system features traditional design and construction practices, and can be used for steel braced frames, moment frames and plate walls.

In which regions can this system be used without height limitations?

According to the National Building Code of Canada (NBCC) 2005 Clause 4.1.8.9, the height limitation depends on the specified short-period and one-second spectral acceleration ratios of the site. In regions where $I_E\ F_a\ S_a(0.2) \geq 0.35$ or $I_E\ F_v\ S_a(1.0) > 0.3$, the building height is limited to 15 m. I_E is the earthquake importance factor and $S_a(T)$ is the 5% damped spectral response acceleration for period T in seconds. F_a and F_v are the acceleration-based and velocity-based site coefficients, respectively, which are functions of $S_a(T)$ as well as the Site Class (based on the soil profile).

Assuming $I_E = 1.0$ and Site Class = C (very dense soil and soft rock), Canadian regions where Conventional Construction may be used without height limitations include the Prairie provinces, most of Ontario (including Toronto but excluding Ottawa), and the Atlantic provinces except for some areas of New Brunswick.

As a side note, single-storey industrial steel structures are exempt from height limitations (NBCC 2005 Structural Commentary J, paragraph 143).

What are the general design requirements?

Conventional Construction must meet the requirements of CSA Standard S16-01, Clause 27.10. Since this system is designed using ductility-related and overstrength-related force modification factors of $R_d = 1.5$ and $R_o = 1.3$, respectively, the resulting member sizes may be larger than for other, more ductile, systems. However, connection details are often simpler because the other provisions of Clause 27 do not apply.

In regions where $I_E\ F_a\ S_a(0.2) > 0.45$, diaphragms and connections must either be proportioned to ensure a ductile failure mode in the connections, or be designed to resist the gravity loads together with the seismic load multiplied by R_d. See Clause 27.10 and the CISC Commentary for further information.

What is meant by a ductile failure mode?

Details that are considered to achieve ductile failure modes include welded connections consisting of fillet welds loaded primarily in shear and bolted connections in which the governing failure mode corresponds to bolt bearing failure. The CISC Commentary provides additional guidance for selecting appropriate connections for braced and moment-resisting frames.

Terri Meyer Boake

Vancouver SkyTrain Millennium Line: The Brentwood Station

STEEL AND OTHER MATERIALS THREE-PART SERIES
PART TWO: STEEL AND WOOD

John Leckie

Pairing steel and wood in a single project can lead to unique assemblies of sustainable and aesthetically pleasing hybrid structures. The strength of steel lessens the bulk and provides an economy of structure that would not be possible with an all-wood design. The warmth of wood can add a welcoming touch to an all-steel building.

Steel and wood are two very different materials and combining them can be a challenge to designers. Steel is a manufactured product – strong, predictable and infinitely recyclable. Wood is a natural material – relatively weak, variable in strength but renewable. Temperature differentials cause steel to expand and contract but has little effect on wood; however, changes in humidity, which have little effect on steel, can cause wood to shrink and permanently change its dimensions.

HISTORY

In the late 1700s, the first cast iron bridge was built across the River Severn in Shropshire, England. With no precedent to go on, the designers turned to wood, basing the connections on carpentry, using mortise and tenon and blind dovetail joints to fasten the elements together. There is some irony in the fact that it is at the joints that steel now holds the greatest advantage over wood and, even in structures that are heavily weighted to wood, steel is used as the connecting link, greatly reducing the bulk of the structure.

In Canada, hybrid structures have been used in several ways. In Quebec and Ontario, there are hundreds of steel-wood bridges, where steel is used as the main structural system (steel girders) and wood is used as the secondary structural system (wood planks). This application is also common in buildings, where steel acts as the supporting frame and wood as the planar elements.

While the two materials have been used together across Canada, the prime area for bringing them together has been on the West Coast. In that part of the country, a tradition of wood construction has linked up with design firms and fabricators of both steel and wood who are willing to stretch beyond their traditional activities. The result is often hybrid frames where wood and steel share gravity and lateral load transfer.

THE OTHER MATERIAL: WOOD

Wood is described as a heterogeneous, hygroscopic, cellular and anisotropic material. That means it is made up of a diverse range of different items, it attracts water molecules from the existing environment though absorption or adsorption, it has a cellular structure and its properties are directionally dependent.

Most of the lumber used in construction is known as softwood lumber, coming from conifers (needle-bearing trees) such as pine, cedar, hemlock or spruce. Hardwood lumber (from broad-leafed trees) is used more for furniture making.

For building purposes, wood, in the form of lumber, timber, glulam (glue-laminated beams) and structural composite lumber can be used as primary structural members and, in the form of plywood, oriented strandboard, waferboard and plank decking, is used as secondary structural members, such as sheathing and decking.

Products such as glulam and structural composite lumber are considered engineered products because of the manufacturing process. While the gluing and lamination increases the strength and reduces the moisture content of the wood, it makes the products unsuitable for recycling and, as with many wood products, generates up to 30 per cent wasted wood, which counters some of the positive marks for green building that wood receives for being a renewable resource.

CHALLENGE AT THE INTERFACE

Because of their different properties, connections between wood and steel can be difficult.

"The big problem from a structural point of view is the different expansion/contraction coefficients when you have dissimilar materials, especially on a column-beam-wall type interface," says Martin Nielsen, a principal at Busby Perkins + Will architects.

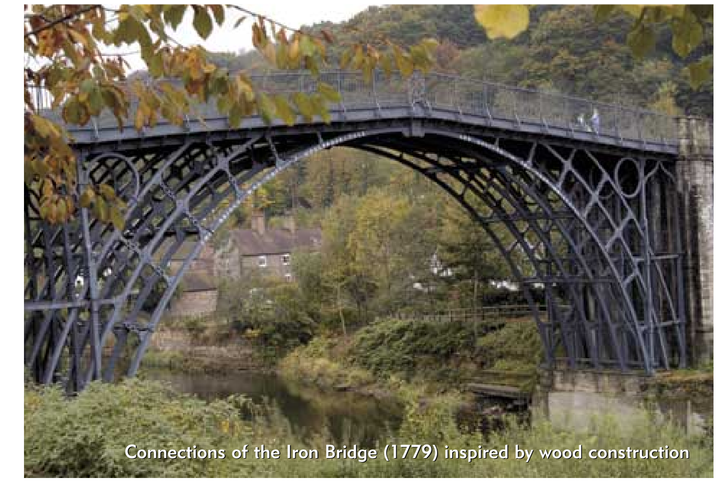
Steel excels in tension while wood reacts much better to compression.

Paul Fast, a partner in Fast + Epp structural engineers says there are analytical programs available now to help set up the structure needed when combining the materials. In some cases, slotted holes in the steel can allow for some movement. The important thing in creating a hybrid structural system is to remember the strengths of each material and in what context each of them works best, Fast says. "Steel is a much stronger material, so if you are going to create a hybrid wood/steel truss, you want to put the wood up on top of the truss (in compression) and steel at the bottom chord (in tension). That way you just need to butt the wood elements one against each other with very little bolting, and avoid large connections at the bottom truss since steel is transferring the high-tension forces."


Croft Pelletier Architectes

Anne Carrier Architectes (Benoit Lafrance)

Steel as the primary structural system and wood as the secondary system (sheathing, decking)


Connections of the Iron Bridge (1779) inspired by wood construction

Steel is subject to oxidation while wood is subject to decay.

There are other issues where wood and steel come into contact as well. Steel needs to be protected, by being galvanized or with a specific paint system, in order to resist the humidity changes in the wood. It also helps to use dry wood instead of green wood at the interface, if possible, because it moves less over time. Because it is important to limit the restraint that the steel connecting elements impose, a bolted steel connection should not span the full depth of a wood element. On bridges, where timber decking is used supported by steel girders, the two materials should be separated by a waterproof membrane.

DESIGN PROCESS

Steel is a crucial element in the design of these hybrid structures because it allows the use of slender, delicate profiles that would not be possible with wood alone. "In an all-wood structure, you are really limited in what you can do in terms of joinery," Nielsen says. "You are forced into a more traditional approach."

Using steel and wood together, the designer has to be very aware of balance. "Typically, they are a very different expression, so it can be quite visually jarring to see two different materials if they are not harmonious or balanced and it can be quite visually jarring at the interface between the two," he says. "If you look at Brentwood Station, for example, the ribs are a synergy between wood and steel where the right material has been selected for the right reason."

Fast says, while he doesn't have an exact rule of thumb for his projects, it is necessary to use enough of the complementing material to provide an appealing accent. On a primarily steel structure, there has to be enough wood to warm up the building

Vancouver SkyTrain Millennium Line: The Gilmore Station

and, on a primarily wood structure, there has to be enough steel to provide some interest.

CASE STUDY: THE SKYTRAIN STATIONS

Five of the 12 stations on the Vancouver SkyTrain Millennium Line have some combination of steel and wood. The Brentwood Station features a structure integrating steel and glulam timber beams, as do the Rupert and Renfrew stations and the Commercial station. The Gilmore Station features a cable and steel casting-type system to create a roof of stressed plywood panels.

"We used Timberstrand on the Gilmore Station," Nielsen says. "It is really an engineered chipboard that comes in inch-and-a-half strips that can run as long as you want. We used a steel kingpost and a wire tensioner and that worked out really well. The panels were prefabricated in the shop and they could just be brought out on the site and dropped into place. They were preroofed so the membrane was already in place."

There was a learning curve for the steel fabricator on the remaining projects, however. It is all well and good to have a hybrid design but someone has to step up to the plate to put that in place and it fell on the steel fabricator to take charge. Rob Third of George Third and Son agreed to take delivery of the glulam beams from the wood supplier, marry them to the steel and erect them on the site. That meant a major leap into working with an unfamiliar material. It also led to some educational moments, when the steel fabricators learned that an SDS screw was not simply a self-drilling screw as they assumed, but a brand-name screw made by Simpson Strongtie. That lesson was not without cost because the SDS screw is more expensive than a self-drilling screw.

Working with wood brought some more lessons as well. There were concerns about damaging the wood in the shop, either through handling or by welding or heating steel too close to the wood in the structure. "With a minimal amount of care, it turned out to be not much of a problem," Third says. "You would have to get the wood really hot and keep the heat right up next to it for a long period of time before you start to scorch it. We were able to weld right up against the wood with a heat shield and it didn't seem to be much of a problem."

Making sure everyone in the shop was aware of the differences in the materials was an important factor. The large wood beams were on the floor of the shop. Had they been steel, there would not be any problem with people walking over them but that had to be discouraged for the wooden beams because they might be marked as a result and refinishing them would have been difficult.

To a degree, it was easier to get the message across because the workers had been used to dealing with architecturally exposed structural steel. Other efforts, such as covering saw horses with wood and carpeting and using nylon slings to move the wood beams rather than the chains and hooks usually used with steel, minimized problems.

BEST PRACTICES

Someone has to take charge.

The Brentwood station project featured a steel column base and a wood span. The two pieces had to be married together and erected on the site. Unless the wood supplier or the steel fabricator took charge, there would potentially be problems, Nielsen says.

"If something went wrong in terms of the fit, they would start pointing fingers at one another."

In this case, George Third stepped up and took responsibility for the whole effort, coordinating shop drawings, delivery schedules and erection. Despite the fact that they were not involved in the selection of the wood supplier, it was essential to establish direct contact with them rather than going through the general contractor, Third says.

An interesting aspect of steel and wood projects is that few wood suppliers and steel fabricators wish to face the unfamiliar challenges of hybrid construction. Since contractors involved in such projects are likely to be well skilled, their proficiency will help facilitate the construction process.

THE FUTURE

Projects involving steel and wood are not always easy to put together so they are likely never going to be an everyday occurrence. But projects like the SkyTrain stations, the Olympic speed skating oval in Richmond, B.C., Quest University in Squamish, B.C., the Surrey City Centre mall, have all demonstrated that appealing structures can be created by marrying steel and wood. Rob Third, who has taken on a few of these projects, is somewhat leery of turning half of his shop over to wood on a regular basis but likes the challenge of building something that breaks away from traditional roles. Both Martin Nielsen and Paul Fast have been designing and building hybrid structures for over a decade and they have confidence that the hybrid structures are here to stay.

DREAM GARDEN NEEDS STEEL SUPPORT

Rose Cino and Peter Kula

Covenant House, Canada's largest shelter for homeless youth, offers a second chance to thousands of kids annually. Much more than a shelter, Covenant House provides young people with the tools to build independent lives including education, counseling, job training and vocational assistance.

A progressive leader in the field of caring for homeless youth over the past 25 years, Covenant House is now developing a plan to realize its dream of constructing a roof-top garden or green roof at its McGill Street site in downtown Toronto.

The firm of Read Jones Christoffersen Ltd. (RJC) was commissioned in April 2007 to investigate the structural potential of constructing a green roof on the existing roof. From approximately 1981 the building was a private women's club. Architectural and structural drawings were available from that time which indicated the building also underwent major renovations. These renovations included the addition of the current fourth floor and roof levels on a previous three-storey building. The roof that was added at that time had been designed as a rooftop recreational area as opposed to strictly a roof. This included designing the steel roof structure for live loading in excess of Building Code snow load requirements.

Renovations in 2001/2002 removed the rooftop recreational facilities; consequently there remained reserve structural capacity in the existing steel framing. The roof structure is constructed of long-span open-web steel joists, which clear-spanned the entire 60 ft. width of the building. This joist framing is overlain with concrete topping on steel roof decking. RJC's investigations included review of the 1981 structural drawings, site measurements of steel joist properties and spans, as well as a subsequent numerical analysis to confirm the load-carrying capability of the roof structure. RJC concluded that there is reserve capacity of the steel structure to construct an "extensive" green roof, with a lightweight-growing medium. The original use of structural steel for this roof framing added to the flexibility of the use of this rooftop space, including the construction of the green roof.

Mr. Brian Roth, of Roth and Associates (landscape architects, Waterloo, ON), designed the green roof for Covenant House and has made use of steel construction with the incorporation of Gotten steel planter boxes and a weathering steel water feature. The texture and color of the weathering steel is a significant addition to the landscape architect's palette of natural materials used in this design. Mr. Roth has chosen steel for its durability and its adaptability as it lends itself perfectly for constructing the gently curving shapes of the planters and water feature. Additionally, steel HSS framing was used to create a free-standing trellis structure. Steel was chosen due to limited anchorage to the existing relatively thin concrete topping. Timber post framing would have required moment-connected bases, which were impractical due to this limited anchorage. As well the presence of a drywall ceiling in the uppermost floor did not allow for a through-bolted attachment.

In addition to ornamental plants, the roof will have plots for vegetables, fruits and herbs, which can be used by the agency's food services department or in youth cooking classes. There will also be a wetland area where students from Ryerson University will be doing environmental research work. As well, solar panels will help offset energy costs, rain barrels will collect rain water for future use in the garden and composting bins will be used by kitchen staff in order to reduce the amount of waste and to create organic compost.

It is estimated that 400 to 500 youths will participate in the green roof project. Covenant House receives 80 percent of its annual budget from individuals, corporations and foundations. "In addition to providing these struggling youth with much needed hope, this endeavor will also cultivate life-long benefits and opportunities to help them to prosper and create stable futures," says Ruth Da Costa, Executive Director of Covenant House.

If you would like to help, Covenant House is looking for donations of steel components for the construction of the garden, which is set to begin in the spring of 2008 in partnership with Ryerson University. The requirements include HSS for framing a trellis and weathering steel for planter boxes. Anyone interested in getting involved should contact *John Tarnawsky, Associate Director, Operations* at (416) 204-7091.

THE STEEL-PLATE SHEAR WALLS OF LES BRISES DU FLEUVE V

A NEW TYPE OF (DISCREET) POSITIVE REINFORCEMENT!

Frédéric Simonnot

Bracing a concrete building with steel to bring it up to seismic standards is a new idea dictated by necessity. This technical feat in discreet reinforcement earned a CISC Design Award for Teknika HBA, Provencher Roy + associés and Structures Yamaska.

Containing 84 luxury housing units, Les Brises du Fleuve V, in the Verdun suburb of Montreal, is a 12-storey concrete residential highrise. On November 7, 2001, the south side of its peripheral roof, formed by a concrete slab terrace, collapsed just a few months after construction. The falling slab caused major damage and endangered the building's safety. A comprehensive engineering study was performed on all structural members. Its conclusions showed the building's noncompliance with the seismic standards in force, among other defects, as well as incomplete work and deficiencies.

"Among the defects, apart from the fact that the building was neither designed nor built to seismic standards, we found that the steel of the column capitals supporting the slab did not have the required strength," remembers Gilles Beauchamp, the Beauchamp Bourbeau architect mandated by the syndicate of co-owners to carry out an architectural evaluation.

Following this evaluation, a call for tenders by invitation was issued and Teknika HBA received the mandate to prepare the engineering drawings and specifications, and provide partial supervision of the reinforcement and upgrade to standards.

It's no easy matter to reinforce an existing and occupied building. From the outset, it was obvious that meeting the various objectives of safety, esthetics, efficiency and speed would require an innovative solution.

The first issue to address was whether to reinforce the building from the inside or from the outside. In the latter case, concrete options partially obstructed the view while steel reinforcements made it look like scaffolding, undermining both the building's appearance and the units' property value. Interior steel-plate shear walls were therefore chosen. "The normal technical solution would have been to use concrete and build a wall between apartments. But this would have resulted in a loss of surface area in every dwelling and the amendment of all titles of ownership, along with administrative and legal complications," explains Gilles Beauchamp, currently working with Provencher Roy + associés.

ANATOMY OF A SEISMIC REHABILITATION 1" THICK ON A 12-STOREY CONCRETE RESIDENTIAL BUILDING

1) Bring the members necessary to build the shear plate in pieces onto the site: U-collars, W-sections, angle sections and plates.

2) Anchor, bolt and weld everything.

3) Replace the metal studs and the insulation.

4) And close with gypsum panels!

After many meetings, the project team opted for seismic reinforcement inside the building. Steel-plate shear walls allowed braces less than one inch thick, which could be inserted within the existing walls. "This was a technical feat involving a very complex solution and a lot of calculations, but it was dictated by the situation," Mr. Beauchamp points out.

The use of steel plates installed between the concrete slabs, columns and walls allowed better ductile structural behaviour of the building, besides the time and money saved by not adding concrete walls. "Had we opted for a concrete wall, we would have lost at least five inches in each apartment, not counting the additional work required in all units. This solution allowed us to work on only one side of the party wall between two apartments. In this way, only one third of the occupants of each six-unit floor had to be rehoused during the renovations, for a little under one week per dwelling," explains Louis Crépeau, Teknika HBA's engineer in charge of the upgrade.

The steel plates form a very effective lateral-load-resisting system. In addition to ensuring excellent stiffness, the system requires less steel than conventional systems while also taking up less space.

This unusual but logical reinforcement method necessitated an innovative solution because the plates had to be anchored between existing structural concrete members to transfer forces from the top to the base of the building.

"A steel plate 6 m long by 2.5 m high and 5 mm thick was installed between the walls and the concrete columns to stiffen the entire structure and increase the wall dimensions, which then became a composite concrete-steel wall about 9 m long instead of its original 3 m. Steel channels and angles were bolted and glued with epoxy and anchored to the concrete walls, slabs and columns so that the plate could be welded to them.

"When you're dealing with concrete of unknown quality and have doubts about the quantity of reinforcing steel present, you must be certain that the load is transmitted properly. We therefore used continuous members all the way to the base, serving both as connection and reinforcement to resist tensile forces. In the event of an earthquake, the excess weight would be supported by the steel. The most delicate operation involved an analysis to check that forces were properly transmitted between the steel and the concrete. This was done by modelling the geometry and properties of both materials using ETABS software."

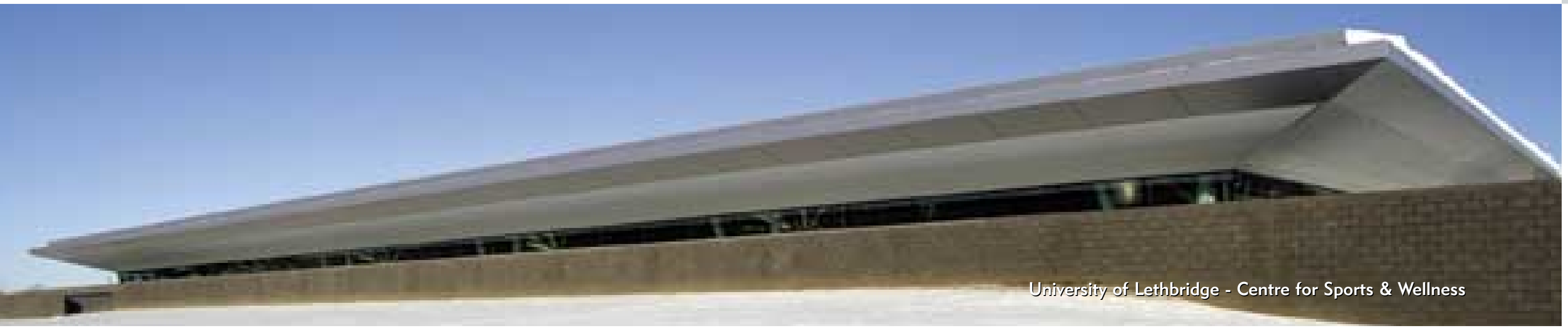
"The real technical challenge was the design," says Michel Ménard, an engineer with Structures Yamaska, "even though installing the plates in the 32 shear walls was further complicated by the concrete structure which wasn't always rectilinear."

It was also necessary to strengthen the foundation by adding extra piles and consolidating the column capitals to prevent punching. "An additional concrete ring was cast in place on the exterior balconies. Steel collars were installed for the interior columns, since it was more difficult to pour concrete," explains Louis Crépeau.

Teknika HBA then obtained the mandate to reinforce Phases 3 and 4 of the same residential complex whose structure, although made of steel, also required corrections to upgrade it to standards. "We simply reinforced the existing chevron braces with seismic brakes (Pall system) to dampen lateral forces in case of an earthquake."

It must be recognized that reinforcing or modifying a steel structure is almost always simpler and cheaper than for a structure made of other materials. One thing is certain – this unusual use of steel-plate shear walls is likely to be copied in many rehabilitation and renovation projects because the solution is so efficient (and discreet)!


PHOENIX FIRE STATION
50
NUCOR-YAMATO
STEEL
Photo courtesy of Deutsch Associates Architects/Photographer: Jessie Shotwell


University of Lethbridge - Centre for Sports & Wellness

ALBERTA AND ONTARIO 2007 STEEL DESIGN AWARDS

ALBERTA REGION DESIGN AWARDS

ARCHITECTURAL AWARD
7th Avenue LRT Refurbishment

OWNER: City of Calgary
ARCHITECT: Sturgess Architecture and GEC Architecture
STRUCTURAL ENGINEER: Read Jones Christoffersen
GENERAL CONTRACTOR: PCL-Maxam
CISC SUPPLIER: Daam Galvanizing Ltd.

Calgary's 'Transit Mall' has become a huge success at moving commuters in and out of the city core, since its implementation in the 1980s. However, the desperate physical and economic conditions of 7th Avenue made it very clear that there was a need for renovation and rethinking for this portion of the LRT system. The resulting master plan re-envisions the transit mall as a "linear park" connecting Millennium Park in the west through downtown to Fort Calgary on its eastern edge. With their design for the first of the new stations, the design team's (Sturgess Architecture, GEC Architecture, and Carlyle + Associates) functional objective was to cover as much of the street as possible and provide maximum enclosure for the transit users. At the same time, their design inspiration was the brightness of the foothills sky, and they looked to providing height, openness and transparency to maximize the sky views and sun penetration.

Opened in the fall of 2005, their design fulfills these aspirations, merging effortlessly with the adjacent buildings. The new station was created through the close collaboration of all members of a large team including numerous city departments. The lightness, grace and order of the new structure are a testament to this team's success at unravelling a complex knot of initial challenges. If the 7th Avenue improvements are a first step in changing downtown Calgary for the better, then they are right on track.

ENGINEERING AWARD
Low Level Bridge - Northbound Rehabilitation

OWNER: City of Edmonton
ARCHITECT: Cohos Evamy
GENERAL CONTRACTOR: Alberco Construction Ltd.
CISC STEEL FABRICATOR: Supreme Steel Limited – Bridge Division
CISC SUPPLIER: Daam Galvanizing

The Low Level Bridge Northbound over the North Saskatchewan River has been in service for over 100 years. The first railway bridge to cross the river in the City of Edmonton, it was later converted to carry vehicular traffic. It currently carries approximately 23,000 vehicles per day and is a vital transportation link to the downtown core.

In 2004, a bridge condition assessment revealed significant corrosion of many of the century-old steel truss members, and severe deterioration of the paint coating. The required rehabilitation work consisted of strengthening selected truss members, repainting the bridge, and rebuilding a wider sidewalk. The use of structural steel in the Low Level Bridge Northbound — both in the original bridge and in its rehabilitation — has allowed it to adapt to the changing needs of the City of Edmonton for over 100 years. The technically sound and cost-effective rehabilitation was completed in 2006 on time, and on budget. The bridge will continue to serve Albertans for many years to come.

INDUSTRIAL AWARD
Millennium Coker Unit - Cooling Tower Structure

OWNER: Suncor Energy Inc.
ENGINEER: Bantrel Co.
CISC STEEL FABRICATOR: Waiward Steel Fabricators Ltd.
CISC DETAILER: M&D Drafting Ltd.

The new cooling tower support structure for the Suncor Energy Millennium Coker Unit was designed as a "wharf-like" steel structure as opposed to filling the entire site to the desired elevation. The structural steel option eliminated concerns with difficult site conditions and presented a safe, economical solution while minimizing construction time and labour by incorporating modularization concepts that reduced field work and met the project schedule. This concept provided a non-conventional solution that fulfilled all strength and serviceability requirements and was designed to withstand extreme temperature changes, blast loads and exceptional crane loads. It included special connections and many design features due to the teamwork in Bantrel and cooperation with Waiward Steel Ltd.

STEEL EDGE AWARD
University of Lethbridge - Centre for Sports & Wellness

OWNER: University of Lethbridge
ARCHITECT: Gibbs Gage Architects + Barry Johns Architecture Ltd.
STRUCTURAL ENGINEERS: Read Jones Christoffersen Ltd.
GENERAL CONTRACTOR: Graham Construction & Engineering Inc.
OTHER: Cannon Design & Ferrari Westwood Architects Ltd.
CISC STEEL FABRICATOR: CANAM - Solutions and Service

The original iconic Arthur Erickson University of Lethbridge Campus has been recently reflected in the design of the new campus Health and Wellness Facilities. Leading into the ground in a former parking lot, this expansion to the existing Physical Education Building honours the original dramatic horizontal profile of the Erickson Building. A vast steel roof appears to be "floating" slightly above the horizon line and over a continuous band of light at night, visible from across the complete setting of the city. The use of curved steel roof trusses and canted 'V' shaped columns create the appearance of a light and floating structure and reinforce the open and transparent atmosphere of the project interior.

ONTARIO REGION DESIGN AWARDS

ARCHITECTURAL AWARD
Award of Excellence
Fire & Emergency Services Training Institute

OWNER: Greater Toronto Airports Authority
ARCHITECT: Kleinfeldt Mychajlowycz Architects Inc.
STRUCTURAL ENGINEER: Halsall Associates Limited
GENERAL CONTRACTOR: Aquicon Construction Co. Ltd.
CISC FABRICATOR & DETAILER: Benson Steel Limited

Steel was chosen as the dominant architectural element for this project because it was the only material that would give the design a light and articulated counter-point to the exposed, monolithic concrete core slabs and poured concrete elements of the buildings. The steel was considered integral to the design, not simply exposed - an eloquent expression of the variety of volumes and skins that are possible with a steel structure - prefinished steel panels, precast panels, curtainwall and unit masonry. Interior and exterior finishes, including the Solar Wall, perforated acoustic interior panels, catwalks and railings, illustrate the diversity of the material and how it can be used as effectively for a structural member as it can for a brilliant and refined stainless steel railing. The Fire and Emergency Services Training Institute was completed in January 2007.

Award of Merit
Cooling Tower Replacement at U of T, Scarborough Campus

OWNER: University of Toronto, Scarborough Campus
ARCHITECT: Baird Sampson Neuert Architects Inc.
STRUCTURAL ENGINEERS: Stantec Consulting Ltd.
GENERAL CONTRACTOR: Adelt Mechanical Works Ltd.
CISC STEEL FABRICATOR & DETAILER: Benson Steel Limited

The University of Toronto at Scarborough needed to modernize their existing mechanical equipment and to add capacity for future expansion. The required size of the new equipment surpassed the existing mechanical enclosure. An intervention in the building was required to expand the mechanical equipment enclosure at the roof.

Three considerations were of great importance in order to achieve coherence within the existing fabric of the campus. First was the materiality of the building, a monolithic concrete structure; next, the iconic chimney, which could be described as a modern interpretation of the tower clock, giving a visual reference throughout the campus; and third the massing of the lecture rooms.

The form of the enclosure extends the pattern of canted walls and projecting lecture halls that characterize the building, while acoustically reflecting equipment sound vertically away from adjoining courtyard spaces.

ENGINEERING AWARD

Award of Merit

Royal Ontario Museum Renaissance Expansion Project

OWNER: Royal Ontario Museum
ARCHITECT: Studio Daniel Libeskind & Bregman + Hamann Architects - Architects in Joint Venture
STRUCTURAL ENGINEER: Halsall Associates Limited in Association with ARUP
GENERAL CONTRACTOR: Vanbots Construction
CISC FABRICATOR, DETAILER & ERECTOR: Walters Inc.

The ROM Renaissance project, one of the largest projects of its kind, is an exceptional example of engineering and steel design excellence. This high profile project exemplifies a passion and commitment to a transformative design and restoration process, one that is equally impressive and respectful. As part of the demolition program, salvaged structural steel was redirected to the U of T, Scarborough Campus, Student Centre – a project that received honourable mention in the engineering category of the CISC's 2005 Design Awards program.

The intersecting gallery building superstructure is essentially five intersecting volumes constructed of structural steel frames. The intersections create two internal atria as key elements of the architectural expression. The sloped walls of each structure provide vertical support for the floors and extend to form roof elements. The cladding system is a composite panel system that ranges in translucence from opaque to clear.

Award of Merit

Insurance Research Lab for Better Homes

OWNER: University of Western Ontario
STRUCTURAL ENGINEER: Hastings & Aziz Ltd.
GENERAL CONTRACTOR: Mycon Construction Limited
CISC DETAILER & FABRICATOR: ACL Steel Ltd.
CISC ERECTOR: Spencer Steel Ltd.

The Insurance Research Lab for Better Homes at the University of Western Ontario is a first-of-its-kind research facility to examine all aspects of house construction. The seven million dollar structure will house full-scale homes and buildings for intensive study and eventual destruction. Novel experiments on extreme wind effects, moisture penetration, energy efficiency and mould growth will be performed. The ultimate aim of the research is to improve construction techniques to make our communities more resilient to natural hazards and more energy-efficient in the coming decades.

The test building sits inside a steel reaction frame, which provides an area to mount wind-pressure boxes that are 0.6, 1.2 and 2.4 metres square. The exterior structure around the test building is purposely built on wheels attached to a pair of rails so researchers can pull it away.

GREEN BUILDINGS AWARD

Award of Excellence

Fire & Emergency Services Training Institute

OWNER: Greater Toronto Airports Authority
ARCHITECT: Kleinfeldt Mychajlowycz Architects Inc.
STRUCTURAL ENGINEER: Halsall Associates Limited
GENERAL CONTRACTOR: Aquicon Construction Co. Ltd.
CISC STEEL DETAILER & FABRICATOR: Benson Steel Limited

The Fire and Emergency Services Training Institute, completed in January 2007, is the GTAA's first LEED (silver) project and steel has played a major role in this application. It contributes to the building's energy savings, reduces the building's reliance on virgin construction materials and reduces the project's material transportation requirements because of the steel industry's local recycling and manufacturing presence. Perforated steel cladding on the south elevation has been designed to form a solar air heating plenum, which can preheat incoming air by up to 17° C above outdoor temperatures. This reduces the building's energy use, which is more than 30% less than a building built to the Model National Energy Code. As construction figures are being finalized, the whole project is documenting in excess of 15% of construction material value representing recycled materials, for which LEED will award 2 points. Steel has played a large role in this achievement.

PROJECTS CONSTRUCTED OUTSIDE OF ONTARIO AWARD

Award of Excellence

The United States Air Force Memorial

OWNER: United States Air Force Memorial Foundation
ARCHITECT: Pei Cobb Freed & Partners Architects LLP
STRUCTURAL ENGINEERS: Arup
GENERAL CONTRACTOR: Centex Construction
CISC STEEL FABRICATOR: Mariani Metal Fabricators Limited

Soaring 270 feet into the air, The USAF Memorial's three spires symbolize the conquest of flight over gravity. Stainless steel is now the material of choice in the sophisticated architectural design world. Owing to the durability of the material, of at least 100 years, the Memorial should retain its original and spectacular appearance.

However, stainless steel is notoriously difficult to handle. Mariani Metal was required to use stainless steel with extremely low sulphur content - low sulphur stainless steel 316. This requirement allows low-sulphur steel to machine very well and fends off the effects of the environment, considerably extending the lifespan of the structure. In addition, welding often robs the alloy of valuable chromium, making those areas much less resistant to corrosion.

The quantity of material was enormous - 1 million pounds of stainless steel, 7,000 pounds of 100% radiographed weld metal, covering 17,500 square feet of surface area. Nothing on this scale had ever been attempted before.

SCHOLARSHIPS AND AWARDS

G.J. JACKSON MEMORIAL FELLOWSHIP AWARD

The G. J. Jackson Fellowship is awarded annually by the Steel Structures Education Foundation in memory of the late Geoffrey Jackson. Mr. Jackson was for many years a leader in the Canadian structural steel fabrication industry and was a founding member of the Steel Structures Education Foundation. The Award is presented to Canadian engineering students conducting graduate studies in structural engineering, with major emphasis on steel structures. This prestigious award is currently valued at $15,000, over a one-year period. This award is presented at the SSEF Annual General Meeting and commemorated with the Geoffrey J. Jackson Memorial Medal.

The interest in the fellowship this year was considerable with seven applications representing the following universities; Alberta (1), École Polytechnique (3), Moncton (1), Toronto (1) and Waterloo (1). Six of the applications were at the Master's level and one at the Ph. D. level. Academic records of the applicants were impressive, and the proposed research programs and the applicants' rationales for the various courses of studies suitable.

After careful deliberation the committee concluded that the 2007 Jackson Fellowship recipient is **Adam Korzekwa**, from École Polytechnique de Montréal. Adam was presented with his award at the annual SSEF / CISC convention this past June in Kelowna, B.C.

Adam is a Master's student, working under the supervision of Robert Tremblay. His project is to develop and validate design rules for steel-buckling restrained braces. Adam will use finite element analysis techniques to study and characterize the stability and behaviour of steel-core braces under cyclical plastic deformation. This is intended to lead to a component calculation methodology that prevents the core from buckling. Adam will also use experimental techniques on full-scale seismic specimens to validate his results.

This year's judging committee was composed of Joe Schneider and Stig Skarborn, members of the SSEF Board of Governors, and David MacKinnon, SSEF staff representative.

2007 SSEF ARCHITECTURAL STUDENT DESIGN COMPETITION

"UP!" - a steel tower

From time immemorial, towers have been intertwined with the desire of the human race to escape the limitations of our earthly bonds. Through the construction of vertical structures we have sought to extend our reach towards the heavens, while at the same time enabling ourselves to expand our visual mastery of the landscape to which we are so firmly rooted. Our earliest source of inspiration to gain an advantage over our surroundings is undoubtedly linked to the simple principle of a vertical cantilever as it is expressed in the functional form of a tree. The ability to move "Up" is intrinsically linked to structure, and therefore, to material.

Students were challenged to design a tower on a site of the designer's choosing. While the purpose, scope and scale of the tower were left to the discretion of the designer, it was important to focus on what it means for us to engage and experience a structure as "Up." The structure was to be primarily steel, but otherwise, the material palette remained open.

As part of the annual SSEF / CISC convention this past June in Kelowna, B.C., Loraine Fowlow gave a short presentation to outline the 2007 design competition and this year's winners. Forty-two entries from across Canada were received. Three first-year architecture students from the University of Waterloo have won the 6th Annual Steel Structures Education Foundation national architecture student design competition for their tower entry, entitled "Whistler Point Lighthouse". Teams from schools represented last year, McGill and Waterloo, also won both Awards of Merit.

The jury consisted of Chris Adach, M & G Steel Ltd., Mark Gorgolewski, Ryerson University and John McMinn, University of Waterloo.

Award of Excellence

- Patrick Burke, Michael Hasey, Richard Lam, *University of Waterloo*
- Faculty Advisor: Terri Meyer Boake and John Cirka
- Amount: $3,000

Award of Merit

- Valerie Buzaglo, Serena Lee, Jennifer Marshall, Dominique Nguyen-Huy and Nisreen Balh, *McGill University*
- Faculty Advisor: Pieter Sijpkes
- Amount: $2,000

Award of Merit

- Christopher Mosiadz, Leon Lai and Graham Brindle, *University of Waterloo*
- Faculty Advisor: Terri Meyer Boake and John Cirka
- Amount: $2,000

2007 SSEF ARCHITECTURE SCHOLARSHIP

The SSEF is pleased to provide scholarships to students enrolled in accredited professional Schools of Architecture across Canada. These students must show innovation and excellence in steel design. The precise criteria for the award were developed by the individual School and Faculty / Administration.

- Martha Barnstead, Dalhousie University, $3,000
- Josianne Tadif, McGill University, $1,500
- Anne Rodgers / Bori Yoon / Chloe Malek, McGill University, $500
- Nathaniel Funk, University of British Columbia, $3,000
- Michael Bootsma / John McFarlane / Priscilla Yeung, University of Waterloo, $1,200

2007 SSEF UNIVERSITY RESEARCH GRANTS

The SSEF actively promotes the research of topics that are considered to be of interest and importance to the steel industry. More than 63 research grants have been awarded to full-time members of engineering faculties of Canadian universities over the past 11 years. The principal researcher of the highest ranked proposal also receives the **H.A. Krentz Research Award** and a gift of $5,000. In 2007, SSEF was able to provide funding of approximately $110,000. Among the research projects funded this year are "Use of Light-Gauge Steel Plate in Plate Walls" and "Design of Laterally Unsupported Crane-Supporting Girders." For further details and the application process, please go to the SSEF web site at: www.ssef.ca.

CISC also offers a number of scholarship award programs and initiatives for students across Canada. Funded through regional efforts, these initiatives are offered to students conducting studies in the field of structural engineering, and are designed to help promote structural steel studies at Canadian education institutes. The following awards have been presented in the Atlantic, Ontario, Alberta, Central and British Columbia Regions in 2007.

Atlantic Region

The Atlantic region's scholarship program is open to applicants who will be doing a postgraduate degree on research in structural steel structures or a related topic at one of the four Atlantic Engineering Universities (University of New Brunswick, Université de Moncton, Dalhousie University and Memorial University). Two awards, each in the amount of $2,500 are available annually.

So far this year, one award has been presented to (Tony) Hui of Dalhousie University, Department of Civil and Resource Engineering.

Ontario Region

The Ontario Regional Committee awarded eight scholarships in 2007 to students who excelled in their steel design courses, six of which were presented to engineering students and two to architectural students. Chosen recipients were selected based on input from their professors at each respective institution. This year's recipients are:

- **Emmanuel Agostino**, Carleton University – studying under the direction of Professor Heng Aik Khoo, sponsored by Dymin Steel Inc. and M & G Steel Ltd.
- **Sara Albinger**, Ryerson University, Architectural – studying under the direction of Professor Vera Straka, sponsored by MBS Steel Ltd. and Skyhawk Steel Construction Limited
- **Liam Butler**, Waterloo University – studying under the direction of Professor Lei Xu, sponsored by Spec-Sec Incorporated and Dymin Steel Inc.
- **Paul Heerema**, McMaster University – studying under the direction of Professor Mike Tait, sponsored by Walters Inc. and Telco Steel Works Ltd.
- **Adam Kirsh**, University of Toronto, Engineering – studying under the direction of Professor Peter Birkemoe, sponsored by Telco Steel Works Ltd. and Mariani Metal Fabricators Limited
- **Aren Nazari**, Ryerson University, Engineering – studying under the direction of Professor Khaled Sennah, sponsored by Skyhawk Steel Construction Limited and MBS Steel Ltd.
- **Katie Reipas**, University of Western Ontario – studying under the direction of Professor Mike Bartlett, sponsored by Spec-Sec Incorporated and Dymin Steel Inc.
- **Scott Waugh**, University of Toronto, Architectural – studying under the direction of Professor Ted Kesik, sponsored by M & G Steel Ltd. and Walters Inc.

These awards provide each recipient with $2000 in scholarship funding. The applicants must be undergraduate students who excel in the steel design course during their third year and who also selected a steel elective in their final year. The award presentations were part of the Ontario Region's 23rd Annual Spring Reception held May 16, 2007 at the Toronto Congress Centre.

Alberta Region

The Alberta Regional Committee offers civil engineering students from the University of Alberta an opportunity to participate in a cooperative employment placement program. The program selects a group of outstanding third-year students based on their submissions and places them into a working environment with a CISC Alberta region steel fabricator. This is the fifth year the program has been offered to engineering students at U of A and the following were chosen for the 2007 program. The CISC steel fabricator employer is also listed.

- Jesse Edwards, Supreme Steel Ltd., Bridge Division
- Dana Klassen, Collins Industries Ltd.

G.L. Kulak Scholarship Award

In 2004, CISC's Alberta Regional Committee established a scholarship award in honour of Dr. G.L. Kulak, Professor Emeritus at the University of Alberta, to recognize his outstanding contributions to the engineering profession, education and to the Canadian steel industry.

Funded by the Alberta Regional Committee, this $15,000 scholarship award provides financial assistance to Canadian steel engineering graduates who are pursuing an advanced degree in steel structures research. Applicants must be Canadian citizens, and entering their second year of graduate studies in structural engineering at the University of Alberta, with major emphasis on steel structures research. Students enrolled in a Masters or Doctoral Degree program are also eligible to apply, provided they are committed to furthering their education in steel structures research and have intentions on maintaining effective relationships with the steel industry.

The 2007 Scholarship was awarded to Georg Josi.

Applications should include an explanation of the chosen area of steel research and the long-term economic impact on the steel industry; an indication that the individual plans to maintain effective relationships with the steel industry; an official transcript of their undergraduate and post-graduate record to date; and a recommendation from their supervisor or other member of the steel structures research group. All applications must be received by February 15 of the year in which the scholarship will be awarded, and should be forwarded to Peter Timler, P.Eng., CISC Western Regional Executive Director.

Central Region
The Central Regional Committee has established an annual scholarship award in the amount of $2,000, which is presented to a student enrolled in the College of Engineering at the University of Saskatchewan. The 2007 selection process is underway.

British Columbia Region
The BC Regional Committee has offered a Fabricator's Engineering Apprentice program for the past eight years. The program formally integrates a UBC student's academic studies with work experience in co-operative employer organizations, for a four-month work-term working with both a CISC fabricator and structural engineering consultant. Congratulations to the following students who were selected to participate in the 2007 program. The CISC steel fabricator employer is also listed. These students were presented with a certificate award at the BC Region's 2007 Steel Design Awards of Excellence in Vancouver held on November 21, 2007.

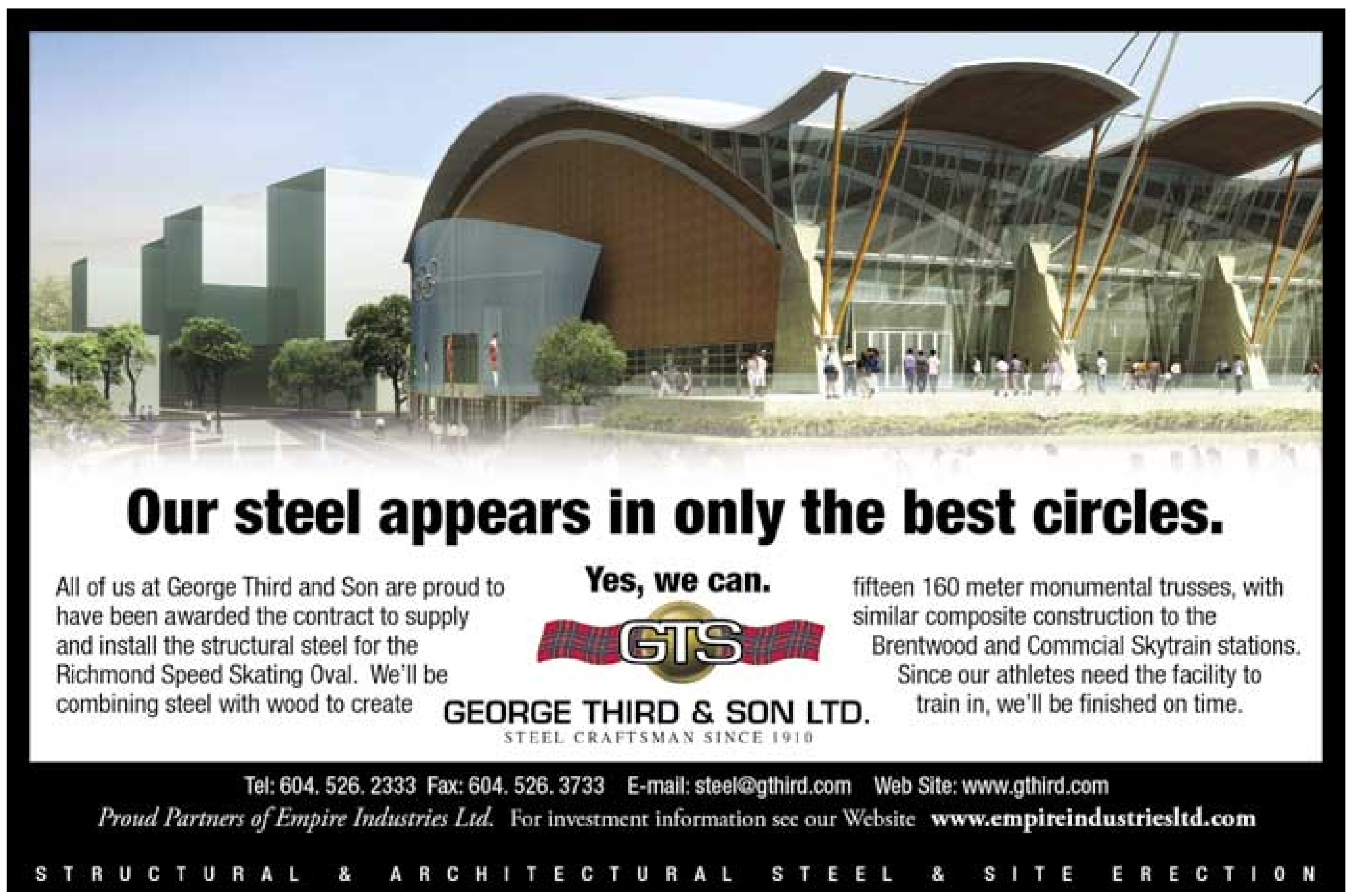
- Jocelyn Leung, George Third & Son
- Arshia Mandegarian, Empire Iron Works Ltd.
- Brian Ho, Canron Western Constructors Ltd.
- Winston Gao, Dowco Consultants Ltd.
- Denny Anggabratta, Wesbridge Steelworks Ltd.

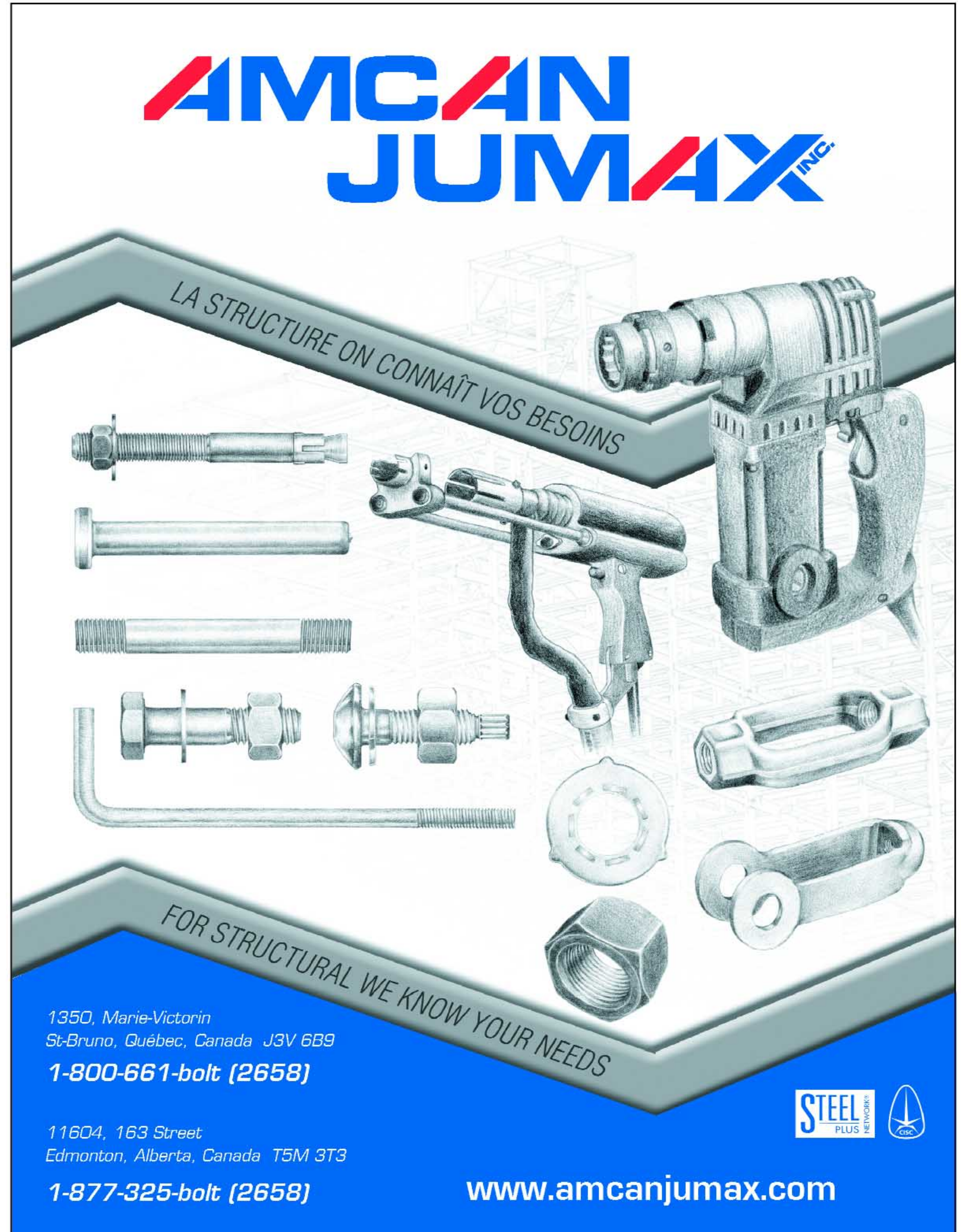
PIZZA AND POP PRESENTATIONS

The Atlantic Regional Committee is continuing with this concept to showcase and discuss the benefits and merits of working with structural steel within the steel industry, at Universities and Community Colleges in the Atlantic region. Last year's meeting at Dalhousie University was such a success they are returning this year! They are also planning one for the University of New Brunswick.

We bring the lunch, the people and the content! These meetings can be arranged with students and/or professors onsite at the campus. CISC's Atlantic Regional Director, Alan Lock will facilitate the meeting and bring along a local CISC steel fabricator(s), and an industry consultant, as well as representatives from a local steel erector or steel detailer to enhance the presentation, if possible. This is a great opportunity for senior civil engineering students to view and discuss the latest industry drawings and pictures, and hopefully increase their knowledge and interest in working with structural steel.

For more information about these education initiatives or to find out how to apply for an award, please contact your regional director or visit our websites at www.cisc-icca.ca and www.ssef-ffca.ca.





WHAT'S COOL, WHAT'S HOT, WHAT'S NEW

BOLTING AND WELDING FOR DESIGN ENGINEERS

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

Toronto, ON – December 7, 2007
Register online at www.cisc-icca.ca/courses.

SSEF 2007 ARCHITECTURAL DESIGN COMPETITION

The Steel Structures Education Foundation is please to announce the "Seventh Annual Student Architectural Design Competition". This year the students are challenged to design a cantilever structure. The span, scale, and purpose is up to the discretion of the student; it is important to focus on what it means for us to engage and experience structure as "cantilever". The registration deadline is January 31, 2008. The Award of Excellence is $3,000. Please check the web site for all the details. www.ssef-ffca.ca

THE STEEL CONFERENCE – NASCC -2008

The 2008 edition of the Steel Conference (NASCC – 2008) looks to be bigger and better than ever! We've had a peek at the preliminary planning. Scheduled topics include Green Design, Robust Structures, Composite Steel Joists, Effective IT Strategies, Detailing for Steel and Precast Structures, 3D Modelling, Earthquake Engineering and AESS and the New Canadian Matrix. Among the speakers and moderators scheduled to participate are Sylvie Boulanger, Terri Meyer Boake, Walter Koppelaar, George Frater and Mark Gorgolewski. Be sure to mark your calendars for this great resource! With the strengthening Canadian dollar this event is more economical than ever. **April 2 – 5, 2008**. Check out the web site for details, as they become available: www.aisc.org/nascc/.

CISC AND SSEF ANNUAL GENERAL MEETINGS

The 2008 AGMs will take place **June 4 to 7** at The Fairmont Algonquin Hotel in St. Andrews, NB. We anticipate over 250 delegates representing the steel industry from across Canada will attend the 2008 event in this idyllic, charming town on the Bay of Fundy, renowned for the highest tides in the world.

St. Andrews represents one of the best-preserved examples of colonial heritage in North America. While maintaining its charm, St. Andrews is also a dynamic, prosperous community with small town values and friendly neighbours. This rustic seaport became the summer residence of choice for the wealthy and powerful, including Sir Samuel Leonard Tilly, Sir James Dunn, Sir William Van Horne and C.D. Howe. The main town portion of St. Andrews has been designated a National Historic District and many of the homes have been marked with descriptive plaques.

The Fairmont Algonquin Hotel is fondly referred to as the "CASTLE BY-THE-SEA." Built in 1889, this castle-style resort sits perched on a hill, overlooking the town and within walking distance of all St. Andrews attractions. This full-service resort offers 250 rooms, 5 restaurants, and numerous activities for all to enjoy.

Just a few of the activities that The Atlantic Regional Committee is planning: boat trips to famous islands, outdoor sea kayaking, strolling along the historic waterfront, or through the magnificent public gardens and golfing on the scenic seaside championship course.

Of course the fun filled "down east lobster boil and kitchen party" will be a must for everyone on the Friday night!

FABRICATOR LAINCO'S 10TH BIRTHDAY

Lainco was born October 31st, 1997. Their founders are Éric and Martin Lachapelle, who were respectively 23 and 26 years old when the adventure started. They have since become accredited by the CWB, under Division 2, and joined CISC. They are currently implementing the CISC quality certification programme. Lainco has developed a loyal client base and has expanded both office and shop space. They have recently performed work for a project outside Quebec. Congratulations to a young and promising fabrication team!

CONSULTING ENGINEER DESSAU'S 50TH BIRTHDAY

Dessau is the second-largest engineering firm in Québec, fifth-largest in Canada and ranks among the top 100 in the world. The smooth transition in leadership in 1992 when founder Paul-Aimé Sauriol transferred management of the company to his son Jean-Pierre, and the merger with Soprin in 1998, gave the firm new momentum at the international level. The Laval-based firm has offices in 40 cities, as well as Algeria and several South American countries, for a total of 3000 employees. Dessau has won four Quebec Steel Design Awards including the Télé-Université building (2001) in Quebec City, the Palais des Congrès (2003), the Rond Point de l'Acadie (2004) and l'École Nationale de Cirque (2004). Dessau is considered one of Canada's "50 best-managed companies". Our members look forward to fabricating steel structures for Dessau over the next 50 years!

ARCHITECTURE FIRM LEMAY'S 50TH BIRTHDAY

Founded in 1957, Lemay is one of the most important architecture firms in Québec. Lemay architects have married architecture and steel structure in exemplary fashion in several projects such as Le 1000 de la Gauchetière (1993), the Canadian Space Agency (1993), the Bell Centre (1996), Agmont Factory (1997), the Complexe Les Ailes (2002), the CDP Capital Centre (2003), the rond point de l'Acadie (2004), the Jewish General Hospital, Sir Mortimer B. Davis Pavilion (2006), and the Centre for oncology research (CRCEO) in Québec City (2007). Lemay has collected awards for seven of those projects in the first decade of the Quebec Steel Design Awards. Lemay creates enduring value by design. This philosophy is only possible with the support of the CEO, Louis T. Lemay, son of co-founder Georges E. Lemay, who received a Hommage Prize from CISC-Quebec on behalf of Lemay. We hope Lemay will continue to be regulars at our Design Awards in the years to come and wish you happy birthday.

CONGRATULATIONS TO DAVE OULTON

Dave Oulton owner of Marid Industries Limited has received the Mentor/Coach Award of Excellence from the Nova Scotia Apprenticeship Board. Dave Oulton has always been a strong supporter of apprenticeship training and has hired over a hundred Ironworker and Metal Fabricator apprentices since the program inception. Marid presently employs over half a dozen apprentices in their day-to-day operations. Dave has also been (charter member) and continues to be a member of the Ironworkers Local #752 Rebar & Structural Training Trust Fund.

APENS AWARD WINNER

Congratulations to Member Robbie Fraser on receiving the Young Engineer Award from the Association of Professional Engineers of Nova Scotia. He was the main designer of the Self-Launching Bridge Formwork Gantry System, which won his employer, CBCL Ltd., the 2007 APENS Lieutenant Governor's Award for Excellence in Engineering. In this as in all his assignments Robbie Fraser has demonstrated an exceptional and unique talent for innovation in his engineering designs.

NEW MEMBERS

At the November Board meeting of the CISC the following organizations were elected as new members.

STEEL SERVICE CENTRE

Metalium Inc.
4020 Garand, Laval, Québec H7L 5C9
Tel: 450-963-0411
Fax: 450-963-7969

FABRICATOR

Atcon Industrial Services Inc. – Fabrication Division
626 Newcastle Blvd., Miramichi, N.B. E1V 2L3
Tel: 506-627-1220
Fax: 506-627-1259
www.atcongroup.com

FASLRS Métaux Ouvrés F.G.
6518 Magloire, St-Léonard, Québec H1P 1N8
Tel: 514-852-6467
Fax: 514-852-0042
www.fgmetal.com

Ray Métal Joliette Ltée
930 Village St-Pierre Sud, Joliette, Québec J6E 3Z1
Tel: 450-753-4228
Fax: 450-753-3885

SUPPLIER

A/D Fire Protection Systems Inc.
2820 Boulevard Saint-Martin Est, Bureau 100
Laval, Québec H7E 5A1
Tel: 450-661-0006
Fax: 450-661-8776
www.adfire.com

Moore Brothers Transport Ltd.
54 Torada Court, Brampton, Ontario L7A 1H5
Tel: 905-840-9872
Fax: 905-840-4531
www.moorebrothers.ca

EVENTS

The Steel Conference, NASCC 2008,
April 2 – 5, 2008, Nashville, TN
www.aisc.org/nascc/

ASCE, Crossing Borders,
2008 Structures Congress
April 25 – 26, 2008, Vancouver, BC
CSCE members can register at ASCE member rates. In addition, CSCE will have its own session on Thursday, April 24th.
(see www.csce.ca for details)
www.content.asce.org/conferences/structures2008/

IABSE Conference – Information and Communication Technology (ICT) for Bridges, Buildings and Construction Practice
June 4 – 6, 2008, Helsinki, Finland
www.iabse.org/conferences/helsinki2008

CISC and SSEF Annual General Meetings
June 4 – 7, 2008, St. Andrews, NB
Fairmount Algonquin

The Canadian Society for Civil Engineers (CSCE) Annual Conference
Theme: "Partnership for Innovation"
June 10-13, 2008, Quebec City, Quebec

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

ATLANTIC REGION

* **Canam - Canada, A Division of Canam Group Inc.** S,J
Moncton, N.B. (506) 857-3164
www.canam-steeljoist.ws

Cherubini Metal Works Limited S,P
Dartmouth, N.S. (902) 468-5630
* Mount Pearl, Nfld. (709) 745-8060
www.cherubinigroup.com

Marid Industries Limited S
Windsor Junction, N.S. (902) 860-1138
www.marid.ns.ca

MacDougall Steel Erectors Inc. S
Cornwall, PEI (902) 855-2100
www.mse-steel.ca

MQM Quality Manufacturing Ltd. S,P
Tracadie-Sheila, N.B. (506) 395-7777

Ocean Steel & Construction Ltd. S,P
Saint John, N.B. (506) 632-2600
www.oceansteel.com

Prebilt Structures Ltd. S,P
Charlottetown, P.E.I. (902) 892-8577
* Summerside, P.E.I. (902) 436-9201

RKO Steel Limited S,P
Halifax, N.S. (902) 468-1322
www.rkosteel.com

Tek Steel Ltd. S
Fredericton, NB (506) 452-1949

Titan Metal Group Ltd. S
Saint-Antoine, NB (506) 525-2416
www.titansteelgroup.com

QUÉBEC REGION

Acier Métaux Spec inc. S
Chateauguay, Québec (450) 698-2161
www.metauxspec.ca

Acier Robel inc. S
St-Eustache, Québec (450) 623-8449
www.acierrobel.com

Acier Trimax Inc. S
Ste-Marie, Beauce, Québec (418) 387-7798
www.trimaxsteel.com

Alma Soudure Inc S
Alma, Québec (416) 669-0330
www.almasoudure.com

B.K. Fer Ouvré/Iron Works Inc. S
St-Bruno, Québec (450) 441-5484

Constructions PROCO Inc. S
St. Nazaire, Québec (418) 668-3371
www.proco.ca

Industries Canatal Inc. S
Thetford Mines, Québec (418) 338-6044
www.canatal.net

Canam Canada, une division de Groupe Canam Inc. S,J
Ville de St. George, Québec (418) 228-8031
* Boucherville, Québec (450) 641-4000
* Sainte-Foy, Québec (418) 652-8031
www.canam-poutrelle.ws

Jean Yves Fortin Soudure Inc.
Montmagny, Québec (418) 248-7904

Lainco Inc. S
Terrebonne, Québec (450) 965-6010

Les Aciers Fax Inc. S
Charlesbourg, Quebec (418) 841-7771

Les Acier Jean-Pierre Robert inc. S
Laval, Québec (450) 661-4400
www.jprobert.ca

Les Charpentes d'acier Sofab Inc. S
Boucherville, Québec (450) 641-2618
www.sofab.ca

Les Constructions Beauce-Atlas Inc. S
Ste-Marie de Beauce, Québec (418) 387-4872
* Montréal, Québec (514) 942-7763
www.beauceatlas.ca

Les Industries V.M. inc. S
Longueuil, Québec (450) 651-4901

Les Métaux Feral Inc S
St-Jerome, Québec (450) 436-8353

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

Les Structures GB Ltée S,P
Rimouski, Québec (418) 724-9433
www.structuresgb.com

Les Structures Gialay Inc. S
Varennes, Québec (450) 929-4765

Locweld Inc. S
Candiac, Québec (450) 659-9661
www.locweld.com

Métal Moro Inc. S
Montmagny, Québec (418) 248-1018

Métal Perrault Inc.
Donnacona, Québec (418) 285-4499

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

Delta Joists Inc./ Poutrelles Delta Inc. J
Saint-Marie, Beauce, Québec (418) 387-6611
* Montréal, Québec (450) 923-9511
www.deltajoists.com

Quéro Métal inc. S
St. Romuald, Québec (418) 839-0969
www.querometal.com

Quirion Métal Inc. S
Beauceville, Québec (418) 774-9881
www.quirionmetal.com

Structal - Ponts, une division de Group Canam Inc. S,P,F
Québec, Québec (418) 683-2561
www.structalponts.ws

Structures Yamaska inc. S
Saint-Césaire, Québec (450) 469-4020

Sturo Métal Inc. S
Levis, Québec (418) 833-2107
www.sturometal.com

Supermétal Structures Inc. S,P
St. Romuald, Québec (418) 834-1955
www.supermetal.com

Systèmes TAG (2844249 Canada Inc.) S
Ange-Gardien, Québec (450) 379-9661

ONTARIO REGION

ACL Steel Ltd. S
Kitchener, Ontario (519) 568-8822
www.aclsteel.ca

Agent Steel Inc. S
Bolton, Ontario (905) 857-4437
www.agentsteel.ca

Benson Steel Limited S,J
Bolton, Ontario (905) 857-0684
www.bensonsteel.com

Burnco Mfg. Inc. S
Brampton, Ontario (905) 794-5400
www.burncomfg.com

Canam – Canada, A Division of Canam Group Inc. J
Mississauga, Ontario (905) 671-3460
www.canam-steeljoist.ws

Central Steel Fabricators Limited S,J
Hamilton, Ontario (905) 547-1437

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

Cooksville Steel Limited S
Mississauga, Ontario (905) 277-9538
Kitchener, Ontario (519) 893-7646
www.cooksvillesteel.com

Eagle Bridge Inc. S
Kitchener, Ontario (519) 743-4353

Ed Lau Ironworks Limited S
Kitchener, Ontario (519) 745-5691
www.edlau.com

Etobicoke Ironworks Limited S
Weston, Ontario (416) 742-7111
www.eiw-ca.com

Fortran Steel Inc. S
Greely, Ontario (613) 821-4014
www.fortransteel.com

G & P Welding & Iron Works S,P
North Bay, Ontario (705) 472-5454
www.gpwelding.com

Gorf Contracting Limited S,P
Schumacher, Ontario (705) 235-3278
www.gorfcontracting.com

Lambton Metal Service S
Sarnia, Ontario (519) 344-3939
www.lambtonmetalservice.ca

Laplante Welding of Cornwall Inc. S
Cornwall, Ontario (613) 938-0575
www.laplantewelding.com

Lorvin Steel Ltd. S
Brampton, Ontario (905) 458-8850
www.lorvinsteel.com

M & G Steel Ltd. S
Oakville, Ontario (905) 469-6442
www.mgsteel.ca

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

Maple Industries Inc. S
Chatham, Ontario (519) 352-0375
www.mapleindustries.ca

Mariani Metal Fabricators Limited S
Etobicoke, Ontario (416) 798-2969
www.marianimetal.com

MBS Steel Ltd. J
Brampton, Ontario (905) 799-9922
www.mbssteel.com

Mirage Steel Limited S.J
Brampton, Ontario (905) 458-7022
www.miragesteel.com

Niagara Structural Steel, A Division of Canadian Erectors Limited S,P
1-888-853-4346
St. Catharines, Ontario (905) 684-2022
www.niagarastructuralsteel.com

Nickel City Steel Limited S,P
Sudbury, Ontario (705) 522-1982

Norak Steel Construction Limited S
Concord, Ontario (905) 669-1767

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

Nor-Weld Ltd. S
Orillia, Ontario (705) 326-3619
www.norweld.com

Paramount Steel Limited S
Brampton, Ontario (905) 791-1996
www.paramountsteel.com

Paradise Steel Fab. Ltd.
Richmond Hill, Ontario (905) 770-2121

Pittsburgh Steel Group (A Division of 1226616 Ontario Inc.) S
Vaughan, Ontario (905) 669-5558
www.pittsburghsteel.com

Quad Steel Inc.
Bolton, Ontario (905) 857-6404

Rapid Steel Inc. S
Erin, Ontario (519) 833-4698
www.rapidsteel.com

Shannon Steel Inc. S
Orangeville, Ontario (519) 941-7000
www.shannonsteel.com

Skyhawk Steel Construction Limited S
Brampton, Ontario (905) 458-0606
www.skyhawksteel.com

Spec-Sec Incorporated S,P
Rexdale, Ontario (416) 213-9899
www.spec-sec.com

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

Spencer Steel Limited S
Ilderton, Ontario (519) 666-0676
www.spencersteel.com

Telco Steel Works Ltd. S
Guelph, Ontario (519) 837-1973
www.telcosteelworks.ca

Tower Steel Company Ltd. S
Erin, Ontario (519) 833-7520
www.towersteel.com

Tresman Steel Industries Ltd. S
Mississauga, Ontario (905) 795-8757
www.tresmansteel.com

Victoria Steel Corporation S
Oldcastle, Ontario (519) 737-6151

Walters Inc. S,P
Hamilton, Ontario (905) 388-7111
www.waltersinc.com

CENTRAL REGION

Abesco Ltd. S
Winnipeg, Manitoba (204) 667-3981

Capitol Steel Corp. S
Winnipeg, Manitoba (204) 889-9980
www.capitolsteel.ca

Coastal Steel Construction Limited S,P
Thunder Bay, Ontario (807) 623-4844
www.coastalsteel.ca

Elance Steel Fabricating Co. Ltd S
Saskatoon, S.K. (306) 931-4412
www.elancesteel.com

Empire Iron Works Ltd. S
Winnipeg, Manitoba (204) 589-7371
www.empireiron.com

Falcon Machinery (1965) Ltd.
Winnipeg, Manitoba (204) 927-7000
www.falcongalv.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, Manitoba (204) 237-3528
www.omegajoists.com

Precision Industries Ltd. S,P
Prince Albert, SK (306) 763-7471
www.precisionindustrialltd.com

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

Supreme Steel Ltd. S,P
Saskatoon, SK (306) 975-1177
www.supremesteel.com

Weldfab Limited S
Saskatoon, SK (306) 955-4425
www.weldfab.com

ALBERTA REGION

Bow Ridge Steel Fabricating S
Calgary, Alberta (403) 230-3705

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

Canam – Canada, A Division of Canam Group Inc J
Calgary, Alberta (403) 252-7591
www.canam-steeljoist.ws

Capital Steel Inc.
Edmonton, Alberta (780) 463-9177

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

Empire Iron Works Ltd. S,P,J
Edmonton, Alberta (780) 447-4650
www.empireiron.com

Eskimo Steel Limited S,P
Sherwood Park, Alberta (780) 417-9200
www.eskimosteel.com

Garneau Welding Inc. S
Morinville, Alberta (780) 939-2129
www.garweld.com

Moli Industries Ltd. S
Calgary, Alberta (403) 250-2733
www.moli.ca

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

Northern Weldarc Ltd.
Sherwood Park, Alberta (780) 467-1522
www.northern-weldarc.com

Omega Joists Inc. J
Nisku, Alberta (780) 955-3390
* Calgary, Alberta (403) 250-7871
www.omegajoists.com

Petro-Chem Fabricators Ltd. S
Edmonton, Alberta (780) 414-6701

Precision Steel & Manufacturing Ltd. S
Edmonton, Alberta (780) 449-4244
www.precisionsteel.ab.ca

Rampart Steel Ltd. S
Edmonton, Alberta (780) 465-9730
www.rampartsteel.com

RIMK Industries Inc.
Calgary, Alberta (403) 236-8777

Spartan Steel Ltd. S
Edmonton, Alberta (780) 435-3807

Supermétal Structures Inc., Western Division S,P
Edmonton, Alberta (780) 435-6633
www.supermetal.com

Supreme Steel Ltd. S,P
Edmonton, Alberta (780) 483-3278
www.supremesteel.com

Supreme Steel Ltd., Bridge Division S,P
Edmonton, Alberta (780) 467-2266
www.supremesteel.com

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

TSE Steel Ltd. S
Calgary, Alberta (403) 279-6060
www.tsesteel.com

W.F. Welding & Overhead Cranes Ltd. S
Nisku, Alberta (780) 955-7671
www.wfwelding.com

Waiward Steel Fabricators Ltd. S,P
Edmonton, Alberta (780) 469-1258
www.waiward.com

Whitemud Ironworks Limited S
Edmonton, Alberta (780) 465-5888
www.whitemud.com

BRITISH COLUMBIA REGION

* **Canam – Canada, A Division of Canam Group Inc.** J
Port Coquitlam, B.C. (604) 583-9760
www.canam-steeljoist.ws

Canron Western Constructors Ltd. S,P
Delta, B.C. (604) 524-4421
www.supremesteel.com

Clearbrook Iron Works Ltd. S
Abbotsford, B.C. (604) 852-2131
www.cliron.com

Dynamic Structures Ltd. S,P
Port Coquitlam, B.C. (604) 941-9481
www.empireds.com

Empire Iron Works Ltd. S
Delta, B.C. (604) 946-5515
www.empireiron.com

George Third & Son S,P
Burnaby, B.C. (604) 526-2333
www.geothird.com

J.P. Metal Masters Inc. S
Maple Ridge, B.C. (604) 465-8933
www. jpmetalmasters.com

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

Macform Construction Group Inc.
Surrey, BC (604) 888-1812

* **Omega Joists Inc.** J
Surrey, B.C. (604) 596-1138
www.omegajoists.com

Rapid-Span Structures Ltd. S,P
Armstrong, B.C. (250) 546-9676
www.rapidspan.com

Solid Rock Steel Fabricating Co. Ltd. S
Surrey, B.C. (604) 581-1151
www.solidrocksteel.com

Warnaar Steel-Tech Ltd. S
Kelowna, B.C. (250) 765-8800

Wesbridge Steelworks Limited S
Delta, B.C. (604) 946-8618
www.wesbridge.com

X.L. Ironworks Co. S,J
Surrey, B.C (604) 596-1747
www.xliron.com

CISC DETAILER MEMBERS

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

ABC Drafting Company Ltd. B
Mississauga, Ontario (905) 624-1147
www.abcdrafting.com

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

A.D. Drafting B
Brampton, Ontario (905) 488-8216

Aerostar Drafting Services B
Georgetown, Ontario (905) 873-6565

Automated Steel Detailing Associates Ltd. (ASDA) B,Br,P
Toronto, Ontario (416) 241-4350
www.asda.ca

Base Line Drafting Services Inc. D,B
Concord, Ontario (905) 660-7017
www.bld.ca

B.D. Structural Design Inc./ Dessin Structural B.D. Inc. B,Br,P,J
Boucherville Québec (450) 641-1434
www.bdsd.com

Cadmax Detailing Inc./Dessin Cadmax Inc. B,Br
Boisbriand, Québec (450) 621-5557
www.cadmax.ca

Capacity Plus Inc. B
Mississauga, Ontario (905) 267-0647
www.capacity-plus.com

Datadraft Systems Inc./ Les Systèmes Datadraft Inc. S,P,J,B
Montréal, Québec (514) 748-6161
www.datadraft.com

Detailed Design Drafting Services Ltd. B
Parksville, B.C. (250) 248-4871
www.detaileddesign.com

Dessins de Structures DCA Inc.
Levis, Québec (418) 835-5140
www.structuredca.ca

Dowco Consultants Ltd. B,Br,P
Surrey, BC (604) 606-5800
Maple Ridge, BC (604) 462-7770
Laval, QC (450) 963-4455
Mississauga, ON (905) 565-9030
www.dowco.com

GENIFAB B,Br
Charlesbourg, Quebec (418) 622-1676
www.genifab.com

Haché Technical Services Ltd./ Haché Services Techniques Ltée B,P
Caraquet, N.B. (506) 727-7800

Husky Detailing Inc. B
London, Ontario (519) 850-9802
www.huskydetailing.com

International Steel Detailing Ltd. B
Nanaimo, B.C. (250) 758-6060
www.intersteel.ca

IRESCO Ltd. B
Edmonton, Alberta (708) 433-5606
www.steeldetailers.com

JCM & Associates Limited B,P
Frankford, Ontario (613) 398-6510

JP Drafting Ltd. B,Br,P,J
Maple Ridge, B.C. (604) 465-3568
www.jpdrafting.com

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

Les Dessins de Structures Steltec Inc. B
Ste-Thérèse, Québec (450) 971-5995
www.steltec.ca

Les Dessins Trusquin Inc. B,Br
Laval, Québec (450) 688-7336

Maximum Steel Detailing Inc. B
Langley, B.C. (604) 514-1474

M & D Drafting Ltd. B,Br,P
Edmonton, Alberta (780) 465-1520
Surrey, BC (604) 513-4210
www.mddrafting.com

MHM Drafting Inc. B
Wellesley, Ontario (519) 656-2059

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

ProDraft Inc. B,Br,P
Surrey, B.C. (604) 589-6425
www.prodraftinc.com

Ranmar Technical Services B,P
Mt. Pearl, Nfld. (709) 364-4158
www.ranmartech.com

Saturn Holdings Limited B
Winnipeg, Manitoba (204) 663-4649

SDI Structural Drafting Inc. B,Br,P
Edmonton, Alberta (780) 463-2140
www.sdiinc.ca

TDS Industrial Services Ltd. B,P
Prince George, B.C. (250) 561-1646
www.tdsindustrial.com

Techdess Inc. B
Saint-Jérôme, Québec (450) 569-2629
www.techdess.com

Tenca Steel Detailing Inc. Br
Charlesbourg, Quebec (418) 634-5225
www.tensorengr.com

ASSOCIATE - ERECTOR

E.S. Fox Limited B
Niagara Falls, Ontario (905) 354-3700
www.esfox.com

K C Welding Ltd. B
Angus, Ontario (705) 424-1956

Montacier Plus Inc. B,Br
Boisbriand, Québec (450) 430-2212
www.montacier.com

Montage D'acier International
Terrebonne, Québec (450) 965-7360

Supermétal-Mojan Inc. B,Br,J
St-Romuald, Québec (418) 834-1955
www.supermetal.com

ASSOCIATE - SUPPLIER

Acier Picard Inc.
St-Romuald, QC (418) 834-8300
www.acierpicard.com

Advanced Bending Technologies Inc.
Langley, B.C. (604) 856-6220/ 1-800-563-2363
www.bending.net
(Rolled or bent structural sections)

Altitube Steel Inc./Acier Altitube Inc.
Laval, Québec (514) 637-5050
www.altitube.com
(Specializing in tubes (HSS), structural pipe)

Amercoat Canada
Montréal, Québec (514) 333-1164
Oakville, Ontario (905) 847-1500
www.amercoatcanada.com
(Protective paints and coatings)

American Iron & Metal Inc./ La Compagnie Américaine de Fer et Métaux Inc.
East Montréal, Québec (514) 494-2000
www.scrapmetal.net

Amcan Jumax Inc.
Saint Bruno de Montarville, Québec (450) 441-6011
www.jumax.net
(bolts, Nelson studs, anchors, hot-dip galvanization)

Atlantic Industries Limited
Dorchester, NB (506) 379-2428
www.ail.ca
(galvanizing)

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

Blastal Coatings Services Inc.
Brampton, Ontario (905) 459-2001
www.blastal.com
(Wheelbrating, blasting, glass bead services, epoxy coatings, enamels, zinc rich primers, metalizing, plastic flame coating)

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

Bolair
Mississauga, ON (905)564-2231
www.bolair.ca
Paint spray equipment & accessories, ie: hoses, valves, filters, spray guns, etc.

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

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

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

Commercial Sandblasting & Painting Ltd.
Saskatoon, Saskatchewan (306) 931-2820
(Sandblasting and protective coating applications)

Corrcoat Services Inc.
Surrey, BC (604) 881-1268
(Sandblasters & Coaters)

CMC Steel division of Crawford Metal Corp./ Acier CMC division de Crawford Metal Corp.
Longueuil, Québec (450) 646-6000
(Angles, channels, hss, beams, plates)

Custom Plate & Profiles
Delta, B.C. (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, Alberta (780) 468-6868
www.daamgalvanizing.com
(Hot dip galvanizing)

Devoe Coatings
Edmonton, Alberta (780) 454-4900
www.devoecoatings.com
(Coating, paint)

Distribution d'Acier de Montréal
St-Hyacinthe, Québec (450) 771-7101
(Steel tubes (HSS), round, square and rectangular)

EBCO Metal Finishing L.P.
Richmond, B.C. (604) 244-1500
www.ebcometalfinishing.com
(Hot dip galvanizing)

EDVAN Industries Inc.
Nisku, Alberta (780) 955-7915
www.edavancan.com
(Shear & form of steel plates & coil, supply of safety grating – grip strut, perf-o grip, traction, tread))

Endura Manufacturing Co. Ltd.
Edmonton, Alberta (780) 451-4242
www.endura.ca
(Paint and Coating Materials)

Fisher & Ludlow, A Division of Harris Steel Limited
Longueuil, Québec (450) 670-5085
Edmonton, Alberta (780) 481-3941
Surrey, B.C. (604) 888-0911
www.fisherludlow.com
(Welded steel /aluminum/stainless steel grating, "Grip Span" and "Shur Grip" safety grating)

Frank's Sandblasting & Painting
Nisku, Alberta (780) 955-2633

General Paint/Ameron Protective Coatings
Vancouver, B.C. (604) 253-3131
www.generalpaint.com
(Shop primers, protective coatings, paint)

Globec Machinery/Globec Machineries
Quebec, QC (418) 864-4446
www.globec-machinery.com

ICI Devoe Coatings
Vancouver, B.C. (604) 637-1152
www.devoecoatings.com
(Paints, Linings, Protective Coatings)

Industrie Dry-Tec Coating inc.
Terrebonne, Québec (450) 965-0200
www.drytec.ca
(Grating, metallizing, paint)

Jet de Sable Houle Sandblasting Ltee
Montréal, Québec (514) 881-2400
www.houlesandblast.com
(Preparation et finition de surface metallique par projection d'abrasif et rejetement anti corrosif liquide)

Kubes Steel Inc.
Stoney Creek, Ontario (905) 643-1229
www.kubessteel.com

La Corporation Corbec
Lachine, Québec . (514) 364-4000
www.corbec.net
(Supplier of hot dip galvanizing only)

Lincoln Electric Company of Canada LP
Toronto, Ontario (416) 421-2600
www.lincolnelectric.com
(Welding equipment and welding consumables)

Les Industries Méta-For Inc.
Terrebonne, QC (405) 477-6322
www.meta-for.ca

Marmon/Keystone Canada Inc.
Langley, B.C. (604) 857-9844
Leduc, AB (708) 986-2600
www.marmonkeystone.com
(Hollow Structural Sections, A106 Seamless Pipes)

Micron Coatings Inc.
Edmonton, Alberta (780) 432-4519
www.microncoatings.ca
(Protective coatings)

Midway Wheelabrating Ltd.
Abbotsford, B.C. (604) 855-7650
www.midwaywheelabrating.com
(Wheelabrating, sandblasting, industrial coatings)

Pacific Bolt Maufacturing Ltd.
New Westminster, BC (604) 524-2658
www.pacolt.com
Steel fasteners, structural bolts, anchor bolts, tie rods.

Peinture Internationale (une division de Akzo Nobel Peintures Ltée.)
Dorval, Québec (514) 631-8686/1-800-361-2865
www.internationalpaints.com
(Protective coatings, corrosion-resistant paints)

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

Price Steel Ltd.
Edmonton, Alberta (780) 447-9999
www.pricesteel.com
(Structural, plate, bars, HSS tube, grating, pipe)

Pure Metal Galvanizing, Division of PMT Industries Limited
Rexdale, Ontario (416) 675-3352
www.puremetal.com
(Custom 'Hot-Dip' Zinc Galvanizing; Pickling and Oiling)

R.P. Richmond Industrial Contractors
New Westminster, B.C. (604) 521-7922
(Wheelabrating & Priming)

Red River Galvanizing Inc.
Winnipeg, Manitoba (204) 889-1861
www.redrivergalvanizing.com
(Supplier of hot dip galvanizing only)

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

Reliable Tube Inc.
Langley, B.C. (604) 857-9861
www.reliabletube.com
(Hollow structural steel tube)

Samuel, Son & Co. Ltd
Winnipeg, Manitoba (204) 985-6600
www.samuel.com
(Structural Sections incl. Bar. angle, shapes and plate)

Selectone Paints Limited
Weston, Ontario (416) 742-8881
www.selectonepaints.ca
(Paint primers, fast dry enamels, coatings)

Sherwin-Williams Canada
Ville d'Anjou, Québec (514) 356-1684
www.sherwin.com
(Specialty industrial coatings)

Silver City Galvanizing Inc.
Delta, B.C. (604) 524-1182
(Custom 'Hot-Dip' Zinc Galvanizing; Pickling and Oiling)

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

Tri-Krete Coatings Company
Bolton, Ontario (905) 857-6601
(Sandblasting; protective coatings; metallizing)

VARSTEEL Ltd.
Lethbridge, Alberta (403) 320-1953
Delta, B.C. (604) 946-2717
www.varsteel.ca
(Beam, angle, channel, HSS, plate, Sheet, Grating, expanded metal, pipe, flats, rounds, etc.)

VICWEST Corporation
Oakville, Ontario (905) 825-2252
Edmonton, Alberta (780) 454-4477
Surrey,B.C. (604) 590-2220
Moncton, N.B. (506) 857-0057
Winnipeg, MB (204) 669-9500
www.vicwest.com
(Steel Metal floor/roof deck, wall and roof cladding)

Vixman Construction Ltd.
Milton, Ontario (905) 875-2822
www.vixman.com
(Roof and Floor Deck)

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

Western Studwelding Supply
Edmonton, Alberta (780) 434-3362
(Stud Welding Equipment and Supplies; Sales, Service, Rental)

Wilkinson Steel and Metals, A division of Premetalco Inc.
Edmonton, Alberta (780) 434-8441
Vancouver, B.C. (604) 324-6611
www.wilkinsonsteel.com
(Misc. structural shapes, hot rolled bars and plates)
(Structurals - angles, flats, beams, channel, plate)

MILL MEMBERS

Algoma Steel Inc./ Acier Algoma Inc.
Sault Ste. Marie, Ontario (705) 945-2351
From Ont., Atlantic & Qué. 1-800-387-7850
* Calgary, Alberta (403) 263-4102
* Burlington, Ontario (905) 331-3400
www.algoma.com 1-800 387-7850

Atlas Tube Canada ULC
Harrow, Ontario (519) 738-5000
www.atlastube.com

IPSCO Enterprises Inc.
Regina, Saskatchewan (306) 924-7700
* Surrey, B.C. (604) 596-3361/1-800-644-3361
* Scarborough, Ontario (416) 321-4949/1-888-576-8530
* Calgary, Alberta (403) 543-8000
Lisle, IL (630) 810-4788
www.ipsco.com

STEEL SERVICE CENTRES

Acier Leroux Boucherville, Div. De Métaux Russel Inc.
Boucherville, Québec (450) 641-4360
www.acier-leroux.com 1-800-241-1887

Acier Pacifique Inc.
Laval, Québec (514) 384-4690
www.pacificsteel.ca 1-800-361-4167

A.J. Forsyth, A Division of Russel Metals Inc.
Delta, B.C (604) 525-0544
www.russelmetals.com

Dymin Steel Inc.
Brampton, Ontario (905) 840-0808
Abbotsford, B.C. (604) 852-9664
www.dymin-steel.com

Russel Metals Inc.
Lakeside, N.S. (902) 876-7861
Mississauga, Ontario (905) 819-7777
Edmonton, Alberta (780) 439-2051
Winnipeg, Manitoba (204) 772-0321
www.russelmetals.com

Salit Steel (Div. of Myer Salit Ltd.)
Niagara Falls, Ontario (905) 354-5691
www.salitsteel.com

York-Ennis, A Division of Russel Metals Inc.
Mississauga, Ontario (905) 819-7297/1-800-387-3714
* Port Robinson, Ontario (905) 384-9700/1-800-471-1887

HONORARY MEMBERS

ArcelorMittal International
Hamilton, Ontario (905) 545-3777
www.arcelormittal.com

Chaparral
Midlothian, Texas 1-800-779-1291
www.chapusa.com

Corus International Americas
Schaumburg, Illinois 1-847-619-0400

Enraz Oregan Steel Mills Inc.
Portland, OR 1-800-468-8913

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

AFFILIATED MEMBERS

CWB Group
Burlington, Ontario (905) 637-9194
Mississauga, Ontario (416) 542-1312
Oakville, Ontario

INDIVIDUAL

William J. Alcock, P.Eng, N. Vancouver	604-986-0663
Jonathan B. Atkins, P.Eng., Toronto	416-489-7888
Dwain A. Babiak, P. Eng., Calgary	406-338-5826
F. Michael Bartlett, P.Eng., London	519-661-3659
Leonard G. Basaraba, P.Eng., Vancouver	604-664-5409
Dominique Bauer, ing., Montréal	514-389-9844
Marc Bélanger, ing., Val-Brillant	418-742-3111
Gordon J. Boneschansker, P.Eng., Fredericton	506-452-1441
Eric Boucher, ing, Québec	418-871-8103
Gordon D. Bowman, P.Eng., Gloucester	613-742-7130
George Casoli, P.Eng. Richmond	604-273-7737
Samuel Chan, P.Eng., Toronto	416-499-0090
François Charest, ing., Repentigny	450-581-8070
Michel P. Comeau, P.Eng., Halifax	902-429-5454
Marc-André Comeau, ing, Salaberry-de-Valleyfield	450-371-8585
Frédéric Côté, ing., Sherbrooke	819-565-5974
Louis Crépeau, ing., Montréal	514-931-1080
Jean-Pierre Dandois, ing., Châteauguay	514-592-1164
Geneviève Demers, ing., Trois-Rivieres	819-375-1691
Arno Dyck, P.Eng., Calgary	403-255-6040
Daniel A. Estabrooks, P.Eng., Saint John	506-674-1810
Roberto Filippi, ing., Montréal	514-881-9197
Richard Frehlich, P.Eng., Calgary	403-281-1005
Alex L. Fulop, P.Eng., Vaughan	905-760-7663
Bernard Gérin-Lajoie, ing, Outermont	514-279-4821
Jean-Paul Giffard, ing., St-Jean-Chrysostôme	418-839-7937
James M. Giffin, P.Eng., Amherst	902-667-3300
Daniel Girard, ing, Chambly	450-447-3055
Ralph Hildenbrandt, P.Eng., Calgary	403-245-5501
Gary L. Hodgson, P.Eng., Niagara Falls	905-357-6406
J. David Howard, P.Eng., Burlington	905-632-9040
Don Ireland, P.Eng., Brampton	905-846-9514
David S. Jenkins, P.Eng., Dartmouth	902-452-6072
Ely E. Kazakoff, P.Eng., Kelowna	250-860-3225
Ron Kekick, P. Eng., Markham	905-474-2355
Franz Knoll, ing., Montréal	514-878-3021
Bhupender S. Khoral, P.Eng., Ottawa	613-739-7482
Pierre Laplante, ing., Sainte Foy	418-651-8984
Renaud LaPointe,ing, Drummondville	819-474-1448
Nazmi Lawen, P.Eng., Charlottetown	902-368-2300
R. Mark Lasby, P.Eng., Calgary	403-290-5000
Barry F. Laviolette, P.Eng., Edmonton	780-454-0884
René Laviolette, ing., Lévis	418-304-1405
Marc A. LeBlanc, P.Eng., Dieppe	506-382-5550
Steve Lécuyer, ing, Montréal	514-333-5151
Jeffery Leibgott, ing., Montréal	514-933-6621
William C.K. Leung, P.Eng., Woodbridge	905-851-9535
Constantino (Dino) Loutas, P.Eng., Edmonton	780-423-5855
Clint S. Low, P.Eng., Vancouver	604-688-9861
Douglas R. Luciani, P.Eng., Mississauga	905-542-0547
James R. Malo, P.Eng., Thunder Bay	807-345-5582
J. Craig Martin, P.Eng., Mississauga	905-826-5133
Ciro Martoni, ing., Montréal	514-596-1000
Alfredo Mastrodicasa, P.Eng., Woodbridge	905-856-2530
Rein A. Matiisen, P. Eng., Calgary	403-338-5804
Brian McClure, P.Eng., Nanaimo	250-713-9875
Philip A. McConnell, P.Eng., Edmonton	780-450-8005
Allan J. McGill, P.Eng., Port Alberni	250-724-3400
Glenn J. McMillan, P.Eng., London	519-453-1480
Grant Milligan, P.Eng., Toronto	416-961-8294
Philip Meades, P.Eng., Barrie	705-733-3200
Andrew W. Metten, P.Eng., Vancouver	604-688-9861
Jason Mewis, P. Eng., Saskatoon	306-978-7730
Mark K., Moland, P.Eng., Lepreau	506-659-6388
Mirek Neumann, P.Eng., Mississauga	905-823-7134
Neil A. Paolini, P.Eng., Etobicoke	416-249-4651
Robert J. Partridge, P.Eng., Winnipeg	204-786-4068
Claude Pasquin, ing., Montréal	514-282-8100
George C. Pauls, P.Eng., St. Catharines	905-988-5565
Tiberiu Pepelea, ing., Trois-Rivieres	819-372-4543
Gerard Pilon, ing., Valleyfield	450-373-9999
Nathan Priest, P.Eng., Prince William	506-575-1222
Bertrand Proulx, ing., Shawinigan	819-537-5771
Dan S. Rapinda, P.Eng., Winnipeg	204-488-6674
R. Paul Ransom, P.Eng., Burlington	905-639-9628
Mehrak Razavi, P.Eng., N. Vancouver	604 988-1731
Hamidreza (Hami) Razaghi, P. Eng., Edmonton	780-989-7120
Joël Rhéaume, ing., Beauport	418-660-5858
William Rypstra, P.Eng., Georgetown	905-877-6636
Bijoy G. Saha, P.Eng., Fredericton	506-452-9000
Sohail Samdani, P.Eng., Toronto	416-674-8505
Joseph M. Sarkor, P.Eng., Kelowna	250-868-1413
Carlo Simonelli, P.Eng., Calgary	403-236-9293
Stig Skarborn, P.Eng., Fredericton	506-452-1804
Paul Slater, P. Eng., Kitchener	519-743-6500
Ralph E. Southward, P.Eng., Burlington	905-639-7455
Jeffery D. Stephenson, P.Eng., Toronto	416-635-9970
Robert D. Stolz, P.Eng., Medicine Hat	403-526-6761
Wilfred W. Sui, P. Eng., Edmonton	780-451-1905
Danis St. Laurent, ing., Dieppe	506-382-9353
Thor A. Tandy, P.Eng., Victoria	250-384-9115
Mike Trader, P.Eng. Hamilton	905-381-3231
Deborah Vanslyke, P.Eng., Fredericton	506-452-8480
Gérard Vallière, ing., Laval	450-688-4970
Serge Vézina, ing, Laval	514-281-1010
J.H.R. Vierhuis, P.Eng., Willowdale	416-497-8600
Dave Vrkljan, P.Eng., Calgary	403-241-2578
Roy Walker, P.Eng., Markham	905-477-4312
Edward Whalen, P.Eng., Mississauga	905-542-0547
M. Declan Whelan, P.Eng., Hamilton	905-523-1988
David A. Wolfrom, P.Eng., Dalmeny	306-254-4956
Chell K. Yee, P.Eng, Edmonton	780-448-5636
Kenneth W. Zwicker, P.Eng., St. Albert	780-458-6964

COMPANY

Adjeleian Allen Rubeli Ltd., Ottawa	613-232-5786
Associated Engineering (B.C.) Ltd., Burnaby	604-293-1411
Axys Consultants inc., Ste-Marie de Beauce	418-387-7739
Baird, Bettney & Associates Ltd., Surrey	604-574-2221
Blackwell Bowick Partnership Ltd., Toronto	416-593-5300
BPTEC - DNW Engineering Ltd., Edmonton	780-436-5376
BPR Bâtiment Inc., Québec	418-871-8151
Brenik Engineering Inc., Concord	905-660-0754
Bureau d'études specialisées inc, Montréal	514-393-1500
Byrne Engineering Inc., Burlington	905-632-8044
Carruthers & Wallace Limited, Toronto	416-789-2600
CIMA+, Québec	418-623-3373
Cohos Evamy, Edmonton	780-429-1580
Consultant S. Leo Inc., Kirkland	514-693-5575
CPE Structural Consultants Limited, Toronto	416-447-8555
CWMM Consulting Engineers Ltd., Vancouver	604-731-6584
D'Aronco, Pineau, Hébert, Varin Inc., Laval	450-969-2250
Dorlan Engineering Consultants Inc., Mississauga	905-671-4377
E.C. & Associates Ltd., Markham	905-477-9377
Finelli Engineering, Burlington	905-639-5555
Giffels Associates Limited, Toronto	416-798-5472
Glotman Simpson Consulting Engineers, Vancouver	604-734-8822
Group Eight Engineering Limited, Hamilton	905-525-6069
Gulesserian Associates Inc., North York	416-391-1230
Halcrow Yolles, Toronto	416-363-8123
Halsall Associates Limited, Toronto	416-487-5256
Hastings and Aziz Limited, Consulting Engineers, London	519-439-0161
Herold Engineering Limited, Nanaimo	250-751-8558
Hillside Consulting Engineers Ltd., Fredericton	506-454-4455
Kazmar Associates Limited, Markham	905-475-7270
K D Ketchen & Associates Ltd., Kelowna	250-769-9335
Krahn Engineering Ltd., Abbotsford	604-853-8831
Leekor Engineering Inc., Ottawa	613-234-0886
Les Consultants GEMEC inc., Montréal	514-331-5480
Magnate Engineering & Design Inc., Brampton	905-799-8220
Mardon Engineering Ltd., London	519-659-2264
McCavour Engineering Limited, Mississauga	905-629-9934
Morrison Hershfield Limited, North York	416-499-3110
Morrison Hershfield Limited, Vancouver	604-454-0402
MPa Groupe Conseil inc., Richelieu	450-447-4537
N.A. Engineering Associates Inc., Stratford	519-273-3205
Pomeroy Engineering Limited, Burnaby	604-294-5800
Pow Technologies, Div. of PPA Engineering Technologies Inc., Ingersoll	519-425-5000
R.J. Burnside & Associates Ltd., Collingwood	705-446-0515
Read Jones Christoffersen Ltd., Toronto	416-977-5335
RSW Inc., Québec	418-648-9512
Saia, Deslauries, Kadanoff, Leconte, Brisebois, Blais, Montreal	514-938-5995
Schorn Consultants Ltd., Waterloo	519-884-4840
Stantec Consulting Ltd., Mississauga	905-858-4424
The Walter Fedy Partnership, Kitchener	519-576-2150
Totten Sims Hubicki Associates, Whitby	905-668-9363
UMA Engineering Ltd., Mississauga	905-238-0007
Valron Engineers Inc., Moncton	506-856-9601
VanBoxmeer & Stranges Engineering Ltd., London	519-433-4661
Weiler Smith Bowers, Burnaby	604-294-3753
Westmar Consultants Inc., N. Vancouver	604-985-6488

TECHNICAL-INDIVIDUAL

George Graham, C.E.T., Winnipeg	204-943-7501
Pat M. Newhouse, New Westminster	604-319-2391
Anjelo M. Ricciuto, Concord	905-669-6303
Ronald W. Rollins, Burnaby	604-453-4057
Yvon Sénéchal, Laval	450-663-8668
Darcy G. Yantz, Winnipeg	204-786-4068