



ArcelorMittal

steel design

SPRING 2016 | VOLUME 48 | NO. 1

- 3 Steel Framing – the material of choice for affordable Rental Housing, Ottawa, Ontario
- 6 Sky Cottage – a bold & innovative approach to Residential Design
- 9 Rath Eastlink Community Centre Truro, Nova Scotia
- 12 Vancouver Transit Centre – Bus Operations & Maintenance Facility
- 14 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.

The Editor, *Steel Design*
1039 South Bay Road
Kilworthy, Ontario P0E 1G0
E-mail: davidfolis@vianet.ca

CHANGE OF ADDRESS, NEW SUBSCRIPTIONS

Please send details (including your old and new addresses where applicable) to:

Marketing Directions
1039 South Bay Road
Kilworthy, Ontario P0E 1G0
E-mail: davidfolis@vianet.ca
Fax: 1-443-347-1472

Steel Design is published by ArcelorMittal as a service to architects, engineers, specifiers, building officials, contractors and others involved in the building design and construction fields. *Steel Design* is distributed free of charge and is available in English and French. Material may be reprinted either in part or in full, provided an acknowledgment is made to *Steel Design*.

Galvalume and Galvalume Plus are registered trademarks of ArcelorMittal in Canada. ArcelorMittal, P.O. Box 2460, Hamilton, Ontario L8N 3J5

100% recycled, 10% post-consumer paper, Acid-free

Canadian Publications Mail Agreement Number PM 412285518



COVER PHOTO: Affordable rental housing
140 Den Haag Drive, Ottawa, Ontario.

ArcelorMittal

transforming
tomorrow



3

3 Steel Framing the material of choice for Ottawa Affordable Rental Housing

Besides steel's excellent strength-to-weight performance – 6 times better than wood – its workability enhanced construction speed. From beginning red iron erection to fully enclosed with floor, roof structure and exterior walls took three months. Red iron modules provided support for LSF floor joists and curtain wall studs. A total 500,000 lbs of red iron was used in the project and 300,000 lbs of LSF.

6 Sky Cottage – a bold and innovative approach to Residential Design

The intention was to employ a green building design effective enough to attain LEED certification. That approach, combined with the high solar reflectivity of the unpainted Galvalume Plus steel cladding and white brick exterior, contributed to the home receiving LEED Silver certification.



9

9 Rath Eastlink Community Centre, Truro, Nova Scotia

A bold statement in glass and steel, the Rath Eastlink Community Centre in Truro, features the extensive use of pre-painted Galvalume steel cladding. Cost, maintenance, life cycle, as well as the goal of achieving LEED Silver certification were key factors in its selection.



12 Vancouver Transit Centre – Bus Operations & Maintenance Facility

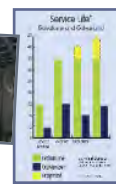
Designed to store, maintain and dispatch a fleet of 400 buses, the newer centre replaced the Oakridge Transit Centre. As the only facility servicing the city's fleet of electric-trolley buses, it features a single-storey maintenance centre surrounding a four-storey support building, which houses stores, administration offices, a depot, a training area and a cafeteria.



12

14 The Last Word in Steel News

- Boulder, Colorado, Sunshine House: Corey Martin, 2013
- Benton, Arkansas, Hurricane Creek Elementary School
- Galvalume™ – the Steel Product of Choice for Superior Corrosion Resistance
- Private Homes in Chantepie "Meccano Flexible"
- Flanking Sound Transmission in Light Frame Steel Construction



In February 2015 the official opening of 140 Den Haag Drive was celebrated in Ottawa by representatives of all levels of government and various other dignitaries. It was a new affordable rental housing complex comprising an 8-storey apartment building with 10 adjoining townhouses for a total of 74 rental units. The building also houses the administrative offices for the Ottawa Community Immigrant Services Organization (OCISO) Non-Profit Housing Corporation, the project owner.



Steel Framing – the material of choice for affordable rental housing in Ottawa

A design team made up of the architect, engineer, general contractor, steel framing contractor as well as the contractor for the structure and drywall package, combined to arrive at the most cost-effective solution. The result: this 7,432,24m² (80,000 sq. ft.) project, begun late July 2013 and completed in August 1, 2014, at a cost of \$15.2-million, was quickly, fully occupied.

Gerry Morin, of Morin Bros. Inc., who supplied the cold formed galvanized steel framing, also advised the team regarding design options for fire and sound ratings, as well as for steel joists and openings. Fire Code C rated gypsum panels in conjunction with light steel framing (LSF)

The floor assemblies were designed for an estimated STC 61 sound rating. The subsequent field test indicated STC 60 for the gypsum-concrete floor system, an excellent result.





Light steel framing was used for the exterior walls as well as throughout the interior.

provided optimum protection. The floor assemblies were designed for an estimated STU 61 sound rating. The subsequent field test indicated STU 60 for a gypsum-concrete floor system weighing only 5.896 kg per m² (13 lbs. per sq. ft.), an excellent result.

Red iron modules provided support for LSF floor joists and curtain wall studs. A total 226.8 kg (500,000 lbs.) of red iron was used in the project and 136.08 kg (300,000 lbs.),

DESIGN AND CONSTRUCTION TEAM

OWNER: OCISO Non-Profit Housing Corporation 613-745-9744

ARCHITECT: Christopher Simmonds Architects 613-567-7888

ENGINEER: Cleland Jardine Engineering Ltd. 613-591-1533

GENERAL CONTRACTOR: Warlyn Construction 613-729-8300

STRUCTURE AND DRYWALL PACKAGE: PW Prefab Wall Systems 613-913-3280

WALL PANELS: Hardie Panels

of LSF – load-bearing for exterior walls and non-load-bearing for interior walls. The total weight of the structure, including floor topping, was 10.432 kg (23 lbs. per sq. ft.), which is more than five times lighter than a comparable concrete building that would typically weigh about 54.43 kg (120 lbs. per sq. ft.).

Besides steel's excellent strength-to-weight performance – 6 times better than wood – its design versatility enhanced the speed of construction. From red iron erection to fully enclosed – with floor, roof structure and exterior walls – took just three months.

Gerry Morin explains a couple of contributing factors: "We supplied all the cold formed steel and connectors. We had 95% pre-cut to size

to save labour and site debris. The steel's precision and straightness allowed the use of pre-engineered panels.

We estimate close to a \$10.00 per 0.093m² (\$10 per sq. ft.) savings over a concrete structure.

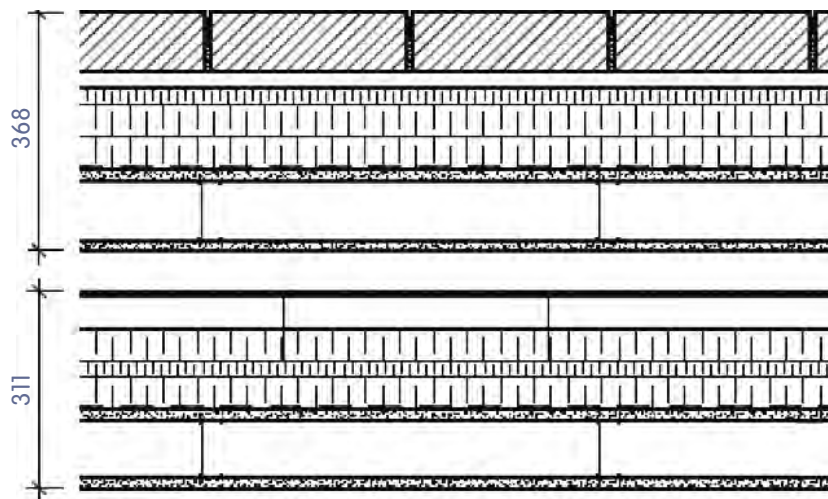
Morin adds "This structure concept was developed by NuSys Structure. A team of experienced tradesman and professionals has worked together to design different steel structures that are lightweight with the strength to resist seismic conditions in the Ottawa market. It did not take long to realize that it works and it is very competitive in cost. Since 2003 the NuSys concept has been used on 8 buildings, ranging from 1 to 8 stories and totaling over 32,515m² (350,000 sq. ft.)"

Upon shop drawing approval, framing, floor and wall panels were fabricated in a sequential manner to ensure lower level components were delivered to the site by the time the foundations were completed. Lower levels of structural steel frame are erected (typically in 3-storey sections). Prefabricated floor and wall panels are placed and secured floor by floor. The work of sub trades can commence below as floors are installed.

Upper sections of steel frame are erected and this process repeats floor by floor. No shoring is required, allowing fit-up work to closely follow the structural framing. With wall panels in place a safe, secure working environment is provided without the need for temporary barriers and enclosures. Without the requirement for concrete curing, temporary heat is not necessary. NuSys Structures system use lightweight gypsum cement topping placed on an acoustic blanket following all rough-in, providing contiguous fire stopping and sound isolation all within an insulated, controlled space.

The exterior wall cladding for the apartment building comprised cement/polymer panels over flat and Z section steel framing, while the adjacent townhouses were bricked. All insulation for the building envelope is 5-inch Roxul Non-combustible outside the curtain wall.

Ottawa is located in a moderate to severe seismic zone. Engineer Mike Cleland believes that the LSF/red iron combination used in 140 Den Haag is the best option to meet the area's seismic requirements. Gerry Morin adds, "The strength with reduced weight is a big advantage in non-combustible construction here. I think we need more education in the industry regarding the advantages of steel. For instance a 6-storey wood building must have a staircase of non-combustible material to allow a safe escape route for occupants, something that is not required when LSF is used.



TYPICAL WALL DESIGN ASSEMBLY RSI VALUE: 4.4

92mm Brick Veneer (BV)
25mm Air Space
127mm Rigid Insulation (RSI 4.4 min.)
Air/Vapour Barrier
16mm Glass-Mat Sheathing
92mm Steel Studs @ 600 o.c.
16mm Gypsum Board
Finish as per room – Finish Schedule

W2 – TYPICAL PANEL ASSEMBLY RSI VALUE: 4.4

8mm Cement Board (CB)
51mm Air Space
102mm Vertical Steel Z-Girts @ 400mm o.c.
76 Horizontal Steel Z-Girts @ 400mm o.c.
127mm Rigid Insulation (RSI 4.4 min.)
Air/Vapour Barrier
16mm Glass-Mat Sheathing
92mm Steel Studs @ 600 o.c.
16mm Gypsum Board
Finish as per room – Finish Schedule



Ottawa is in a Seismic moderate to severe zone. Gerry Morin added, "Steel provides the strength with reduced weight – which is a big advantage in non-combustible construction here."



PW PREFAB WALL SYSTEMS – NUSYS STRUCTURES

PERFORMANCE CRITERIA:

FIRE: Fire ratings up to 2 hours (1 hour is the typical rating in residential buildings).
SOUND: STU – 2 rating up to 62
VIBRATION: Meets National Building Code of Canada requirements.
RECYCLED CONTENT: Steel framing and light metal – 75% minimum.

COMPONENTS:

STRUCTURAL STEEL FRAME: Conventional hot-rolled steel columns, beams and braces designed in accordance with national and provincial buildings codes and CAN/CSA-S16-09 by a professional engineer licensed in the applicable jurisdiction.

FLOOR PANELS: Heavy gauge cold-formed channels supporting steel deck, acoustic blanket and light-weight topping. Designed in accordance with national and provincial building codes and CAN/CSA-S136-07 by a professional engineer licensed in the applicable jurisdiction.

WALL PANELS: Light gauge (non-load bearing) steel studs support exterior grade sheathing insulation, vapour barrier and interior drywall and a full range of exterior claddings (brick, stucco, metal pan).

Besides steel's excellent strength-to-weight performance – 6 times better than wood – its design versatility enhanced the speed of construction. From red iron erection to fully enclosed – with floor, roof structure and exterior walls – took just three months.



"We love steel." So says Barry Yoakum, co-founder in 1995 with Todd Walker of Memphis-based architects Archimania. They describe themselves as "...an open studio of collaborative designers interested in improving the built environment," and have won numerous awards, from local to state, regional to national. Many of their designs highlight the contributions, both aesthetic and practical, made by the firm's commitment to the use of steel.

Memphis firm brings a bold and innovative approach to Architecture

Sky Cottage – unpainted Galvalume Plus steel cladding and white brick exterior contributed to the home receiving LEED Silver certification.

An exciting and eye-catching example is Barry Yoakum's home: 'Sky Cottage' in Harbour Town, a new urban neighbourhood near downtown Memphis, Tennessee, with a breathtaking view of the Mississippi River.

One look at the photographs conveys the imaginative approach involved. It began with the choice of lot. Triangular and small – at only 209 m² (2,246 sq. ft.) – small enough to make any architect cringe, but, "I love a difficult site," says Yoakum, "doing what they say can not be done – even to dramatic effect."

In this case instead of the traditional approach of building

out then up – the home's footprint is 92 m² (990 sq. ft.), only 44% of the lot area, thus allowing a high ratio of green to building space – building up then out arrived at a 3-storey total 238m² (2,566 sq. ft.) home. The main elements of the structure are the 3-storey white brick 'cube' in which nestles a glass-fronted 'box' clad with a standing seam profile steel panel – 279m² (3,000 sq. ft.) of .60mm (.0239") clear acrylic coated AZM165/AZ55 Galvalume Plus™ steel. Total construction time was 16 months, including the concrete foundations and a hybrid structural steel and wood framing system, with a total project cost of US\$416,387.



Many of Archimania's designs highlight the contributions, both aesthetic and practical, made by the firm's commitment to the use of steel.

The box's 2-storey floor to ceiling windows provide a spectacular panorama of river and sky. This in itself led to other challenges as the intention was to employ a green building design effective enough to attain LEED certification. Given that to have the desired view of the river – necessitated facing west and the hot Memphis afternoon sun – special high-performance glass, which significantly reduces heat transfer, was used for the windows.

That, combined with the high solar reflectivity of the unpainted Galvalume Plus steel cladding and white brick exterior, contributed to the home receiving LEED Silver

certification and becoming not only the first custom-built home in Memphis to achieve that, but also the first in Tennessee designed and owned by an architect. That, obviously, was a factor in the choice of steel and, in this case especially, Galvalume Plus. Barry Yoakum: "Galvalume was the choice from the beginning, it could be customized, in this project expressing a metaphor for the rippling river beyond. Add to that it's efficient and easy to work with and has a long life expectancy. It's the perfect building material."

He continues, "We have a wide variety of project types across a range of markets. We experiment with materials



Harbor Village Drive



Sky Cottage is the first custom-built home in Memphis to receive the LEED Silver (Leadership in Energy and Environmental Design) certification from the U.S. Green Building Council. In response to the sustainable design strategy, light reflecting materials were chosen for all major surfaces.



The pie-shaped corner lot provides a magnificent view of the Mississippi River.



The main elements of the structure are the 3-storey white brick 'cube' in which nestles a glass-fronted 'box' clad with a standing seam profile Galvalume steel panel – 279 m² (3,000 sq. ft.) of .60mm (.0239") clear acrylic coated AZ55 Galvalume Plus™ steel.

and design approaches. We don't have a style regarding appearance and materials, we explore." And co-founder Todd Walker adds, "Through our work we try to push the envelope with regards teaching the community, both in Memphis and in-State."

Reflecting on Archimania's work local Hattiloo Theatre owner and founder Ekundayo Bandele said, "to provide this type of building with that much space for \$2.8 million is incredible." Similarly, the House In The Woods illustrates the architects extensive use of Galvalume steel cladding. (Botanic Garden, a 65-acre site, includes a 16-acre live concert site including the Encore Pavilion with a significant amount of window area for an in-the-forest feel) and the steel cladding complements its environs.

As a footnote, something us 'shy and retiring' Canadians probably are unaware of – 'Memphis In May International

Festival 2016' honours Canada – making us only the 2nd country along with Japan and the Netherlands to be honoured twice. Canada is Tennessee's number one trading partner and in 2014 a two-way bilateral trade between that State and Canada exceeded \$14.5 billion.



DESIGN AND CONSTRUCTION TEAM

ARCHITECT: Archimania, Memphis 901-527-3560

GENERAL CONTRACTOR:

Barry Alan Yoakum, AIA, LEED AP 901-527-3560

CONSULTING ENGINEERS – STRUCTURAL:

Poe Engineering Inc. Mississippi 662-223-9732
Memphis 901-249-6653

CONSULTING ENGINEERS – MECHANICAL:

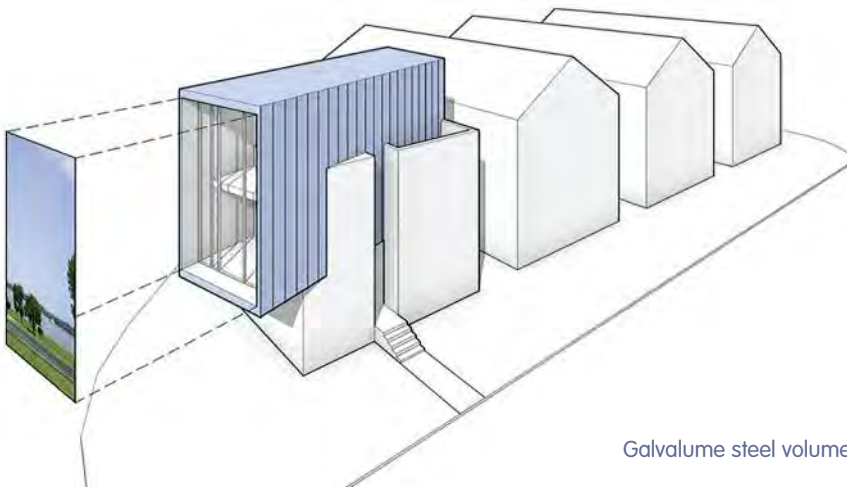
Haltom Engineering LLC Memphis 901-575-5324

STEEL CLADDING SUPPLIER AND INSTALLER:

Tennison Brothers Inc. Memphis 901-274-7773

PHOTOGRAPHY:

Sky Cottage: Jeffery Jacobs Photography 901-274-7632
Hattiloo Theatre: Hank Mardukas Photography



Galvalume steel volume.

The Encore Pavilion, with its significant amount of window area for an in-the-forest feel and the steel cladding – complements its environs.



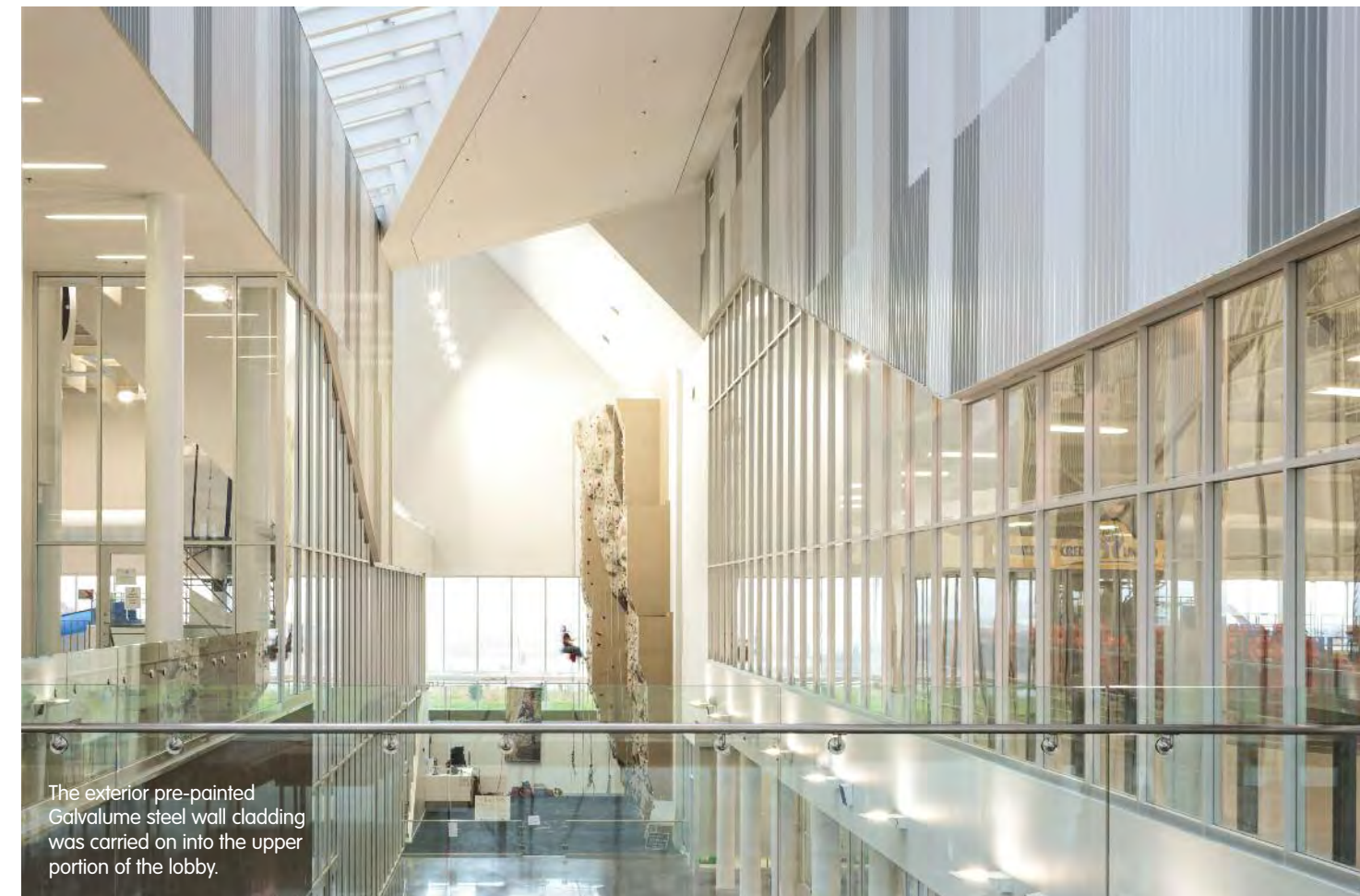
A bold statement in glass and steel, the Rath Eastlink Community Centre in Truro, Nova Scotia, is a bold statement in glass and steel. It features the extensive use of pre-painted AZM165/AZ55 Galvalume steel cladding. Cost, maintenance, life cycle and the goal of achieving LEED Silver certification were the key factors in its selection. "The design was a bit risqué and contemporary for Truro. It did take a while for people to warm up to it," says Paul Smith, senior planner, County of Colchester.



Galvalume cladding is both affordable and durable



Completed in 2013, this 13,471 m² (145,000 sq. ft.) building includes a 2,500-seat event venue, NHL-size ice pad, aquatic centre, fitness and wellness centre, walking lanes and a rock climbing area. Glass walls separate the pool, lobby and arena and maintain transparency and views through the entire 170-metre-long structure.



The exterior pre-painted Galvalume steel wall cladding was carried on into the upper portion of the lobby.



The choice of three colours of cladding, (QC28730 Regent Grey, QC28783 Polar White and QC28317 White) in the Perspectra paint system and the ridged cladding itself, is very successful at breaking up the large wall surfaces.

"The idea of creating a pattern of colours was to break up the monotony and create something that is visually interesting. We didn't want it to look like a warehouse," Smith says. Maintenance was a big concern in the selection of

the exterior building materials. "We were mindful of not encumbering the [operator] with maintenance issues. The building committee was mindful of the life cycle costs," Smith notes. "The goal was to create a strong visual effect that could be viewed from the Trans-Canada highway and that would accentuate the building's sculptural quality using a very cost effective, durable material. The material is something that is widely used in the region and local trades



and contractors would be familiar with it," says Andrew Frontini, project designer, Perkins+Will, for the building.

The Galvalume sheet steel cladding conforms to ASTM A792M and AZM165 coating designation, with a minimum base steel thickness of 0.91 mm (0.036"). It is pre-painted with the Perspectra paint system. The exterior sheet profile is Ideal Roofing's Vee-Rib. "The cladding" Smith says, "is well-suited to the building style."

CLADDING MATERIALS:

Pre-painted Galvalume AZM165 conforming to ASTM A792M

Vee-Rib .032" Regent Grey QC28730

Vee-Rib .032" Bright White QC28783

Vee-Rib .032" White White QC28317

Supreme Liner .026" White White QC28317

Laurentian No stiffeners .026" Galvanized (section interior walls)



The decision to create a pattern of three colours of cladding – very successfully breaks up the large wall surfaces, creating a strong visual effect and accentuating the building's sculptural quality.

DESIGN AND CONSTRUCTION TEAM

OWNER: Municipality of Colchester & Town of Truro

ARCHITECT: Perkins + Will 416-971-6060 Lead Designer
with JDA Architects (now Stantech) 902-422-3000

STRUCTURAL ENGINEERS: Campbell Comeau 902-429-5454

CONSTRUCTION MANAGEMENT:
PCL Constructors Canada 902-481-8500

GENERAL CONTRACTOR: PCL Constructors Canada 902-481-8500

STRUCTURAL STEEL SUPPLIER: RKO Industries 902-468-1322

STRUCTURAL STEEL INSTALLER: RKO Industries 902-468-1322

STEEL DECK SUPPLIER: RKO Industries 902-468-1322

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

CLADDING INSTALLER: Dowd Group 506-632-0022



Designed to store, maintain and dispatch a fleet of 400 buses, the newer centre replaced the Oakridge Transit Centre. As the only facility servicing the city's fleet of electric-trolley buses, it features a single-storey maintenance centre surrounding a four-storey support building, which houses stores, administration offices, a depot, a training area, and a cafeteria. There are also six ancillary buildings: a vault pull, carbon rack, fuel island, bus wash, wastewater treatment plant and a 4 MVA rectifier station.

The Vancouver Transit Centre lets light into what has been a dark and dingy place

"It's nice, bright and airy rather than the dark, oil-stained thing of the past. All the overhead doors have windows to let the light in – we wanted to bring in as much light as possible," says Ian McKay of Architecture 49 Inc. McKay was the Project Architect. "It brings light into the work bays, unlike the old, industrial garage-style workplace. It is now a significantly enhanced work space."

The 42 million-dollar project, which also had a six million dollar expansion, was originally supposed to be constructed at the existing Oakridge site. "It was a nightmare to try for a reconstruction on that site. It had been renovated many times. It was out of date and it was on a very tight site," McKay says.

TransLink, the company that owns the transit centre, purchased a new site in Marpole, a mostly residential neighbourhood. "There was a big concern in the neighbourhood of what this thing would be. There were huge concerns as well as a public presentation, but, after it was completed, there were no complaints," says McKay. "There are 400 buses parked on the riverside, but the entire building screens the noise from the neighbourhood. It's all quiet, so I guess they must be happy."

Most of the Vancouver Transit Centre was constructed of steel in order to achieve the industrial look of the initial design. The upper portion of the building is all steel cladding.

"Using steel seemed to be the most economical approach. It's a long-span building, and we wanted a minimum of columns. The durable finish of the steel

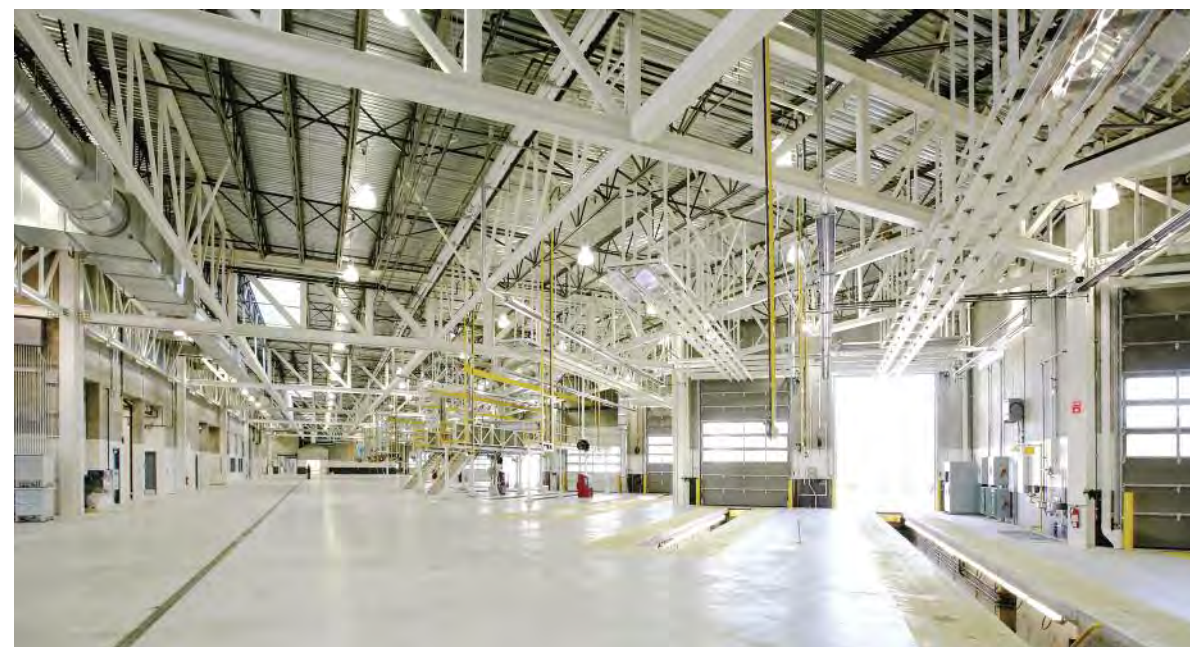


Designed to store, maintain and dispatch a fleet of 400 buses, the newer centre replaced the Oakridge Transit Centre.

requires little maintenance," McKay says. "We did not want to have a dishonest expression of the building. Steel and metal contribute to the industrial look." The 18,580m² (200,000 sq. ft.) bus operations and maintenance facility is located in south Vancouver on the site of an old sawmill. The facility was designed to accommodate a fleet of 400 coaches made up of 12m (40 ft.) trolley coaches, 12m (40 ft.)

diesel coaches and 18.25m (60 ft.) articulated trolley coaches.

Elisa Brandts, Architect of Record, says that detailed site planning was critical to the new transit centre's success. "The centre was an enhancement to a rough, semi-industrial site," she says. "It has a really good view over the Fraser River, which makes it really nice for the staff that work there. They're thrilled with it – they've all given it positive reviews."



"Using steel seemed to be the most economical approach. It's a long-span building, and we wanted a minimum of columns. The durable finish of the steel requires little maintenance," McKay says.

DESIGN AND CONSTRUCTION TEAM

ARCHITECT: Architecture 49, Elisa Brandts,
Project Manager Ian McKay 604-736-5329

STRUCTURAL ENGINEERS: WSP, Glenn Hubick 604-294-5800

GENERAL CONTRACTOR: Bird Construction Group, Lee Cavazzi 604-271-4600

WALL AND ROOF CLADDING INSTALLER: Flynn Canada 604-531-2892

WALL AND ROOF CLADDING SUPPLIERS: Flynn Canada 604-531-2892
Vicwest 604-946-5316

STRUCTURAL STEEL SUPPLIER AND INSTALLER: Empire Iron Works Ltd. 780-447-4650

WALL CLADDING INSTALLER: Flynn Canada 604-531-2892

PHOTOGRAPHY: Architecture 49

WALL CLADDING

ASTM A653M with pre-painted Z275 (G90) zinc coating and unpainted AZM180 Galvalume coating.

.91mm (.036") pre-painted Z275 (G90) galvanized CL840 and AD300 wall cladding coloured Charcoal 56072

.76mm (.0299") unpainted AZM180 Galvalume 7/8" Corrugated wall cladding.

.76mm (.0299") pre-painted Z275 (G90) galvanized with a Snap Lock II profile.



Boulder, Colorado

Sunshine House: Corey Martin, 2013

After a fire decimated his house near Boulder, Denver, Evan Fry turned to college chum Corey Martin, a partner at Hacker Architecture, to design a replacement.

Rising on steel stilts and clad in fire-resistant, uncoated corrugated steel – which was intentionally allowed to change to a rich bronze patina – evoking the region's old mining shacks. This 204.8m² (2,200 sq. ft.) home is heated with geothermal coils and powered by an 8-kilowatt solar array, all supporting the wide-windowed views of the recovering hillsides. The entire south face of the house is composed of sliding glass doors for a spectacular panorama of the Rockies.

ARCHITECT:

Hacker Architect, Portland, Oregon 503-227-1254

PHOTOGRAPHY:

Jeremy Bittermann Photography 971-570-2020

Benton, Arkansas

Hurricane Creek Elementary School

Hurricane Creek Elementary School a "green school," becomes the second LEED certified school in Arkansas. Hurricane Creek has more than 21,945m² (72,000 sq. ft.) and can serve up to 635 students. The 24-gauge Galvalume standing seam roof with a Kynar 500 finish was selected because it can deliver high solar reflectance and high thermal emittance. The school's design allows it to rely heavily on natural light.

Though the project cost \$10.4 million, reduced maintenance and energy costs, save the school \$65,780 and \$24,280 a year respectively. The design is expected to save the community \$8.5 million over all – over the building's expected 50-year lifespan.

ARCHITECT: Brooks Jackson Architects Inc.

GENERAL CONTRACTOR: James H. Cone Inc.



The .61mm (.0239") Galvalume SSR 'coolroof', with a Kynar 500 finish, is designed to reduce the heat island effect.

Galvalume™ – the Steel Product of Choice for Superior Corrosion Resistance

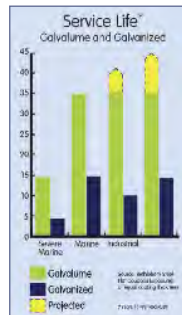
Galvalume™ is the fastest growing steel product in North America. It combines the best protective qualities of aluminum and zinc. In fact, it has proven its superior building material performance in extended field testing in a diverse range of corrosive environments. Galvalume offers these advantages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



- At least twice the corrosion resistance of traditional galvanized coatings of similar thickness under the same exposure conditions.
- Excellent protection of 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.

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.



Private Homes in Chantepie "Meccano Flexible"

In the designated development area Rives du Blosne, in the town of Chantepie, close to Rennes, France, several districts with private homes are being developed, among them a set of 26 homes made of steel.

In course of the project of these houses, called "Meccano Flexible", the architect developed the "Archilenoir" concept. He describes this as a dimensional approach with a basic steel structure (column – beam) and an independent, modular façade which allows different possibilities, combinations and materials, always with a common denominator.

The constructive rationalism of the houses consists of a set of innovative construction methods for experimental optimized housing with four main objectives: cost, quality, reliability and time. It is mainly designed for social housing programs.

Technologies normally used for industrial buildings were applied for these residences: cladding with composite steel panels made of Aluzinc (Galvalume in Canada) coated and black coated steel, plaster or wood for interior walls and partitions, roofing made of Aluzinc (Galvalume) and black coated steel sheets.

Galvalume coated steels, available painted or unpainted, are used widely in construction: roofing, cladding, structural sections, composite panels, tiles, etc.

ARCHITECT: Eric Lenoir, ArcelorMittal, Constructalia



Flanking Sound Transmission in Light Frame Steel Construction

The North American sheet steel industry is in the final stages of a multi-year research program measuring the flanking sound transmission in light frame steel construction. This is in response to evolving building code requirements and the growing market for mid-rise light frame steel buildings.

There are four key requirements for mid-rise light-frame steel construction: structural, fire, thermal and acoustics. Each of these requirements is currently addressed under existing building codes, but these codes are constantly evolving. The National Building Code of Canada (NBCC) is responding to the demands of building owners and residents for improved acoustic separation between dwelling units. (Figure 1) The current method to assess acoustic performance only considers the direct sound transmission through the wall or floor (STU) and ignores any flanking transmissions. The 2015 edition of NBCC will address this situation by requiring Apparent Sound Transmission Class (ASTC) ratings of assemblies.



The simplest way to measure sound transmission between adjacent rooms considers only the direct sound path through the wall or floor separating the spaces. Implicit in this approach is the simplistic assumption that sound is transmitted only through the obvious separating assembly – the separating wall assembly when the rooms are side-by-side, (Figure 1) or the floor/ceiling assembly when rooms are one above the other (Figure 2). In reality the airborne sound excites all the surfaces in the source space, and all of these surfaces vibrate in response.

Some of this sound energy is transmitted across the surfaces abutting the separating assembly, but a significant percentage can be transmitted through the junctions where these surfaces join the separating assembly. Occupants of the adjacent room can actually hear a combination of the direct and flanking sound transmissions.

This research program will provide important data on the acoustic performance of light frame steel construction. (photos 1 and 2) To facilitate the dissemination of this work, a guide is being developed by the National Research Council of Canada in addition to a web-based modeling tool called Sound PATHS. (photos 3 and 4) The guide and Sound PATHS will facilitate designs to provide enhanced levels of sound insulation, and it should be generally applicable to construction in both Canada and the USA.

For more information on the NRC acoustic flanking test facility, visit their web site:

<http://archive.nrcnrc.gc.ca/eng/facilities/irc/flanking.html>

This work is being funded jointly by the American Iron and Steel Institute (AISI), Canadian Sheet Steel Building Institute (CSSBI), Steel Framing Industry Association (SFIA) and the Certified Steel Stud Association (CSSA).



PHOTO 4

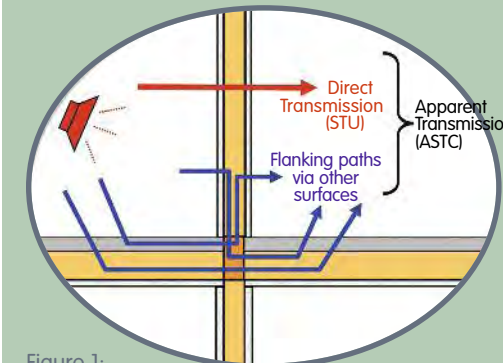


Figure 1:
Acoustic Transmission through Wall Assemblies

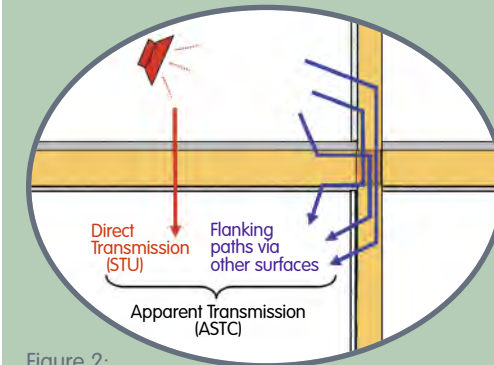


Figure 2:
Acoustic Transmission through Floor Assemblies



Photo 1: Flanking Transmission Test Facility at NRC



Photo 2:
Construction of Cold-Formed Steel Test Assembly

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 P0E 1G0
Or email: davidfolliis@vianet.ca



ArcelorMittal

Building on Success from the inside out



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



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



ArcelorMittal Dofasco steel is
certified to EcoLogo standard
CCD-150 "Steel for Use in
Construction Products"

