



ArcelorMittal

steel design

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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: TEMPE CENTER FOR THE ARTS
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ArcelorMittal

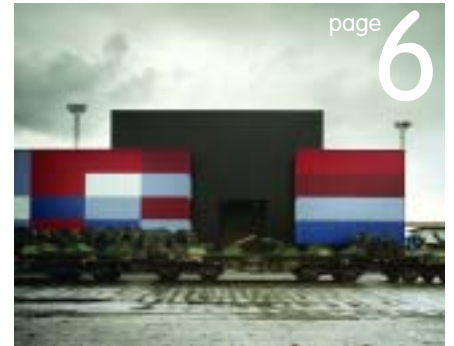
transforming
tomorrow

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3 Tempe Center for the Arts, Tempe, Arizona

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6 The ArcelorMittal warehouse, Port of Avilés, Spain

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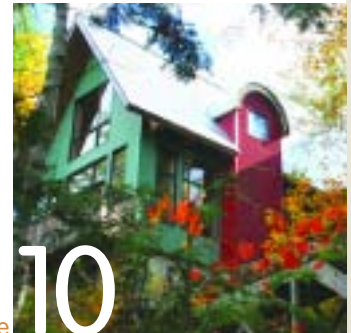
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8 Bloor Street Neighbourhood, Toronto, Ontario

For Toronto's 32-storey, 349-unit Bloor Street Neighbourhood, the exterior envelope consists of pre-assembled light steel framed panel assemblies, to which are mechanically fastened the attractive Dryvit exterior. The structural stud within the panels also forms the cavity for the interior insulation, the wiring, and the services, and carries the inside finishes.

10 Colourful pre-painted steel adds charm to Quebec cottage

The use of colourful steel for the roof and exterior wall cladding sets this unique cottage apart from others in the area. The cottage was constructed with a post and beam skeleton, then completed with structural insulated panels (SIPs), forming walls, floors and roof, with pre-painted galvanized cladding on the walls and roof.



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12 University of Waterloo Health Sciences Campus, Kitchener, Ontario

The buildings designed by Robbie Young + Wright/IBI Group Architects in joint venture with Hariri Pontarini Architects, are located at King and Victoria Streets, house the Waterloo's School of Pharmacy, McMaster's Michael G. DeGroote School of Medicine and UW's Integrated Primary Health Care Teaching Clinic.

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- EcoLogo: Setting the Environmental Standard for Recycled Steel.

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The Tempe Center for the Arts (TCA) in Arizona has been described as 'strikingly magnificent,' and the roof as its 'signature element.' It comprises complex folded geometric plates for which the design inspiration included nearby Hayden Butte, origami and, of all things, stealth aircraft. According to Tempe Architects, Architekton, who designed the structure in conjunction with Barton Myers & Associates of Los Angeles, a steel roof "offered the best combination of durability and aesthetics."



Steel goes artful in Arizona

The US \$67.6 million Center houses a 600-seat Proscenium Theater, a 200-seat Studio Theater, a 325m² (3,500 sq. ft.) Visual Arts Gallery, a 316m² (3,400 sq. ft.) multi-purpose room and a café, all clustered around a common lobby intended to emulate a village square.

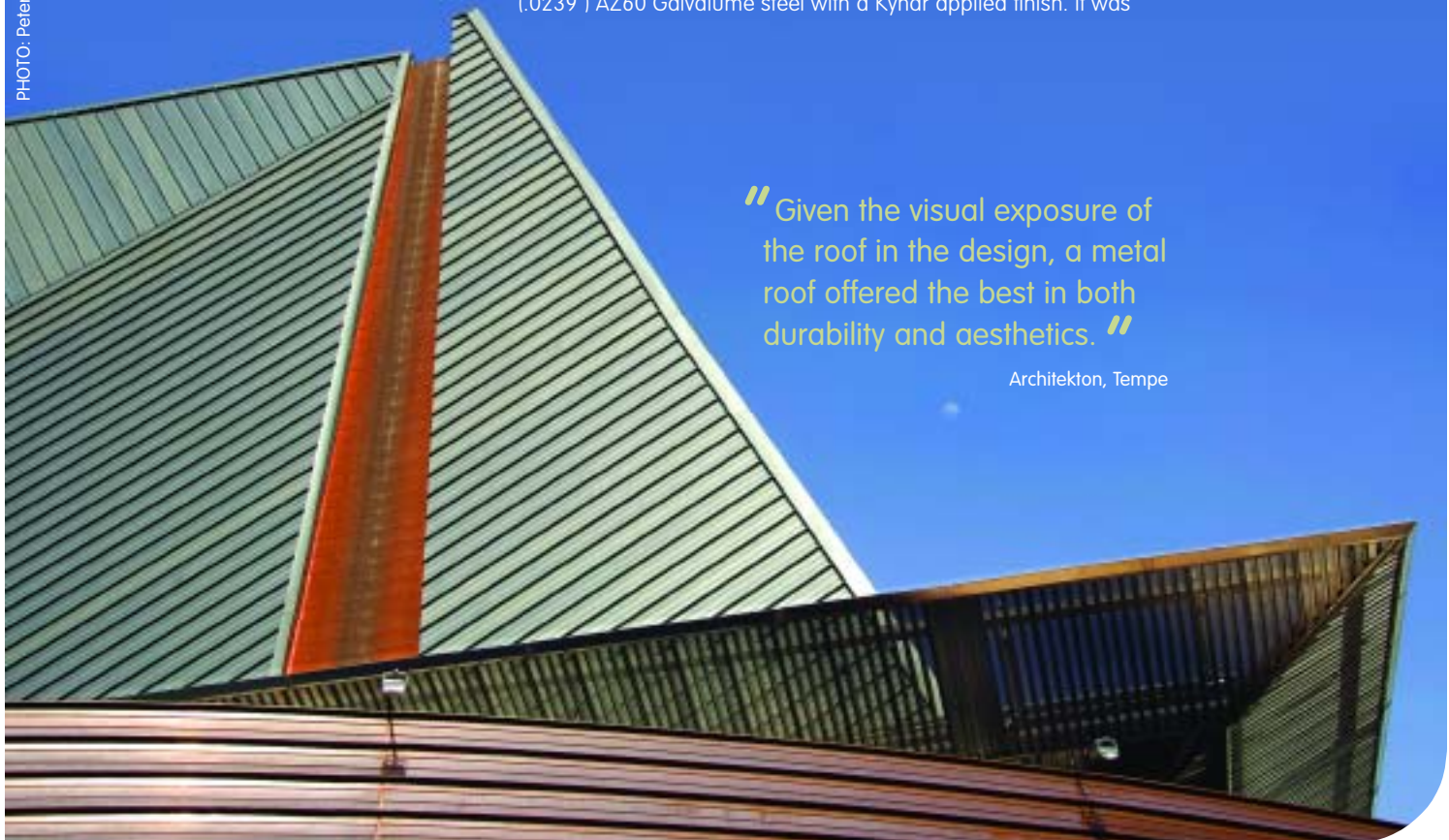
A major consideration for the project was acoustics – not just for the theatres' interior, but to mitigate exterior noise from nearby active train tracks, a busy highway and especially, just 3 km away, the Phoenix Sky Harbor Airport. This was achieved by a 'box within a box' system where each interior space has its own roof and walls and each area is controlled individually to allow the savings of optimal HVAC usage during extended periods of non use – all areas are contained within enveloping exterior walls and roof.

While the label 'iconic' tends to be overused, it is increasingly applied to TCA's roof and its 16 pitches, and the way it complements the surrounding geography. Besides acoustic considerations, it was also designed to provide protection from the heat of the desert sun and involved some 7,432m² (80,000 sq.ft.) of prepainted .61mm (.0239") AZ60 Galvalume steel with a Kynar applied finish. It was

"Given the visual exposure of the roof in the design, a metal roof offered the best in both durability and aesthetics."

Architekton, Tempe

PHOTO: Peter Robertson p_robertson@bartonmyers.com



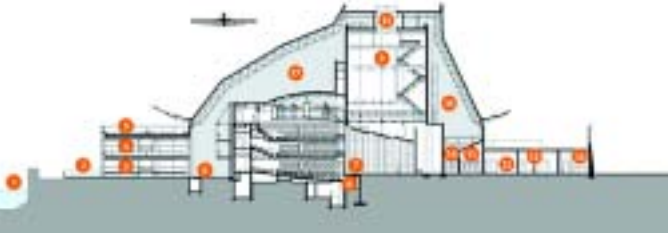
Vertically the design is based on the dramatic earth forms of Monument Valley nearby the Chaco Canyon villages.

placed over concrete that had been poured over a deep steel deck supported by steel trusses. Light steel framing (LSF) was used throughout for interior non-load bearing partitions.

The 'village square' lobby runs around the circular complex. It is fed by two 'streets' and three 'alleys' that are the corridors linking performance and public spaces. Entrances to the mezzanine and balcony levels of the main and studio theatres are exposed to the lobby, thus creating a multi-level street scene.

Designed as a 100-year building, TCA embodies many sustainability and efficiency strategies. Steel plays an important role in that and, as Architekton made clear, "Besides appreciating steel's characteristics as a finishing material in our environment, having it prefinished by the manufacturer improved the quality of the finish and allowed for less construction time."

North/South Section



- | | |
|-------------------|---------------------------|
| 1 Tempo Town Lake | 10 Back-of-House Corridor |
| 2 Outdoor Café | 11 Dressing Room |
| 3 Bar and Café | 12 Wardrobe |
| 4 Donor's Room | 13 Offices |
| 5 Rooftop Terrace | 14 Road Crew Lockers |
| 6 Lobby | 15 Smoke removal hatches |
| 7 Stage | 16 Back-of-House Volume |
| 8 Orchestra Pit | 17 Front-of-House Volume |
| 9 Fly Tower | |

The TCA roof under construction – exposing the various layers of support – including the primary support trusses and the metal deck prior to the placing of reinforcement, concrete topping slab and finished roof.





Tempe Center for the Arts

The 'village square' lobby runs around the circular complex. Corridors link performance and public spaces. Entrances to the mezzanine and balcony levels of the theatres are exposed to the lobby, thus creating a multi-level street scene.

In the 'box within a box' system each interior space has its own roof and walls – all contained within enveloping exterior walls and roof.

The Tempe Center for The Arts is described as 'strikingly magnificent' and the complex folded geometric plates of the roof, as its 'signature element.' The TCA has been designed as a 100-year building and embodies many sustainability and efficiency strategies. The center's 7,432 m² (88,000 sq. ft.) program includes a 600-seat main theatre, 200-seat flexible theatre, gallery, cafe, multi-purpose room and arts park.

DESIGN AND CONSTRUCTION TEAM

ARCHITECT:

Architekton, Tempe 480-894-4637
 Barton Myers Associates Inc., Los Angeles 310-208-2227

ENGINEER:

Arup – structural, mechanical, electrical and plumbing
 Los Angeles 310-312-1540

PROJECT MANAGEMENT:

Kitchell CEM, Phoenix 602-266-1970

GENERAL CONTRACTOR:

Okland Construction Company, Inc., Tempe 480-990-3330

ROOF INSTALLER:

Elward Construction Company, Tempe 480-968-1000
 Morin, a Kingspan Group Company 1-800-700-6140

CIVIL/SURVEY/SITE STRUCTURAL ENGINEERING SERVICES:

Stantec, Phoenix 602-438-2200

THEATRE DESIGN + PLANNING:

Theatre Projects Consultants, Norwalk 203-299-0830

ACOUSTICS & LIGHTING:

Arup Acoustics, San Francisco 415-957-9445

LANDSCAPE:

Design Workshop, Tempe 480-966-5881

FIRE PROTECTION:

Arup Fire, Los Angeles 310-312-5040

COST CONSULTANT:

Davis Langdon Adamson, Los Angeles 310-393-9411





The ArcelorMittal warehouse in the Port of Avilés, Spain, a bolted steel structure, is one hundred percent disassemblable and recyclable. The architect drew inspiration for its design from the recyclability of the materials in order to create a work that is both ephemeral and dynamic in its shape, location and use. The ArcelorMittal industrial sheds are situated in an exceptional location – on the Ria of Avilés, at the San Agustín dock, facing the city.

Cold formed steel offers many benefits and savings



The ArcelorMittal Warehouse in the Port of Avilés, Spain, is one hundred percent disassemblable and recyclable. It was established as a transitory work that, can be disassembled and moved to another location or even its purpose changed over time to venues such as concerts, cultural activities, exhibitions, recreation, etc.

It is an industrial landscape, among cranes and one of ArcelorMittal factories as a backdrop. With the rapid development this Asturian city is undergoing, the new plan for the Ria Isla de la Innovación – Island of Innovation – and the presence of a building by Pritzker prize winner Oscar Niemeyer, enticed us to put forward an alternative for an existing project, a conventional industrial building with a gabled roof and a 120m (393.7') facade facing the city.

We immediately brought up the concept of Industrial Sheds, those simple, old port buildings used for the warehousing of materials. Thus, the idea of containers arose, an image of portside life engraved on the retinas of the people. The facades and roof are made up to appear as containers, dividing up the large buildings into colour pixels intended to blend the large-scale work into its surrounding, providing the area with movement, colour and cleverly used nighttime illumination.

The selection of the range of colours did not only stem from the immediate association with the corporate image of both companies, but was also intended to relate to the industrial areas. And there was a deliberate attempt to

choose colours which, historically, have been used in the construction of industrial buildings, just employing and combining them in a different way.

On a dark metal base, built to resemble the hull of a ship, rises the tower. A subtle beacon emerging from the landscape, addressing the cranes and stacks and serving to break up, once again, the continuity of the facade. This element will house the company logos that the building will bear while also

serving as a boundary for the roof, which becomes the building's fifth facade and serves as an aerial reference point for planes landing or taking off from the nearby Asturias airport.

The sheds are built entirely of steel, including the frame, the exterior building skins, facades and roof. Thus, it meets the requirements of the plan, the history of the place itself as well as the users of the building, ArcelorMittal, the world's leading producer of steel and AGP (Actividades Generales Portuarias) a company dedicated to transport management in the Port of Avilés.

Logical and rational use of materials and manner of construction were addressed in the construction of the Industrial Warehouses. All of its components are produced at the nearby ArcelorMittal factories, and, because it is a bolted-steel structure, they are one hundred percent disassemblable and recyclable. It is also composed of more than seventy percent of recycled material, produced using an electric furnace system.

200 tonnes of structural beams:

Main structure: 50 ton HEA 240, HEA 280, IPE 200 and IPE 240 on S275 JR,

Substructure: 150 ton cold-formed profiles;

- 8000m² (86,111 sq. ft.) sheet PL 40/250 and 0.80mm (.032") thick galvanized steel and polyurethane polyamide Granite® coating;
- 650m² (7,000 sq. ft.) of 1150mm (45.3") panel, 35mm (.013") thick.

It is established as a transitory work that, according to the development of the city, can be disassembled and moved to another location or even its purpose can be changed over time – from warehousing to venues such as concerts, cultural activities, exhibitions, recreation, etc.

An evolutionary building, adapting itself to the needs of the area and the city. A dynamic building that speaks to its surroundings, to the ships, to the sea.

DESIGN AND CONSTRUCTION TEAM

ARCHITECT: baragaño architects +34 915 78 19 45
www.barchitects.eu b@barchitects.eu

CLIENT:

ArcelorMittal & Actividades Generales Portuarias

ENGINEERING FIRM:

Estudios y Proyectos +34 985 30 86 68

CONTRACTOR:

Conrado Antuña S.L. ArcelorMittal Construcción

PHOTOGRAPHER:

Mariela Apollonio +34 961 13 15 61
www.fotografadearquitectura.com



The facades and roof are made up to appear as containers, dividing up the large building into colour pixels intended to blend the large-scale work into its surroundings.

Logical and rational use of materials and manner of construction were addressed in the construction of the Industrial Sheds. The warehouses are built entirely of steel, including the frame, the exterior building skins, facades and roof.





When you're building a 32-storey high-rise condominium in one of Canada's largest cities, every bit of space counts. For Toronto's 349-unit Bloor Street Neighbourhood, the exterior envelope consists of pre-assembled light steel framed panel assemblies to which the attractive Dryvit exterior, in a Terraneo finish, are fastened mechanically.

Lightweight EIFS panels are high on steel and low on environmental impact

Bloor Street Neighbourhood – north-east view.

Lido Wall Systems Vice President Oscar Chiarotto says the exterior walls are approximately 79mm (3.125") thinner than standard pre-cast, thanks to the pre-fabricated panels, also known as 'Exterior Insulated acrylic stucco wall Finish Systems' or EIFS.

"You end up gaining floor space because our panels bypass the commonly used exterior pre-cast concrete slab. Builders can put the drywall right on the back side of the panel," explains Chiarotto. The largest panel spans 2.74m x 8.23m (9' x 27'). Bailey Metal Products provided the light steel framing for the panels, using 96.4mm (3.625") studs in 1.22mm, 1.52mm and 1.9mm (.048", .060" and .075").

"The lightweight panels can be transported to the site much more easily, with less extensive equipment and the panels can be hoisted up on site with simpler equipment," says John Rice, Bailey Metal Products Manager of Product Development. "With Lido's panel, the structural stud also forms the cavity for the interior insulation, the wiring, and the services and carries the inside finishes."

Rice adds, "Both the steel and gypsum can be removed from the panel and recycled at the end of the panel's life."

Steel is also featured in the building's 93m² (1,000 sq. ft.) curved roof system, installed by Vixman Construction Ltd. The curved roof panels are .61mm (.0239") thick, pre-painted galvanized steel, coloured QC-16073 Dark Green in the Tradition 100 profile, manufactured by Vicwest. The roof is supported by a horizontally installed section of 76.2mm (3") deep, .61mm (.0239") thick, Z275 (G90) galvanized roof deck.

Marel Contractors installed the interior partitions and



DESIGN AND CONSTRUCTION TEAM

OWNER: Cresford Developments 416-971-7557

ARCHITECT: Northgrave Architect Inc. 416-929-9495

MECHANICAL & ELECTRICAL CONSULTANTS:
United Engineering Inc. 416-398-1999

STRUCTURAL CONSULTANTS:
Sigmund Soudack & Associates Inc. 416-665-9010

INTERIOR CONSULTANT:
Gluckstein Design Planning Inc. 416-928-2067

LANDSCAPE CONSULTANT:
Paul Cosburn Associates Ltd. 905-940 4443

GENERAL CONTRACTOR:
Toddglen Construction Limited 416-492-2450

The structural stud also forms the cavity for the interior insulation, the wiring, and the services, and carries the inside finishes.



Pre-assembled light steel panels assemblies with a Terraneo finish (dryvit) are easily transported to the site and hoisted in place with simple equipment.



the gorgeous, 232m² (2,500 sq.ft.) carriageway ceiling, which covers a portion of the driveway adjacent to the main lobby – connecting the streets on the north and south sides of the building. “The ceiling is definitely a nice feature. It is 7.62m (25') in the air, two lanes of traffic wide and 21.3m (70') long,” says site supervisor Martin Orbanic of Toddglen Construction. The ceiling’s supporting frame and grid pattern were fabricated using heavy gauge steel stud. The steel framing for the curved roof is custom bent 76.2mm (3”) HSS.

EIFS PANEL FABRICATOR/INSTALLER: Lido Wall Systems Inc.

DRYVIT SUPPLIER: Dryvit Systems Canada 905-642-9174

LIGHT STEEL FRAMING SUPPLIER – EIFS panels and interior: Bailey Metal Products Limited 905-738-6738

LIGHT STEEL FRAMING INSTALLER – INTERIOR: Marel Contractors 905-326-4000

CURVED STEEL ROOF SUPPLIER: Vicwest Steel 905-825-2252

CURVED STEEL ROOF INSTALLER: Vixman Construction 905-875-2822

VAULTED CARRIAGEWAY CEILING INSTALLER: Marel Contractors 905-326-4000



South-west view. For Toronto’s 349-unit Bloor Street Neighbourhood, the exterior envelope consists of pre-assembled light steel framed panel assemblies, with an attractive Dryvit exterior, also known as “Exterior Insulated acrylic stucco wall Finish Systems” or EIFS.



"A modern variation on the gingerbread house from Hansel and Gretel fairytale", is how Honorata Pien'kowska describes her charming cottage that sits on a rocky point of a crystal clean, lake. The use of colourful prepainted steel for the roof and exterior wall cladding sets this unique cottage apart from others in the area. The cottage was constructed with a post and beam skeleton, then completed with structural insulated panels, made by Thermapan, forming walls, floors and roof.

Colourful steel adds charm to unique Quebec cottage

A composite building material, structural insulated panels (SIPs) consist of an insulating layer of rigid polymer foam sandwiched between two layers of structural board, which in this case is steel. SIPs combine several components of conventional building, such as studs and joists, insulation, vapour and air barriers. The 1.2m x 4.88m (4' x 16') panels of .38mm (.015") prepainted galvanized steel was cut to size on site, as necessary. Floor and roof insulation were 209mm (8.25") (R=38) and wall 157.7mm (6.25") (R=29).

WALLS

Interactive box:

Pacific Turquoise QC8258, profile: Laurentian vertically applied

Private box:

Heron Blue QC8330, profile: Corrugated horizontally applied

Pop-Outs:

Tile Red QC8259, profile: Corrugated horizontally applied, thickness 38mm (.015")

ROOF

Ideal Roofing 8000+ series, 38mm (.015") prepainted Galvalume Silver QC 2624, profile: Ameri-Cana

Honorata, an architect, designed the cottage to represent two interlocked, simple "boxes". The blue box contains private spaces, such as bedrooms and studio, while the green box relates to the common areas – entrance, kitchen, dining and sitting rooms. An occasional "pop-out" of red cladding draws attention to special locations of a fireplace, kitchen stove and bathroom wash counter. "The colour composition emphasizes my design concept," says Honorata, citing steel's "great selection of profiles and colours" among the multiple reasons for choosing steel for the cottage. "It allowed me to express playfulness of the design and it's my personal preference to use unassuming, non-standard materials." Honorata also emphasized steel's other advantages of no maintenance, durability and ease and speed of installation.

At first, there was concern as to the neighbours' reactions to this whimsical and colourfully designed cottage. "We kept the neighbours sitting on the edge of their seats throughout the whole construction process," says Honorata. "I believe the concern was that the cottage

would stand out too much – look very aggressive against the natural setting, rather than complement it. I told them the roof is silver on purpose – to best reflect the sun and minimize the heat gains – and that they could expect many colours in the walls. Even the contractor joked about needing sunglasses during installation of the cladding." General Contractor Raymond Cheslock of Alia Construction was responsible for purchasing and installing both the prepainted galvanized steel cladding and prepainted Galvalume steel roofing.

The finished results have elicited numerous compliments. "How lovely it looks from the water, on the rocky point, in the woods against the trees. The roof takes on the colour of the sky. It blends with the brilliant fall colours, as well as when wrapped in sparkling white snow. It is a cottage for every season!"

Obviously, Honorata's design objectives were met. "When I look at the forest, sky, water, I see a plethora of brilliant colours. My colourful whimsy draws on what is around and absorbs it. The colours help to break the volume of the cottage, almost camouflage it. In winter, the effect is the opposite. The cottage becomes a cheerful "bar code strip" of colours caught in between the silver white of the ground and the silver white of the roof. It welcomes you from the distance."



The cottage was constructed with a post and beam skeleton, then completed with structural insulated panels. The use of colourful prepainted Galvalume steel for the roof and prepainted galvanized steel exterior wall cladding sets this unique cottage apart from others in the area.





“When I look at the forest, sky and water, I see a plethora of brilliant colours. My colourful whimsy draws on what is around and absorbs it.”

Honorata Pien'kowska



Prior to construction the anticipation of such a multi-coloured steel envelope gave some concern to the cautions and traditionalist neighbours, but once finished, the design was reviewed and accepted with a thunderous applause.



DESIGN AND CONSTRUCTION TEAM

OWNER: Honorata Pien'kowska

DESIGNER: Honorata P. Roseman Architect 613-233-5556

SURVEYORS: Bussieres & Berube 819-777-2206

GENERAL CONTRACTOR: Alia Construction Ltd. 819-457-4542

CLADDING SUPPLIER: Ideal Roofing Company Ltd. 1-800-267-0860



When civic officials in Kitchener, Ontario were looking to rejuvenate an ailing downtown eyesore, the medicine proved to be ingenuity, effort and a heavy dose of glass, stone and ArcelorMittal Dofasco's prepainted Galvalume steel. The 11,148m² (120,000 sq.ft.) University of Waterloo School of Pharmacy opened in 2009, anchoring a new Kitchener Health Sciences campus – and replacing an old rubber factory site.

Steel provides foundation for downtown renewal

The educational facility, located at King and Victoria Streets, also houses McMaster University's 5,602m² (60,300 sq.ft.) Michael G. DeGroot School of Medicine and UW's Integrated Primary Health Care Teaching Clinic.



Located at King and Victoria Streets, the new Kitchener Health Sciences campus of the University of Waterloo houses both the 11,148 m² (120,000 sq.ft.) School of Pharmacy and McMaster University's 5,602 m² (60,300 sq.ft.) Michael G. DeGroot School of Medicine and UW's Integrated Primary Health Care Teaching Clinic..

"The cladding materials for the School of Pharmacy – the first phase and anchor building for the campus – really established the material palette for the site. Considerable discussion was held with the City of Kitchener, who had a financial, as well as, an urban renewal basis of interest in the project," explains architect Donna Johnston. The buildings were designed by Robbie Young + Wright/IBI Group Architects in joint venture with Hariri Pontarini Architects.

DESIGN AND CONSTRUCTION TEAM

CLIENT: University of Waterloo

ARCHITECTS:

Donna Johnston, Robbie Young + Wright/IBI Group Architects 416-596-1930 IN ASSOCIATION WITH: Siamak Hariri, Hariri Pontarini Architects 416-929-4901

GENERAL CONTRACTOR: Ball Construction 519-742-5851

STRUCTURAL:

Halcrow Yolles Partnership Inc. 416-363-8123

MECHANICAL: Stantec 416-596-6686

ELECTRICAL: Crossey Engineering 416-497-3111

LANDSCAPE:

GSP Group Inc. with Claude Cormier from Montreal

The steel cladding features a custom designed and fabricated louvered wall system, supplied by Andex Metal Products, and installed by Semple Gooder Roofing Corporation. The material is Grade 33, .76mm (.0299") prepainted Galvalume AZ150 coloured Metallic Bright Silver QC 2624. "In this particular situation, we needed a quick delivery of a unique product. It was easier and more cost effective based on the specifics of the project to utilize pre-finished steel, rather than fabricating and post-finishing aluminum," said Semple Gooder's Sven Lavado. The School of Pharmacy contains 1,347m² (14,500 sq. ft.) of the louvered cladding, while the School of Medicine has 557m² (6,000 sq. ft.) of exterior cladding.

A combination of operable and inoperable louvers allow air passage for mechanical units. The louvers not only run horizontally, but are also applied vertically to give the cladding architectural strength. The pharmacy building is also covered with glass, decorated with colourful images of plants known for their medicinal qualities. The glass allows light to flood into lecture theatres, laboratories, classrooms and meeting rooms.

"I've never been on a more complicated job in my life. I was there almost three years. It's just incredible inside; the steel, the glass, the detail is unbelievable," explains Ball Construction's Site Superintendent Claire Morwood. Morwood says every conceivable kind of steel stud was used, from 152.4mm to 41.3mm and 1.5mm to .46mm (6" to 1-5/8", .060" to .018") in thickness.

Commercial Sheet Metal Inc. installed the steel roof decking in both buildings, including 1,394m² (15,000 sq. ft.) of ZF075 galvalume deck 38.1mm, 1.22mm to 0.76mm (1.5", .048" to .0299") in thickness over the pharmacy building's fifth floor mechanical mezzanine and the third floor. As well, 76.2mm x 1.22mm (3" x .048") ZF075 galvalume roof deck was installed on the School of Medicine building.

STEEL CLADDING APPLICATOR/INSTALLER:

Semple Gooder Roofing Corp. 416-743-5370

STEEL CLADDING SUPPLIER: Andex Metal Products 800-265-7070

STEEL DECK INSTALLER: Commercial Sheet Metal Inc. 905-206-1668

LIGHT STEEL FRAMING SUPPLIER: Dietrich Metal Framing 1-800-873-2604

LIGHT STEEL FRAMING INSTALLER:

School of Pharmacy:
System Drywall & Acoustics 905-707-0825
School of Medicine:
CityMark Construction & Drywall Ltd. 905-660-4800



The material is 22 gauge Silver Metallic QC 18624 for the Louvred Wall System and Splices, Notched Z Bars are 18 gauge Galvanized G-90 and the AL315 liner panel is 24 gauge Galvanized G-90. There are louvred openings as well as both vertical and horizontal solid wall sections.



The steel cladding features a custom designed and fabricated louvred wall system, supplied by An dex Metal Products, and installed by Semple Gooder Roofing Corporation. The material is Grade 33, .76mm (.0299") pre painted Galvalume AZ150 coloured Metallic Bright Silver QC 2624.

“ It’s just incredible inside. The steel, the glass, the detail is unbelievable. ”

Claire Morwood, Ball Construction



The design concept for this site was two "L" shaped buildings, wrapped around an internal courtyard. The School of Pharmacy, as the anchor building to the campus, establishes a significant presence through the tower element, but relieves a sense of weight through significant transparency and a high level of surface detail.





Professor Terri Meyer Boake, LEED® AP, Associate Director, School of Architecture, University of Waterloo lead the project as architectural consultant.

University of Waterloo. The project focuses on retail buildings where very little work has been done as yet, aiming to show how a Steel Building System (SBS) can contribute towards a net-zero or carbon neutral building project. SBS is already a common retail building type and shows great potential as the structural system in a low carbon project. This field of study is quite large and so is being approached in phases. The primary goal of phase 1 just completed was to conduct a comprehensive life-cycle analysis (LCA) for the components of a single storey retail building to determine the contribution of each towards the total energy use and global warming potential (GWP).

Using the latest LCA techniques, the total life-cycle energy use and GWP was calculated for 220 different building components including: exterior infill walls, roofs, structural systems, floors, windows, doors, foundations and interior partition walls. Also, a comprehensive LCA study was conducted for five different single-storey retail building types (including a Steel Building System), in order to determine which components have the most environmental impact.

The study shows that for a typical single-storey retail building located in Toronto, Canada, the operating energy accounts for about 91% of the total energy usage, whereas the embodied energy of the construction materials accounts for only about 9% of the total energy after 50 years. This work highlights the relative insignificance of embodied energy in the total energy usage and gives a prioritized list of recommendations for reducing the total life-cycle energy and GWP of a single-storey retail building in Canada.

Visit the CN-SBS web site at www.cn-sbs.cssbi.ca for the details.

Carbon Neutral Steel Building System (CN-SBS) Project Update

Canadian Sheet Steel Building Institute – January 2011

Given the increasing pressure to respond to the urgent challenges of climate change and urban growth, the CN-SBS research project will push the retail building types beyond current definitions of green building towards the goal of carbon neutrality.

The CN-SBS a joint project with students from the School of Architecture and the Department of Civil Engineering from the

Kill* Bill

What's in a word
When that word is 'preferred'?
Does it mean you must use
Or can you still choose?



Not Shakespeare perhaps, but germane to the construction industry. The 'Bill' in this instance refers to Bill C-429. It reared its ugly head in June 2009 when a Bloc Québécois private member's bill proposed an amendment to the Department of Public Works and Government Services Act, 'to give preference to the concept that promotes the use of wood while taking into account the cost and greenhouse gas emissions' for federal government and public works construction projects – both new and renovative. *It died a nicer death than it deserved, being defeated at Report Stage in the House of Commons on December 15, 2010.*

The Bill caused consternation among the entire construction industry, with the exception, of course, of the forestry products industry and the politicians who didn't understand its full ramifications. Those did not include NDP MP and former carpenter Pat Martin who described it as "stupid," nor Conservative MP Chris Warkentin, who sagely pointed out that there were a "host of unintended consequences and problems this (bill) could create."

A cross-section of construction related bodies and companies combined to form the Coalition for Fair Construction Practices. One of their objectives was to draw attention to the dangers of implementing a bill that would ultimately take the decision making power out of the hands of qualified designers and construction experts.

The Canadian Construction Association – a body without ties to any particular industry, said through its president, Michael Atkinson, that while the Association is not opposed to the greater use of wood in non-residential construction, the choice of building materials should be left to the owner and design team.

On the other side of the issue, Québec MP Gerard Asselin, who co-sponsored the Bill said, "We know wood produces much less greenhouse gas than steel and concrete production." One must wonder where Asselin got his information. Surely, if one is to take into account environmental impact, one cannot sensibly stop at just one element - the energy usage involved in extraction – but must look at the complete picture – cradle to cradle.

The fact is, there are some construction applications that wood is simply not suitable for, due to combustibility and other issues. Then, when you factor in the operational life of a building, demolition or deconstructive issues and end of life (the steel in a project is 100% recyclable and EAF technology uses 100% recycled steel), a very different picture emerges. Extraction represents a mere 10 – 15% of the energy usage in the life cycle of a building.

The successful objections to C-429 were based on a combination of philosophical issues such as 'government should not interfere in the free market, nor should it favour one industry over another when the argument that – it would create new jobs – is clearly specious. It would simply result in more jobs in wood and fewer in competing materials'; and practical issues like the ones mentioned above.

One might anticipate further attempts to promote similar legislation involving wood. Hopefully the sequel would be Kill* Bill: Vol. 2.

* to prevent a proposal from going through, for example, the passing of a parliamentary bill.

Light Steel Framing – and the Environment

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

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’¹ 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 shortened payback periods dramatically for investment in sustainable alternatives, so that, simply put, it pays to be green.

Sustainability also includes building maintenance and the associated labour, material and energy inputs. Quality construction practices and 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 (like 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 or 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.

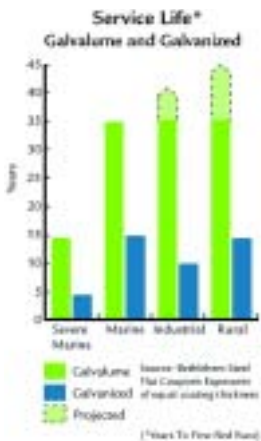
Steel Framing Alliance © SFA, 2008



¹Excerpted from the report of the Brundtland Commission to the United Nations, "Our Common Future" 1988

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Galvalume™ is the fastest growing steel product in North America. It combines the best protective qualities of aluminum and zinc. In fact, it has proven its superior building material performance in extended field testing in a diverse range of corrosive environments. It offers these advantages over galvanized at no extra cost on a per square foot basis.



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The superior corrosion resistance of Galvalume has been proven by actual exposure tests and confirmed through extensive field evaluations of real buildings. Atmospheric tests 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 for 25+ year old Galvalume roofs confirmed that they are still in excellent

condition and are projected to last 30 or more years before requiring major maintenance. For more detailed and extensive information, write to or call Leo De Meo at Dofasco, telephone 1-800-363-2726 ext: 4798 or e-mail: leo.demeo@arcelormittal.com



Setting the Environmental Standard for Recycled Steel

The EcoLogo Program is North America's largest and most recognized environmental certification mark. It is a third-party, multi-attribute eco-labelling program, approved by the Global Ecolabelling Network, an international association of eco-labeling programs as meeting the ISO 14024 standard.

Originally formed in 1988 by Environment Canada, the EcoLogo is now managed by TerraChoice – authors of the "Seven Sins of Greenwashing," which gathered international media attention and exposed a nerve with consumers around false or misleading environmental claims. There are currently more than 100 categories of EcoLogo-certified products, one of which is "Steel for Use in Construction Projects" (CCD-150).

What do EcoLogo-certified products mean for the construction and steel industry? They mean a reduction in the use of resources, a reduction in energy use, and a reduction in toxic emissions to the environment. It also means that EcoLogo-certified steel products meet or exceed all applicable governmental and industrial safety and performance standards. It means a minimum total recycled content of 50%, based on a rolling 12-month average and a minimum total post-consumer content of 15%, based on a rolling 12-month average. The recycled content required in the EcoLogo standard could also contribute up to two credits toward LEED certification. It means organizations carrying this type of EcoLogo-certified product have a sound environmental management system and energy use policy. It means that when you purchase an EcoLogo-certified steel product for use in construction, the EcoLogo Program is behind it, verifying that the product is a leading environmental choice.

For more information about the EcoLogo Program, visit: www.ecologo.org

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:

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