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# steel design

FALL 2014 | VOLUME 46 | NO. 2



3 HEB Grocery Store, Mueller, Texas

6 Pomeroy Place, London, Ontario

8 Carbonear Academy,  
Carbonear, Newfoundland

10 Gravenhurst Centennial Centre and YMCA  
Gravenhurst, Ontario

12 Canadian Centre for Field Robotics  
Toronto, Ontario

13 Fish Turbine Power Plant  
Whitehorse, Yukon

14 The Last Word in Steel News

PROJECT SUBMISSIONS

Do you have a project using sheet steel that you would like to see in *Steel Design*? The editor welcomes submissions of completed buildings – commercial, institutional, industrial, recreational and residential – using components made from steel, including cladding, steel decking, light steel framing, steel roofing, steel doors, steel ceiling systems and steel building systems.

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COVER PHOTO:  
HEB Grocery Store, Mueller, Texas  
PHOTOGRAPHER: SteelMaster



transforming tomorrow

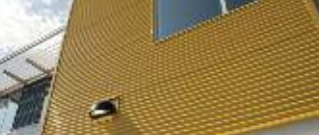
3



3 HEB Grocery Store, Mueller, Texas

The design of the roof had to be compatible with the design concept for the Mueller store, which was a joint effort of Lake Flato Architects and H-E-B's in house design staff. Janet Selser, a Principal with Selser Schaefer Architects, says, "we researched material options for a long span deep-V roof, which resulted in the selection of a SteelMaster arched roof over the main entrance and fuel station."

8



8 Pomeroy Place, London, Ontario

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10 Gravenhurst Centennial Centre and YMCA, Gravenhurst, Ontario

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seemed to be a logical design beginning, in which the use of corrugated AZM 150 Galvalume Plus steel wall cladding seemed to be the perfect base material to make this expression," explains Architect Wayne Rosberg.

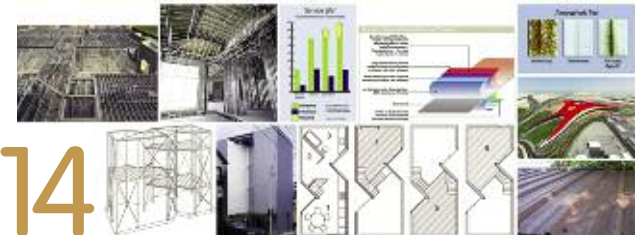
12 Canadian Centre for Field Robotics, Toronto, Ontario

When architects from York University designed two robot pavilions that were weather-resistant, flexible, easy to assemble as well as fully transportable, steel was the obvious choice.



13 Fish Turbine Power Plant, Whitehorse, Yukon

Stantec Consulting Ltd. provided the design for a new generator facility to replace the existing hydro-electric power generating equipment and building on the outskirts of Whitehorse. It is part of the Whitehorse clean energy infrastructure and is designed to potentially supply up to 170 detached houses with clean and sustainable hydro energy.



14

14 The Last Word in Steel News

- Design In Cold Formed Steel Seminar
- Light Steel Framing – Steel and the Environment
- ArcelorMittal Dofasco's Galvalume™
- Ferrari World, Abu Dhabi
- Versatile Steel

From its inception nearly four thousand years ago in Mesopotamia and later regular use by the Ancient Romans, up to today, the arch has graced the architecture of the day. When HEB Grocery Company, LLC, known colloquially as H-E-B, a Texas-based grocery chain, wanted to build a new store in Mueller, a suburb of Austin Texas, on the vacated site of Austin's former airport they wanted a design that was both unique and iconic.



# When yesterday meets today – with a unique design involving steel



The design concept for the Mueller store is a joint effort of Lake Flato Architects and H-E-B's in house design staff. Their choice resulted in the selection of a SteelMaster arched roof over the main entrance and fuel station. William H. Triplett AIA, Sr. VP Strategic Design with H-E-B describes the overall design objectives for the project as being, "...to design a store that would test a wide range of new technology and systems that would allow us to learn how new and different approaches would affect the performance of a store, both in terms of customer interface, experience, sustainability, and energy and water reduction."

Thus the roof design had to also be compatible with those requirements. Janet Selser, a Principal with Selser Schaefer Architects, the project architects, says, "We researched material options for a long span deep-V roof and quickly decided on SteelMaster. Their product quality and selection was exactly

LEFT: The strength of SteelMaster's corrugated curved steel also allowed the designers to minimize the number of primary and secondary structural members for a 'cleaner', uncluttered appearance.

BELOW: Unpainted .76mm (.0299") AZM180 Galvalume Plus™ corrugated steel with a coat of Super Therm®, a ceramic based, water-borne, insulating roof coating designed to reflect heat and reduce energy costs.



what we needed." Gold or Platinum LEED certification is anticipated for the project. Janet Selser explains how the steel roof contributes to that: "It targets LEED Credit 4 Recycle Content and LEED Credit 7.2 Heat Island Effect: Roof. "The steel contains >90% average recycled content including 19.5% pre-consumer scrap and 69.0% post-consumer scrap" The finish on the steel is reflective (an SRI of 62) which reflects the sun and lowers the amount of heat absorbed by the building." The store also will be certified by the Austin Energy Green Building program.

The tribute to the site's former use, and a desire for the iconic, led to the concept of an airplane wing airfoil. That also played to SteelMaster's strength as they specialize in curved arch corrugated steel roofing.

The overall area of the project is 7,710m<sup>2</sup> (83,000 sq. ft.) with the SteelMaster roofing 1,925m<sup>2</sup> (20,723 sq. ft.) over the store entrance and 247m<sup>2</sup> (2,660 sq. ft.) over the fuel canopy, all comprising unpainted .76mm (.0299") AZM180 Galvalume Plus™ corrugated steel with a coat of Super Therm®, a ceramic based, water-borne, insulating

roof coating designed to reflect heat and reduce energy costs, by Superior Products International. The strength of corrugated curved steel also allowed the designers to minimize the number of primary and secondary structural members for a 'cleaner', uncluttered appearance. And as Janet Selser points out, "It also created an extra layer of texture and scale to the project that could not have been achieved by another product."

Redeveloping Robert Mueller Municipal Airport into a mixed-use urban village in the heart of Austin seeks a sustainable community that will become home to approximately 13,000 people, 13,000 permanent employees, 10,000 construction jobs, more than 1,100 affordable homes and approximately 140 acres of public open space. Not only is the H-E-B in Mueller their most innovative store in terms of sustainable design, many of the new features are a result of extensive collaboration with their neighbours throughout the design process. H-E-B in Mueller is an attractive complement to the neighborhood. As William Triplett notes, "People love the design of the building."

#### DESIGN AND CONSTRUCTION TEAM

OWNER: HEB Grocery Company LLC, San Antonio 210-938-8000

ARCHITECT: Design Concept: Lake Flato 210-227-3335 and  
H-E-B In-House Design Team 210-938-8053

PROJECT ARCHITECT: Selser Schaefer 918-728-6175

STRUCTURAL ENGINEERS:  
Beicker Martinez Engineering 210-824-2908

MECHANICAL/ELECTRICAL ENGINEERS:  
ARUP North America Ltd., Houston 713-783-2787

LANDSCAPE ARCHITECT:  
Coleman and Associates 512-476-2090

GENERAL CONTRACTOR: SpawGlass Inc. 512-719-5251

ARCHED STEEL ROOFING: SteelMaster Buildings 800-341-7007

STEEL MANUFACTURER: ArcelorMittal Dofasco 800-363-2726

PHOTOGRAPHER – SteelMaster



The new H-E-B store in Mueller, a suburb of Austin, Texas, is both unique and iconic. Not only is the store their most innovative store in terms of sustainable design, many of the new features are a result of extensive collaboration with their neighbors throughout the design process.





A new luxury apartment complex in London, Ontario is the first building of its kind in Canada. Pomeroy Place, which opened for occupancy in March, is the first high-rise building in the country to use the ComSlab flooring system. It is by far the city's greenest apartment building and, from the moment planning first began, Pomeroy Place was destined to become the new standard for energy-efficient luxury apartment building design in London Ontario.

## Composite steel floor system – light weight and cost efficient

"ComSlab is an alternative to the conventional concrete slab floor. It's ideal for buildings up to 20 storeys high," said Aus Ahmad, Sales Engineering Manager for Bailey Metal Products Ltd., the manufacturer and supplier of the ComSlab system for the project. "One of the benefits is the stay-in-place form. You place the ComSlab, cast the

concrete, and the ComSlab acts as a form. This saves you one step in the construction process and provides a cast in place structurally superior concrete slab."

Ahmad explained that the ComSlab system is 30-50 percent lighter than the conventional concrete floors, and since ComSlab is a composite flooring system "steel works with concrete together", it results in rebar savings of 40-50 percent depending on the design.

"It uses one to two lines of temporary shoring instead of 4 to 5 with the conventional cast in place concrete. The ComSlab system supports its own weight and construction load prior to the concrete pour. It also provides a safe working platform and allows construction crews to work easily," he said. "It was executed very efficiently"

Ahmad added "In addition to ComSlab's great structural performance and savings, it's been the choice of high profile hospitality projects such as The Ritz Carlton and JW Marriott. In addition, ComSlab has multiple ULC and UL listings for 1 and 2 hour Fire Ratings".

The 16-storey apartment building required 21,831m<sup>2</sup> (235,000 sq. ft.) of .91mm (.036") ComSlab. The system is available in 91mm or 1.22mm (.036" or .048") steel, Bailey

ComSlab uses one to two lines of temporary shoring instead of 4 to 5 with conventional cast-in-place concrete. The ComSlab system supports its own weight and construction load prior to the concrete pour.



ComSlab is an alternative to the conventional concrete slab floor. You place the ComSlab, cast the concrete and the ComSlab acts as a stay-in-place form. This saves one step in the construction process and provides a cast-in-place structurally superior concrete slab.



Metal Products used .91mm (.036") G90 galvanized steel for Pomeroy Place. The total weight of the steel used was 326 metric tons (720,000 pounds).

"ComSlab is an alternate system to what we have done for years and years. It was cost-efficient. We don't do anything that doesn't save us a dollar or two," said Zbigniew Wlosek, Manager of Development and Construction for Old Oak Properties Inc., which owns the building. "ComSlab offers a certain amount of stability and a lot less deflection than other system. We are extremely happy with the results."

More than half of the 237 available units have already been rented, Wlosek added. Pomeroy is advertised as the city's greenest building, as it includes features like low-E windows, energy conservation lighting, energy-efficient toilets, showerheads, appliances, a high efficiency HVAC system with magnetic chiller, as well as a cistern to collect rainwater for irrigation.

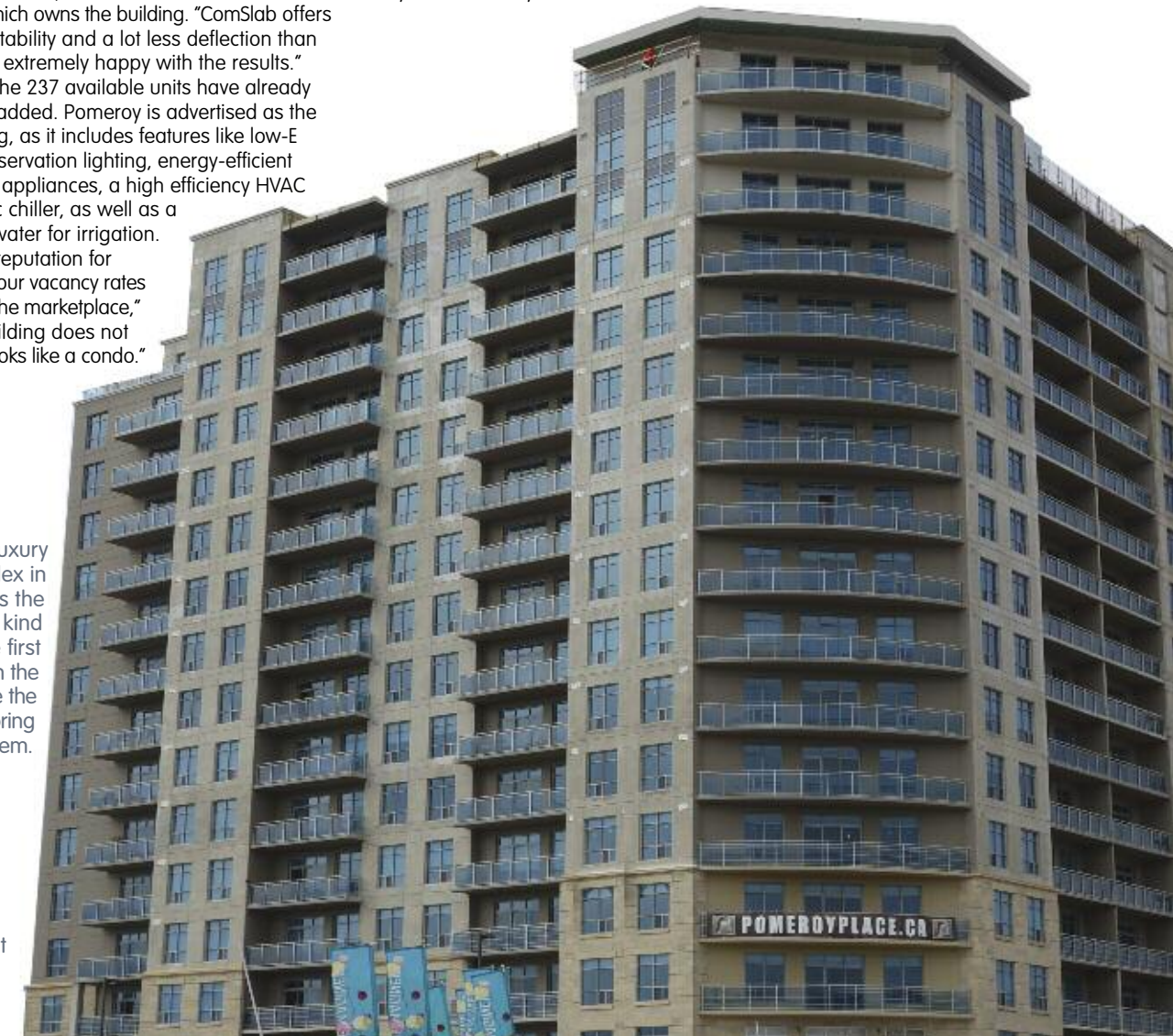
"We have a great reputation for apartment rentals, so our vacancy rates are much lower than the marketplace," said Wlosek. "This building does not look like a rental – it looks like a condo."

- 1 The final quantities of ComSlab shipped for this building is 21,831m<sup>2</sup> (235,000 sq. ft.) of ComSlab
- 2 The Interior LSF systems (walls and resilient, furring channels) were all manufactured by BAILEY
- 3 Dietrich Steel supplied the rebar for the slabs (nothing related to the interior systems) as the LSF interior system is Bailey."



Pomeroy Place, a luxury apartment complex in London, Ontario is the first building of its kind in Canada. It is the first high-rise building in the country to use the ComSlab flooring system.

"ComSlab is a cost efficient system. We don't do anything that doesn't save us a dollar or two," said Zbigniew Wlosek, Manager of Development and Construction for Old Oak Properties Inc.



### DESIGN AND CONSTRUCTION TEAM

OWNER: Old Oak Properties Inc. 519-661-0215

ARCHITECT: SRM Architects 519-885-5600

CONTRACTOR: Old Oak Properties Inc. 519-661-0215

STRUCTURAL ENGINEERS:  
VanBoxmeer & Stranges Engineering Ltd. 519-433-4661

MECHANICAL/ELECTRICAL ENGINEERS:  
Emcad Consulting Engineers (1995) Inc. 519-641-3040

COMSLAB FLOOR SYSTEM: Bailey Metal Products Limited 1-800-668-2154

LIGHT STEEL FRAMING SUPPLIER: Woollatt Building Supply 519-672-7630

LIGHT STEEL FRAMING MANUFACTURER:  
Bailey Metal Products Limited 1-800-668-2154

PHOTOGRAPHER: Aus Ahmad



The Carbonear Academy, which has the capacity for 470 students from Kindergarten to Grade 8, opened for classes in September 2013. Although just completed, a higher than expected number of students forced the Province to spend an additional \$2 million on the construction of four additional classrooms which were completed early this year. The school replaces the 60-year-old Davis Elementary School.

# Colourful prepainted steel adds visual interest to new school in Newfoundland and Labrador

Although originally built to serve 470 students, a higher enrolment than expected forced the Province to spend an additional \$2 million on the construction of four additional classrooms, for the recently completed Carbonear Academy.

Using steel allowed the architect to add visual interest to the school with horizontal cladding in bright primary colours. "We used steel because we were driven by the owner's requirements. The main concerns were durability, weather-ability and low maintenance," says architect Greg Snow of Gibbons Snow Architects Inc. "With steel there are a wide variety of profiles and colours you can use. We used bright colours and different textures to add interest."

The school's location posed a bit of a challenge for the crew, Snow says, "It is built into the side of a hill. If we had gone back any farther, the excavation would have become

very expensive," he explains. "It's a very narrow, long site. We used blocks of colour, which breaks up the elevation and gives it a visual interest. For some sections around the windows, we used regular corrugated profiles to break up the elevation."

The building is 137m (450 ft.) long and has 5,110m<sup>2</sup> (55,000 sq. ft.) of useable space inside. Constructed of structural steel, with pre-painted galvanized steel cladding and masonry walls, it was built to last. "It is a very visible landmark and it has a sense of permanence in the community," says Snow. The school has been built to the



## DESIGN AND CONSTRUCTION TEAM

ARCHITECT:  
Gibbons + Snow Architects Inc. 709-738-4422

GENERAL CONTRACTOR:  
Marco Group 709-754-3737

METAL SIDING CONTRACTOR:  
Hampton Building Systems Inc. 709-747-4490

METAL SIDING SUPPLIER:  
Agway Metals Inc. 1-800-268-2083

LIGHT STEEL FRAMING/DRYWALL CONTRACTOR:  
CAD Construction 709-579-3811

LIGHT STEEL FRAMING SUPPLIER:  
Imperial Group 1-800-561-3100

PHOTOGRAPHY:  
Stephen Sheppard

highest possible efficiency and environmental standards and the architect was able to take advantage of some of the school's green elements in a way that will engage students and teach them about energy consumption. Visitors touring the complex were very impressed by the colourful exterior, neatly designed access lanes and parking, the spacious classrooms and sizable gymnasium.

"We incorporated interactive computer software tied into the building's systems so students can see the mechanical and electrical systems of the school in real time. They can see the energy usage and compare it to other schools."

Snow says. "Some of the teachers are quite interested in using it as a teaching tool for energy consumption." The building's energy conscious features include higher efficiency lights with daylight sensors and geo-exchange heating and cooling.

A long yellow composite panel was used for the canopy in front of the building to add further visual interest and some weather protection. Inside the school, the yellow colour was again used for the corrugated metal stairs. "The lobby and entrance area are a real focal point for the building," says Snow. "We used some custom colours."

"We chose steel, not only for its durability, weather-ability and low maintenance but also for added interest – its wide variety of profiles, different textures and bright colours."

Architect Greg Snow

## STEEL CLADDING:

### VERTICAL SIDING

PROFILE: Plank HF-12-F by Agway Metals  
GAUGE: .76mm (.0299")  
PAINT SYSTEM: Perspectra Series  
COLOUR: Bone White QC 18273 – 1,579m<sup>2</sup> (17,000 sq. ft.)  
SUBSTRATE: Z275 (G90) Galvanized

### HORIZONTAL SIDING

PROFILE: Corrugated  
GAUGE: .76mm (.0299")  
PAINT SYSTEM: Perspectra Series  
COLOUR: HMS 1 – Heron Blue QC 18330 – 604m<sup>2</sup> (6,500 sq. ft.)  
HMS 2 – Bright Red QC 18386 – 130m<sup>2</sup> (1,400 sq. ft.)  
HMS 3 – Custom Yellow – 74m<sup>2</sup> (800 sq. ft.)  
SUBSTRATE: Galvanized Z275 (G90)

### SOFFIT

PROFILE: Non Perforated Plank  
GAUGE: .76mm (.0299")  
PAINT SYSTEM: Perspectra Series  
COLOUR: Bone White QC 18273 – 92.9 m<sup>2</sup> (1,000 sq. ft.)  
SUBSTRATE: Galvanized Z275 (G90)

## LIGHT STEEL FRAMING:

### STEEL STUD

LIGHT GAUGE: 92mm (3 5/8") stud by 3.48m (10 ft.)

### TRACK

LIGHT GAUGE: 92mm (3 5/8") track by 3.48m (10 ft.)

### FURRING CHANNEL

LIGHT GAUGE: 22.23mm (7/8") furring channel by 3.66m (12 ft.)

### CARRYING CHANNEL:

GAUGE: 1.52mm (.060") 38mm (1.5") Channel by 3.66m (12 ft.)





It was about pride. And cost effectiveness. And image. The town of Gravenhurst had specific goals for their new Centennial Centre and YMCA located in the centre of town. The building had to complement existing historical civic structures to maintain the City's unique heritage, while helping to promote the progressiveness of its culture, arts and recreation. CS&P Architects Inc. of Toronto accomplished these design challenges by using steel as the building material of choice.

# Steel adds to the beauty of Gravenhurst Centennial Centre and YMCA

**CLADDING MATERIAL:**  
.61mm (0.0239") unpainted  
AZ150 Galvalume Plus

**WALL CLADDING:**  
1,486m<sup>2</sup> (16,000 sq. ft.)

**WALL CLADDING PROFILE:**  
Tradition 150  
22mm (.875") corrugated

**ROOF:**  
743m<sup>2</sup> (8,000 sq. ft.)

**ROOF PROFILE:**  
Tradition 150  
22mm (.875") corrugated

"Architecturally, it is a showcase that combines red heritage brick with the more modern steel cladding and lots of glass. A sense of openness and lightness seemed to be a logical design beginning, in which the use of corrugated Galvalume steel wall cladding was the perfect base material to make this expression," explains Architect Wayne Rosberg. "We used brick as an accent to anchor elements of the building, but the use of steel siding was inspired by the industrial buildings of the past commercial heritage of the town. We have been very pleased with the success of the use of steel siding to create a dynamic facility that fits into the fabric of the community and performs extremely well as a durable maintenance free material."

The 6,515m<sup>2</sup> (70,127 sq. ft.) Centennial Centre and YMCA of Simcoe/Muskoka, located on Centennial Drive, off the main

intersection of Brock and Bethune Streets, was completed in early 2012. The original community centre was torn down and the existing hockey arena was retained. In addition to the ice rink, which offers heated bleacher seating for over 700 people, the new facility houses two pools, a wellness centre with two fitness studios, gymnasium, child care rooms, meeting rooms and administrative offices as well as a banquet hall – The Terry Fox Auditorium – complete with commercial kitchen facilities for a variety of community and private functions and celebrations.

"We are the hub of the community," emphasizes Deb Broderick, Manager of Recreation, Community Services and Centennial Centre Operations. "We have been pleased with the response. This is a small town, with about 12,000 residents, and it's nice to provide all these facilities in one

## DESIGN AND CONSTRUCTION TEAM

**ARCHITECT:** CS&P Architects Inc. 416-482-5002

**STRUCTURAL ENGINEER:**  
Yolles, A CH2M Hill Company 416-363-8123

**CONSTRUCTION MANAGER:**  
The Dalton Company Ltd. 416-789-4195

**STEEL CLADDING INSTALLER:** Titan Metals Ltd. 905-729-3079

**STEEL CLADDING SUPPLIER:** Vicwest 905-825-2252

**PHOTOGRAPHER:** Allen Keates



For CS&P Architects Inc. steel has a lot of flexibility which, aside from its durable and non-combustible qualities, provides plenty of design freedom. Steel is a robust material, it is lightweight, attractive and maintenance free.

"The client wanted a very durable facility that makes an important impression and signifies that this is an important civic building in which the Town of Gravenhurst can take pride," emphasizes Rosberg.

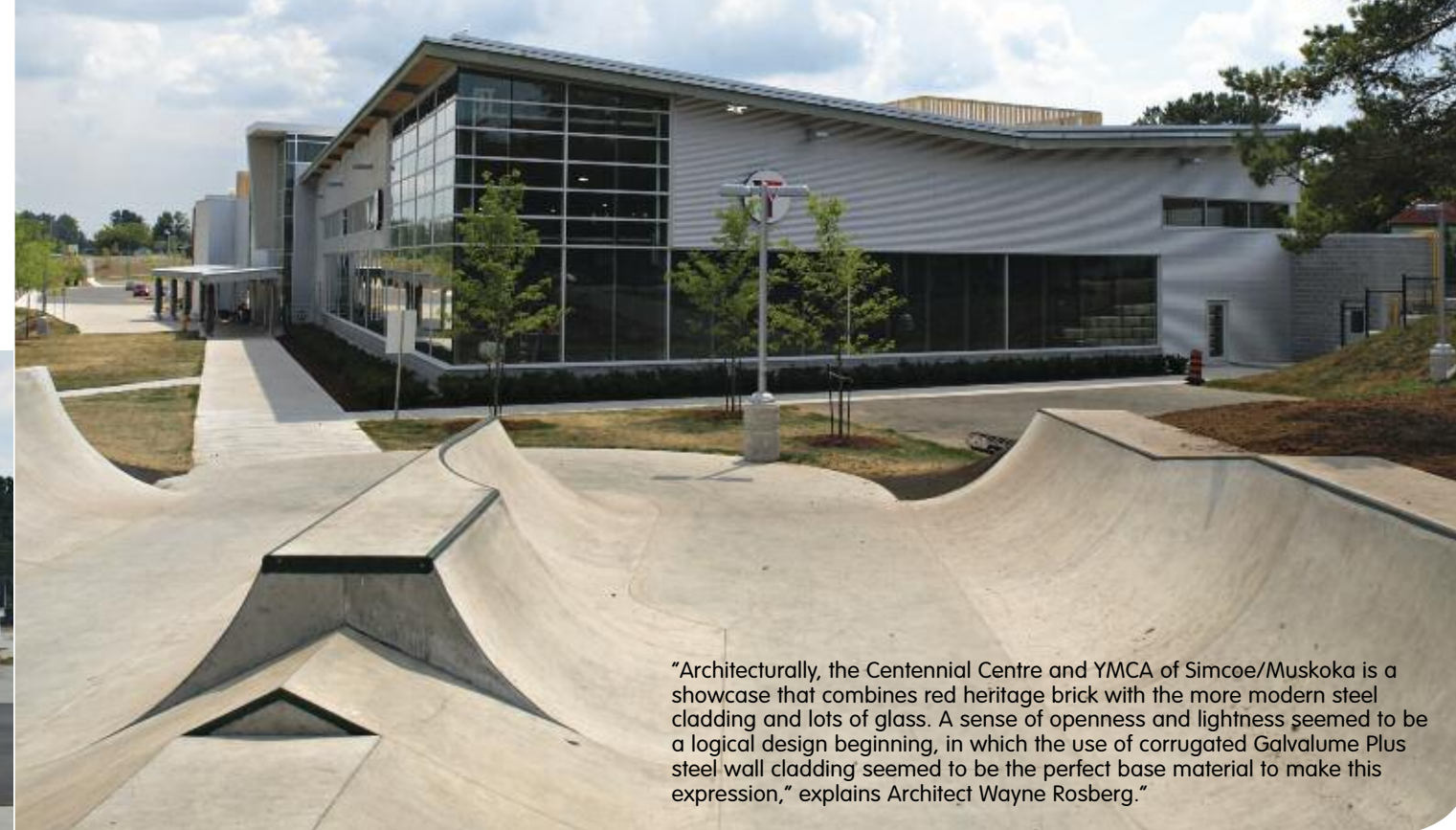


building. Families that we have never seen before are now able to experience the rink and pool all in one building." The YMCA offers swimming lessons, fitness programs, day camps, childcare, leadership development opportunities for youth as well as employment and newcomer services and international aid partnerships.

Residents and visitors alike are impressed with the overall look of the building. Modern steel cladding is not usually seen in Gravenhurst, but it captures the attention of all who drive by. The canopy over the main entrance features pine timbers that wrap around the steel support posts. "The client wanted a very durable facility that makes an important impression and signifies that this is an important civic building in which the Town of Gravenhurst can take pride," emphasizes Rosberg. "Even in the construction phases, the

steel siding really showed its versatility, for it was installed in both summer and winter periods and field adjustments were easy and quick."

Steel is used extensively throughout the building. In addition to the wall cladding, which is 22mm (.875") corrugated, light steel framing was used as infill on some exterior walls. Bailey Metal Products supplied all studs, sills and framing. A minimum Z275 (G90) hot dipped galvanized metallic coating was used for all exterior studs, tracks and connectors. Structural steel supports for the deck are a minimum 3mm thick by 65mm (.118" x 2.56") bearing width. Deck sheets were fabricated from zinc coated structural quality steel conforming to CSSBI specifications 101M and corresponding to ASTM A653 grade 230 with a yield strength of 230 MPa. The roof is also steel.



"Architecturally, the Centennial Centre and YMCA of Simcoe/Muskoka is a showcase that combines red heritage brick with the more modern steel cladding and lots of glass. A sense of openness and lightness seemed to be a logical design beginning, in which the use of corrugated Galvalume Plus steel wall cladding seemed to be the perfect base material to make this expression," explains Architect Wayne Rosberg."



When architects from York University designed two robot pavilions that were weather-resistant, flexible, easy to assemble, and fully transportable, steel was the obvious choice. "The idea to use steel was second nature. We needed a certain speed of construction in order to meet our deadline. A specific Canadian Foundation for Innovation grant was tied to this that had specific deadlines," says Intern Architect Michael Guido.

## Even robots need a home

**STEEL PLATE:**  
Grade 44W, 9.5mm (3/8") thickness and various sizes

**HSS FRAMING MEMBERS:**  
ASTM A 500 Grade C – various metric sizing:  
76mm x 76 mm x 6mm,  
101mm x 102mm x 6.4mm  
152mm x 152mm x 6mm

**PAINT SYSTEM:**  
Ext 5.1F (over H.B. epoxy) finish

"Steel allowed us to construct a building in winter that could be easily assembled on site." Guido added. The resulting glass and steel structures provide shelter for the university's air, land and water robots. The shelters were constructed entirely of steel – steel decking, steel frame, steel roofing, steel doors, a steel ceiling, steel interior millwork and furniture. "The robots are fairly large – about the size of a Mini Cooper. These structures will be research stations where students will do the repairs, or make adjustments, to their machines," Guido says. "The Ontario Provincial Police use these robots to dismantle bombs."

Work on the pavilions began in January 2012 and was completed by September of the same year. The pavilions are 36.3m wide and 6.7m long (119' x 22'). "We got everyone involved in the design. We knew from the outset that we wanted a modular steel structure. Steel is a very malleable and forgiving material. It was easily workable and it could accommodate changes," says Guido. "You can just tack weld it and you can see how it will look. You can do quick mock-ups with steel."

Creating "green" pavilions was very important to the university's mandate, says Patrick Saavedra, York's manager of planning and architectural design services. The steel plate was formed into roof, soffit and interior/exterior wall panels with many angles to suit the design of the pavilions.

The pavilions won first place for permanent modular special application at the Modular Building Institute's Awards of Distinction.

"The initiative started when professors at the university were actively preparing to install trailers on campus," Saavedra says. "We wanted to create these very dynamic structures that spoke to the technology."



The pavilions are versatile enough to be used as picnic shelters and drop-off sites when the robots return to the lab of computer science professor Dr. Michael Jenkins.



"Having minimum waste and prefabricating at the factory allowed us to minimize our carbon footprint. We required our technology to be sustainable, so a large per cent of the steel we used was recycled, and any new steel was sourced locally. All structural steel tube was recycled."

### DESIGN AND CONSTRUCTION TEAM

ARCHITECT: Patrick Saavedra 416-882-9172

CONTRACTOR: Bemocon 416-717-2145

STEEL MODULAR STRUCTURE SUPPLIER:  
NRB Inc. 1-888-340-8795 Lisa Teeff

STEEL PLATE & HOLLOW STRUCTURAL SECTION SUPPLIER:  
Salit Steel 905-354-5691

PHOTOGRAPHER: NRB



Stantec Consulting Ltd. provided the design for a new generator facility to replace the existing hydro-electric power generating equipment and building on the outskirts of Whitehorse. It is part of the Whitehorse clean energy infrastructure and is designed to potentially supply up to 170 detached houses with clean and sustainable hydro energy. The new building is categorized as a "Post-disaster" facility to operate after a major natural or man-made disaster.

## Satisfaction in the North

Reinforced concrete, pre-engineered steel structure and pre-manufactured insulated steel panels were chosen as main building materials because these elements brought in many advantages to this project. These include durability to reduce maintenance costs, flexibility as well as ease of construction to allow a compressed construction schedule.

A 'First Response Room', 'Controls Room' and 'Turbine Room' are efficiently designed inside a 160m<sup>2</sup> (1,722 sq. ft.) floor area. The small utility building is designed to tuck into the slope in a forest clearing and it was essential to keep the site disturbance to a minimum. The building's dynamic trapezoidal appearance complements its function of transforming the dynamic flow of water into electrical energy. Design features include large fenestrations which make

the turbines and technical equipment, and their function, clearly visible. The windows also flood the interior with natural light.

The project was delivered 'on budget' and within the required timeframe. The client is satisfied that with the proper phasing and sequencing of the construction the interruption of supplying electrical energy to the City of Whitehorse was minimal.

### DESIGN AND CONSTRUCTION TEAM

CLIENT: Yukon Electric Company Limited

ARCHITECTURE, MECHANICAL AND ELECTRICAL  
ENGINEERING: Stantec Architecture Ltd. 867-633-2400

STRUCTURAL ENGINEERS:  
Stantec Architecture Ltd. 867-633-2400

GEOTECHNICAL EVALUATION:  
EBA Engineering Consultants Ltd. 867-920-2287

GENERAL CONTRACTOR: NGC Builders Ltd. 867-668-4578

PHOTOGRAPHER: John Berg

A 'First Response Room', 'Controls Room' and 'Turbine Room' are efficiently designed into a 160m<sup>2</sup> (1,722 sq. ft.) floor area. The project was delivered 'on budget' and within the required timeframe.



The small utility building is designed to tuck into a slope in a forest clearing and it was essential to keep the site disturbance to a minimum. The building has a simple, compact form with a stylistic clarity that hides no secrets which also reflects the pre-engineered construction method.

### STEEL:

Steel W-shapes and hollow structural sections.  
Can/CSA-G40.20/G40.21 (2004) 350W  
Channels, angles, other structural sections and plate 300W  
Rockford Manufacturing Ltd.  
843-538-4600

### INTERIOR FRAMING:

Light Steel Framing (studs)  
38mm x 92mm  
25 gauge thickness  
Kilrich Industries  
867-668-5958

### INSULATED STEEL PANELS:

Mel-Span 877-585-9969

ROOF – INSULATION VALUE:  
RSI 9.86 (R56)

EXTERIOR WALLS – INSULATION  
VALUE: RSI 4.93 (R28)

WALLS are pre-painted galvanized coloured Regal Grey  
ROOF is pre-painted galvanized coloured Regal Blue  
UNDERSIDE of the canopies is Galvalume.

### CONCRETE:

CAN/CSA A23.1 (2009) /A23.2 (2009) / A23.3 (2004 R2010)

Minimum Compression  
Strength 35 MPa  
Concrete Reinforcing  
CAN/CSA-G30.18 (2009)  
400MPa

SIZE: 160m<sup>2</sup> (1,722 sq. ft.)  
VALUE: CAD \$905,000.00  
STATUS: Completed 2014

## SEMINAR

## Design in Cold Formed Steel

Monday, September 15, 2014, 8:00am to 5:00pm

ArcelorMittal Dofasco, Main Office, 1330 Burlington Street East, Hamilton, ON

The objective of this seminar is to bring the participant up-to-date with the current design provisions contained in CSA Standard S136-12 North American Specification for the Design of Cold-Formed Steel Structural Members, highlighting significant changes from the previous edition along with numerous illustrative examples. Also, the latest editions of the AISI North American Design Standards for Cold-Formed Steel Framing will be reviewed since these design standards are referenced by CSA S136 for use in Canada. Anyone involved in the design of cold formed steel structural members should plan to attend. This seminar will provide a quick and effective means of learning about the latest edition of CSA S136. The speakers will be Dr. R.M. Schuster, P.Eng., University of Waterloo, and Dr. S. R. Fox, P. Eng., Canadian Sheet Steel Building Institute.

This seminar is organized by the Cold-Formed Steel Engineers Institute Canada, a not-for-profit organization created solely to promote the use of cold formed steel in Canadian building construction through education. To learn more about the CFSEI and to register for the seminar, go to [www.cfsei.ca](http://www.cfsei.ca)



## Light Steel Framing – Steel and the Environment

Sustainability was defined nearly thirty years ago as "progress that serves the needs of the present without compromising the ability of future generations to meet their own needs"<sup>1</sup>. Today, population growth, finite resources and recognition of climate pattern anomalies, possibly resultant from resource depletion and fossil fuel combustion gases, are motivating architects, builders,

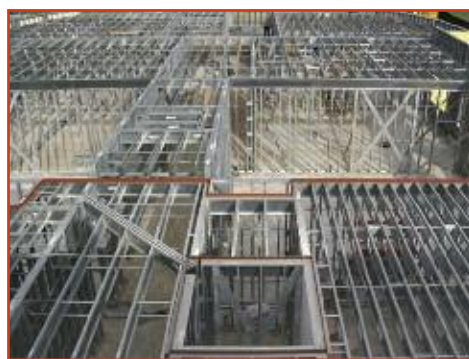
designers and owners to demand products that use resources wisely. This social consciousness and the financial reality of increasing energy costs has dramatically shortened payback periods for investment in sustainable alternatives, so that, put simply, it pays to be green.

<sup>1</sup> Excerpted from the report of the Brundtland Commission to the United Nations, "Our Common Future".

Dimensional Stability  
+ Fire, Insect and  
Mould Resistance  
+ Ductility  
= Durability

Sustainability also includes building maintenance and the associated labour, material and energy inputs. Quality construction practices as well as material selection assure that maintenance intervals fall farther apart, which promotes durability. Materials like steel that satisfy multiple value equations simultaneously are obvious choices for the building owner.

For example, the dimensional stability of steel studs eliminates interior and exterior surface irregularities caused by seasonal movement of cellulose materials, such as drywall, wood sheathing and some claddings. In exterior load-bearing walls, where postponing maintenance can result in water and air intrusion, steel won't rot nor provide a nutrition source for termites, bacteria, or mould. The fire resistance of steel provides an additional level of safety to structural frames in high density communities and arid climates



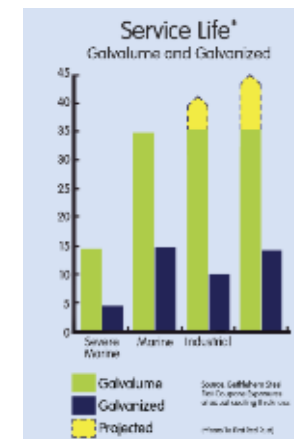
prone to wildfires. The ductility of CFS, or the material's tendency to bend, not break, satisfies criteria for seismic and high wind designs.

- Steel framing may be used in buildings for which noncombustible construction is required by building code, thus extending its use to larger buildings and to those whose uses require a higher degree of resistance to fire.
- Light steel framing is very stable dimensionally because they are unaffected by changing humidity.
- In cold climates, steel framing members can be detailed with thermal breaks, such as foam plastic sheathing or insulating edge spacers between studs and sheathing, to minimize the conducting of heat.
- Walls and partitions framed with steel studs are much lighter in weight, easier to insulate, and accept electrical wiring and pipes for plumbing and heating much more readily.
- Steel framing, being a dry process, may be carried out in wet or cold weather conditions.

Steel Framing Alliance ©

## ArcelorMittal Dofasco's Galvalume™

ArcelorMittal Dofasco's Galvalume™ is a coated steel product that has proven its superior performance as a building material in extended field testing in a diverse range of corrosive environments. Its unique combination of durability, edge protection, and resistance to corrosion is at least twice that of galvanized steel.



Additionally, Galvalume™ offers these advantages over galvanized steel:

- Excellent protection at cut edges
- Exceptional heat reflectivity resulting in lower energy load on buildings and improved interior comfort
- A distinctive appearance, with a smooth, fine spangle and silvery metallic finish
- High temperature resistance

Galvalume™ coating is an alloy composed of 55% aluminium and 45% zinc by weight. The coating is metallurgically bonded to both sides of Dofasco's high quality cold rolled steel sheet using a precise continuous hot-dip coating process. The result is a highly corrosion resistant coated steel that combines the barrier protection and extended durability of aluminium with the galvanic protection of zinc.

Galvalume™ superior corrosion resistance has been proven by actual exposure tests and confirmed through extensive field evaluations of real buildings. Atmospheric tests using flat coupon samples were conducted over 36 years in the USA and 17 years in Canada. The tests covered a variety of environments ranging from rural to severe marine. An inspection of 25+ year-old Galvalume™ roofs confirmed that they are still in excellent condition and are projected to last to 30 or more years before requiring major maintenance.

## A Guide to Coating Thickness

Galvalume™ AZM180 coating will provide at least twice the corrosion protection of galvanized steel coated with Z275 (G90) zinc coating of similar coating thickness under the same exposure conditions. The following chart shows the calculated coating thickness, based on the nominal weight per unit area and density. It is not a measured value, nor does it imply any type of specified limit.

## The Advantages of Galvalume™ Coating

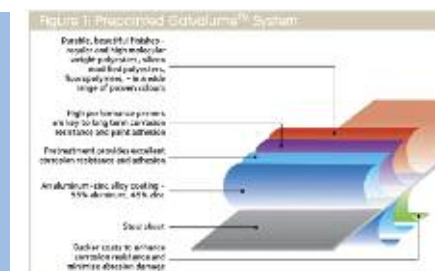
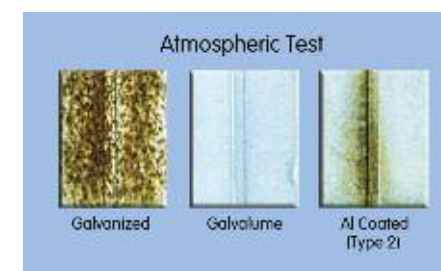
The coating makeup is a duplex microstructure that results from the aluminum-rich phase solidifying first, as the coating cools, forming a network of dendrites. Interdendritic spaces are filled by the zinc-rich phase. The intermetallic layer is an Al-Fe-Zn-Si alloy that metallurgically bonds the coating to the steel substrate and further aids in corrosion resistance.

## Cut Edge Protection

The aluminum-zinc alloy coating provides exceptional cut edge corrosion protection of the steel substrate by providing a long term barrier against corrosive elements. This advantage over galvanized has been well documented from inspections of roof applications on buildings up to 25 years old. The greater corrosion protection of Galvalume™ will provide longer service life, especially in the more corrosive acid rain and coastal regions of North America.

## Heat Reflectivity and Solar Reflectance

The bare, unpainted Galvalume™ product has undergone extensive testing to determine its solar reflective performance. Test results qualified Galvalume™ coated steel as an approved roof product by ENERGY STAR Program, both for low-slope and high-slope applications. On newly-manufactured Galvalume™, heat reflectivity was also rated above the minimum EPA requirement of 0.65. For weathered roofs over three years of age, the solar reflectance also exceeded the minimum EPA requirement of 0.50 for maintenance.



## Ferrari World, Abu Dhabi

Ferrari World, characterized by its enormous red roof, is a main feature of Yas Island – a major UAE tourist attraction.

A total of 12,000 tonnes of ArcelorMittal steel were used to build Ferrari World's iconic roof, designed to look like a giant red sand dune. ArcelorMittal's international construction projects team provided technical assistance and expertise, as well as supplying the tubular steel for the roof support structure. The roof's total surface area is more than 200,000m<sup>2</sup>, with a diameter of more than 700m. ArcelorMittal also supplied the organic coated steel for the roof's decking – 91,000m<sup>2</sup> perforated sheet and 75,500m<sup>2</sup> of non-perforated sheet. Around 15,000m<sup>2</sup> of curved panels were also used.

Edited from the article by Sophie Evans



Steel's versatility makes it an attractive alternative to the most commonly used types of roofing. The choice is wide and varied: profiled panels, sandwich panels, standing seam or cleated seam covering and tiles.

Modular in concept, steel roofing offers a clear advantage when it comes to installation, on both new-build and renovation projects. Steel is also durable, easy to maintain and recyclable, thus providing an exemplary solution to sustainable development concerns. On top of that, steel roofing is an excellent long-term investment.

## EDITORIAL INQUIRIES

We would like to hear from you!

If you have comments about this issue or a project you would like to see in an upcoming issue of *Steel Design*, please send a description of the project, include photographs, to:

The Editor, *Steel Design*  
1039 South Bay Road, Kilworthy, ON POE 1G0  
Or email: [davidfolis@vianet.ca](mailto:davidfolis@vianet.ca)



# Building on Success from the inside out



ArcelorMittal

Designing and building with ArcelorMittal Dofasco steel makes sense in today's world. Consider the bottom line. Consider the environment. And consider quality.

Steel provides the most desirable and cost-effective combination of strength and design flexibility. ArcelorMittal Dofasco steel has industry leading recycled content and is the only steel recognized by Environment Canada's Environmental Choice Program.

Light steel framing, cladding and roofing. Superior performance from the inside out.

## Solutions in Steel™

# transforming tomorrow

  
**Asthma.ca**

Asthma Society of Canada

Building products made  
with ArcelorMittal Dofasco  
steel promote a healthy  
indoor air environment.



ArcelorMittal Dofasco steel is  
certified to Ecologo® standard  
COP 150 \*Steel for Use in  
Construction Products\*



Recycled