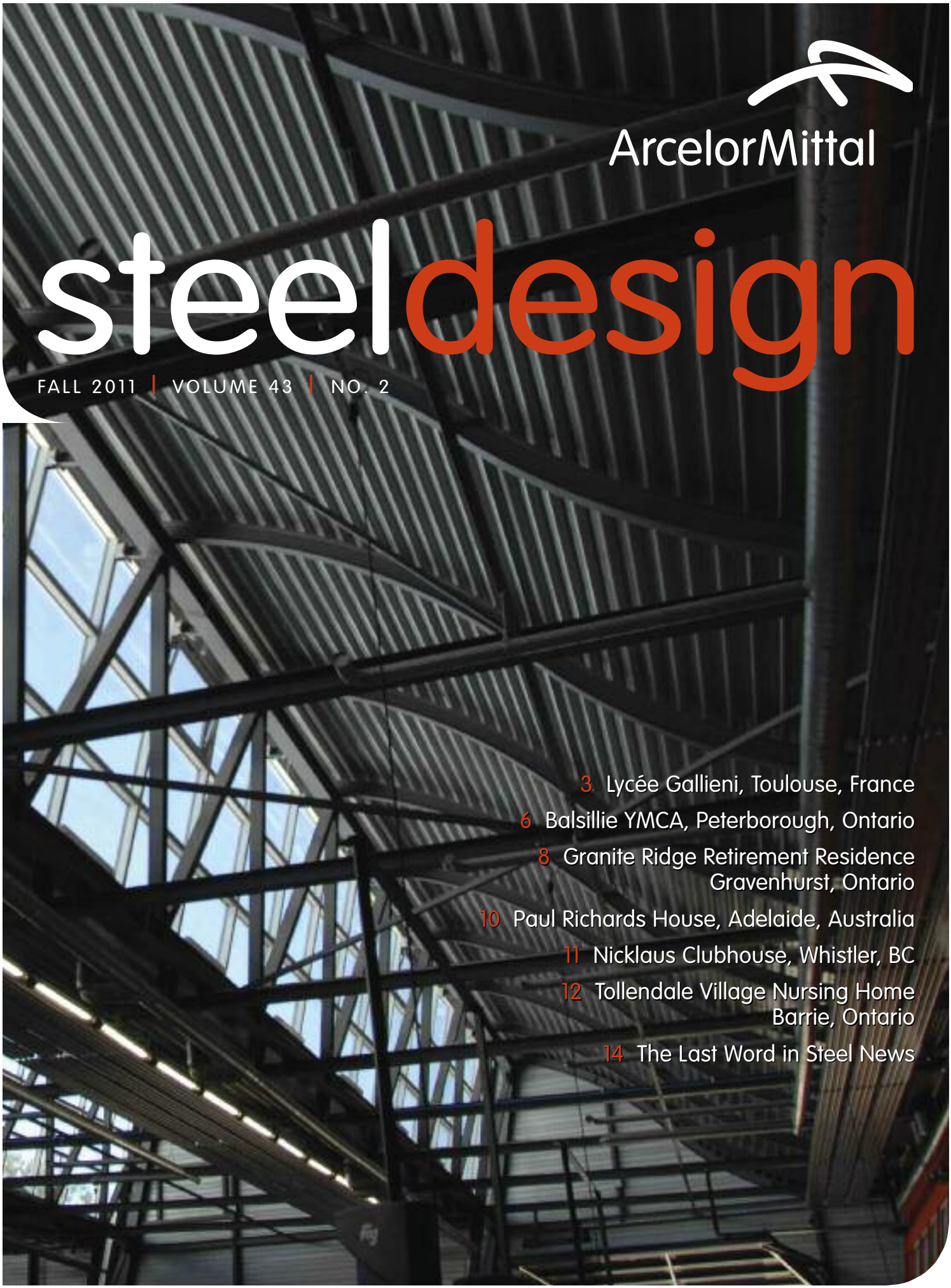

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steeldesign

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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.

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

CHANGE OF ADDRESS, NEW SUBSCRIPTIONS

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COVER PHOTO:
LYCÉE GALLIENI, TOULOUSE, FRANCE
Iosis,@ Vascon and Pierre Engel ????

ArcelorMittal

transforming tomorrow

IN THIS ISSUE

In the past couple of years Lycée Gallieni School in Toulouse, France was rebuilt following a massive explosion at a nearby fertilizer plant. The new 40,000m² (430,550 sq. ft.) highschool, offers general, technology and vocational education dedicated to the transport and automotive engineering trades. It sits on a 110,000m² (1,184,000 sq. ft.) campus which includes a 21,400m² (230,000 sq. ft.) park which is open to the public.

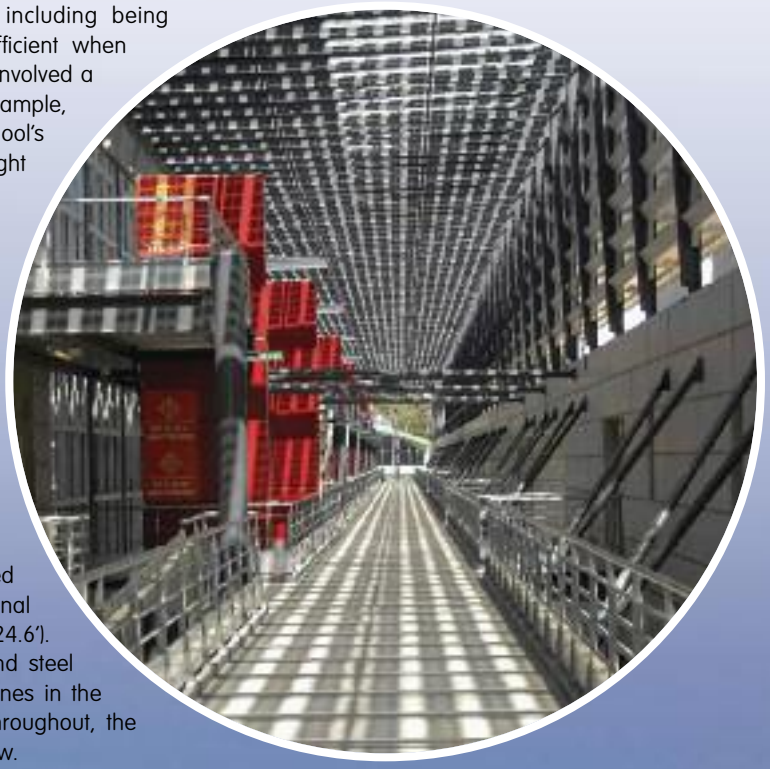
Steel: Meeting Cost and Environmental Imperatives

The construction mandate involved several imperatives, including being environmentally friendly, fast, cost effective and energy-efficient when completed – all within a sustainable framework. The project involved a number of technical, environmental and aesthetic issues. For example, acoustic comfort was especially challenging given the school's proximity to the Aéroport Toulouse-Blagnac and overhead flight lanes for 525-seat Airbus aircraft assembled nearby.

The architect chose steel framing and cladding supplied exclusively by ArcelorMittal throughout the project – from roofs to walls to floors. Besides its strength-to-weight ratio, the modular design that steel allows contributed greatly to fast and simple construction, a clean uncluttered site and no waste.

Accommodating 1,400 students, the school buildings comprise three main elements: General Education Buildings and Administrative Offices, Workshops and The Gallery, known as the 'track' building, which is basically a 300m (984') spine running between, and providing access to, general education classrooms and workshops.

A notable feature of the project is the flooring. This perforated composite floor is half to a third the weight of conventional decking, yet accommodates high loads and spans up to 7.5m (24.6'). It consists of a plastic coated steel liner base, insulation and steel mesh, topped by concrete. It is the flooring for the mezzanines in the Workshops and the five General Education buildings and throughout, the underside is left exposed to serve as ceiling for the areas below.



The Gallieni highschool in Toulouse offers a fine example of steel architecture. The buildings are all of the same design, with a steel column-beam structure and lightweight Cofradal 200 floors (steel decks, insulation and concrete slab). The structure is left exposed, the utilities are visible, the lower surface of the floors serves as the ceiling, the lighting is inset.

The structure of the workshops is of the column-beam type, combined with light-weight cladding, glazed on the northern face and steel panels on the southern face. The choice of a steel frame for the workshops enables large spans in order to obtain uninterrupted volumes beneath the roof. The steel roof structure consists of inclined lattice trusses with a 42m (137.9') span and 4m (13') in height. Each truss node supports a dual-curvature purlin with a 9m (29.5') span.

The uninterrupted space, provided in workshops, is another feature facilitated by steel's strength-to-weight ratio. Above the workshops' floors the mezzanines house classrooms and studios. The workshop roofs are 4m (13.12') high. The northern roof faces are glazed and supported by inclined steel lattice trusses left exposed. Southern faces are clad with ArcelorMittal's Aluzinc® (Galvalume™ in Canada) panels.

The five General Education and Administrative Office buildings are all 3-storeys and are arranged around indoor 'climatic' gardens. They're column and beam in conjunction with box and lattice girders which again are all exposed.

The 300m (985') gallery 'track' building is three storeys in height and the roof covering involves glass photovoltaic panels supported by steel, to provide the equivalent of the school's annual electricity requirements.

As well, all the glass roofs and façades have steel lattice sunbreakers to reduce solar heat from entering. Articulated to adjust to the angle of solar radiation, they can eliminate the need for air conditioning.

So, once again, steel framing and cladding has met and exceeded cost and environmental objectives for a major project.

DESIGN AND CONSTRUCTION TEAM

CLIENT: Conseil régional Midi-Pyrénées

OWNER REPRESENTATIVE: Cogemip

ARCHITECTS:
Vasconi Associates Architects
(Claude Vasconi and Thomas Schinko)

ASSOCIATED ARCHITECTS: Architects CSF
(Keyvan Esnaashari, Philippe and Xavier Lapeyre Ratynski)

ENGINEERING FIRM:
Iosis Sud-ouest and Patmo/Franck Boutté

CONTRACTOR: Serin & fils and Acte 2 paysage

ACOUSTICS: Avel acoustique

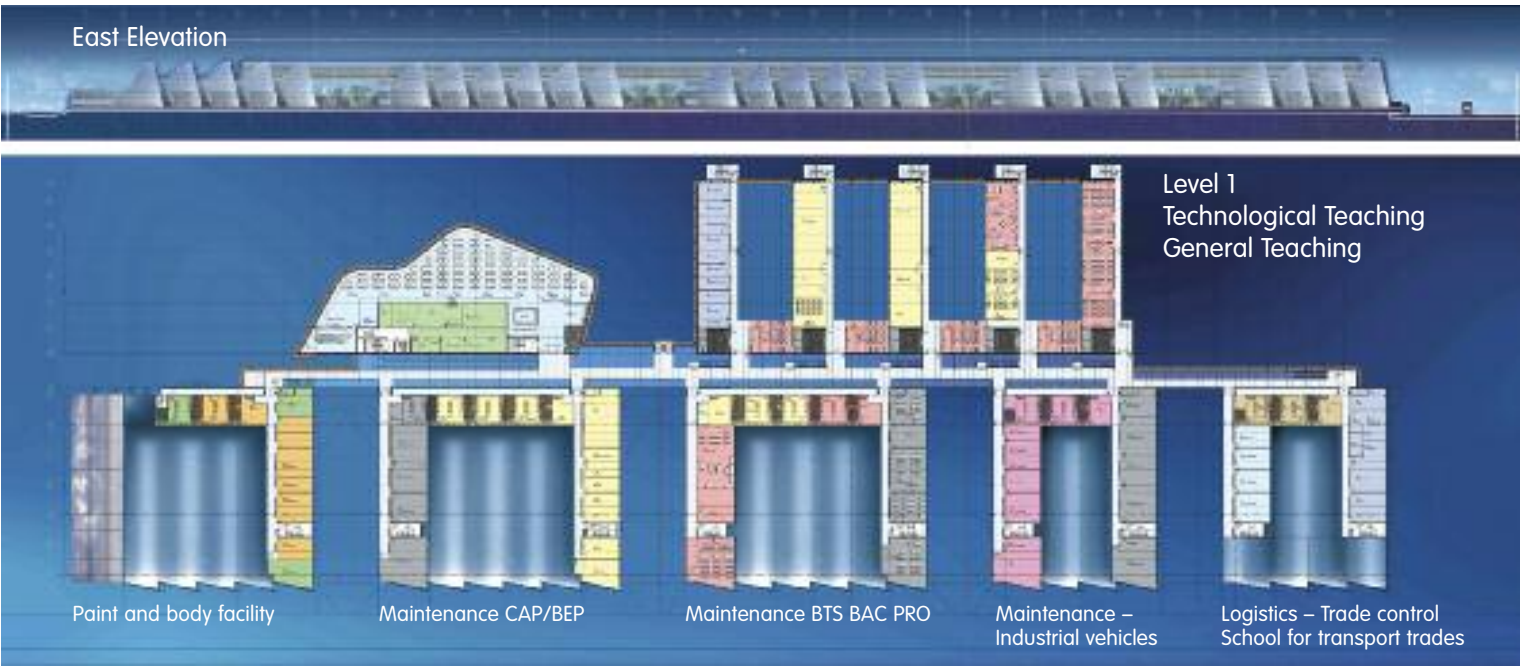
PHOTOGRAPHY:
Iosis,@ Vascon and Pierre Engel

ROOF AND WALL CLADDING:
1mm (.039") AZM185 (Galvalume in Canada)

ROOFING:
11,000m² (118,400 sq. ft.)

WALL CLADDING:
3,000m² (31,900 sq. ft.)

STEEL DECK:
9,000m² (96,900 sq. ft.)
1mm (.039") perforated Cofradal 200



The general education and administrative buildings are all of the same design, with a steel column-beam structure and lightweight steel decks, insulation and concrete slab. The structure is left exposed, the utilities are visible, the lower surface of the floors serves as the ceiling, the lighting is inset. The exterior is clad with ArcelorMittal's Aluzinc AZ185 (Galvalume in Canada and the USA).

The advantages of steel, present in the structure and the floors as well as the glass roof, have solved many technical, environmental and aesthetic issues faced by the project, such as:

- Prefabrication and clean construction site
- Large spans and ease of use
- Thermal, acoustic and visual comfort
- Material savings and cost control

The workshop volumes are naturally and evenly illuminated through a system of sawtooth roofs – four to six depending on the workshops – whose north-facing upper parts are glazed.

The 125-year-old Peterborough YMCA was outdated and accommodated a maximum 1,000 member visits per day. The need for a new facility presented a substantial challenge in terms of funding without Provincial or Federal assistance*. The solution? A 5,806m² (62,500 sq. ft.) dual-height volume building incorporating community input from the YMCA, its members, local residents and businesses during the planning and design processes, and utilizing steel extensively in exterior and interior applications.

Balsillie YMCA Steel enhances a true Community Project

The new Balsillie Family YMCA was built at a new location in central Peterborough. Significantly smaller than its 9,290m² (100,000 gross sq. ft.) predecessor, the new facility none the less accommodates over 2,000 member visits per day. Interestingly, membership has doubled. The fully-accessible amenities include two swimming pools, a full-size gymnasium, fitness centre and studios, community meeting rooms, child-care centre with kitchen, staff room, administrative offices and a café. A centre concourse links all areas while separating their functions and carrying all foot traffic.

Photos this page: Flynn Photo, G. Stewart

The design objectives included a contemporary and well-detailed façade and sustainable energy-efficient features.

The design objectives included a contemporary, well-detailed façade and sustainable energy-efficient features. This was accomplished within the restricted budget of $1,793 per square metre ($167 per sq. ft.). Scott Robinson, Project Manager for Tillmann Ruth Mocellin Inc., Architects says, "Besides creating a vibrant centre of activity we wanted a feeling of openness. Plus we had to achieve this all with quick, economical construction. Steel provided that, as well as being the most efficient choice for construction during the winter months."

Openness was achieved by exposed post-painted open web steel joist (OWSJ) through most of the building. In some lower-height areas acoustic tile or a combination of OWSJ and exposed deck were used. The exterior façade creates visual interest by juxtaposing materials such as steel cladding, architectural block, ceramic tile, sandblasted and clear glass, and wood detailing. The steel cladding totaled 1,533m² (16,500 sq. ft.) of unpainted 22mm (.875") corrugated Galvalume™ Plus. 152mm (6") lightweight steel framing (LSF) with spray-on insulation supported the steel and ceramic tile cladding. LSF studs were also used in the internal partitions. Beneath a PVC roof, the 4,422m² (47,600 sq. ft.) steel roof deck was comprised of .91mm and .61mm (.036" and .0239") ZF075 Galvanneal with 38mm and 76mm (1.5" and 3") profiles.

Scott Robinson concludes, "This project confirmed for us that light steel framing brings numerous advantages, including providing straightforward detailing, rapid availability and the ability to meet critically tight construction schedules."

**It should be noted that Peterborough YMCA received $3-million from the Ontario Ministry of Health Promotion under the province's economic stimulus plan, following completion of the project, unanticipated at its inception.*

Interior of pool with finished exterior wall. The 4,422m² (47,600 sq. ft.) steel roof deck is comprised of .91mm and .61mm (.036" and .0239") ZF075 Galvanneal with 38mm and 76mm (1.5" and 3") profiles on OWSJ.

DESIGN AND CONSTRUCTION TEAM

PROJECT OWNER:	YMCA of Peterborough 705-748-9622
ARCHITECTS:	Tillmann Ruth Mocellin Inc. 416-595-2876
GENERAL CONTRACTOR:	EllisDon Corporation 905-896-8900
CLADDING SUPPLIER:	Vicwest Inc. 905-825-2252
CLADDING INSTALLER:	Flynn Canada Ltd. 905-671-3971
LIGHT STEEL FRAMING SUPPLIER:	Bailey Metal Products 1-800-668-2154
LIGHT STEEL FRAMING INSTALLER:	Four Site Drywall & Acoustics Ltd. 416-803-3111
PVC ROOFING:	Flynn Canada 905-671-3971

The 152mm (6") lightweight steel framing with spray-on insulation supports the steel cladding and ceramic tile cladding.

"Steel provided an economical, efficient choice for construction during winter months."

Scott Robinson, Project Manager, TRM Architects Inc.

WALL CLADDING:
.61mm (.0239") – 22mm (.875") Corrugated AZM180 Galvalume Plus® 1,533m² (16,500 sq. ft.)

STEEL ROOF DECK:
.91mm and .61mm (.036" & .0239") ZF075 Galvanneal with 38mm and 76.2mm (1.5" and 3.0") profile 4,422m² (47,600 sq. ft.)

LIGHT STEEL FRAMING MATERIAL:
Grade 33 (MPa230) for 1.22mm (.048") and lighter
Grade 50 (MPa340) for 1.52mm (.060") and heavier

Photos this page: Tillmann Ruth Mocellin Inc.

The design objectives for Granite Ridge Retirement Residence in Gravenhurst, Ontario was to "provide high level care for seniors who require assistance and a stately, attractive, functional building for the residents," says Bob Dyck, President, Robert J Dyck Architect & Engineer Inc. To meet the goals, steel – with its many benefits: cost effective, design flexibility, non-combustible and speed of erection – was the obvious choice for the project.

Cold formed steel (CFS) offers many benefits and savings

Granite Ridge Retirement Residence, consists of 100 retirement home units on four floors. Steel was used extensively in the 6,455m² (69,480 sq. ft.) building.

Granite Ridge Retirement Residence, consisting of 100 retirement home units on four floors, was completed in September 2009. Steel was used extensively in the 6,455m² (69,480 sq. ft.) building. Light steel framing was used for non-load bearing interior walls, steel studs for exterior wind bearing walls as a requirement for non-combustible institutional construction. In addition, cold formed steel (CFS) was used for roof trusses.

Robert Dyck, who has worked with various products across numerous builds, continues to assert his appeal for the use of steel framing. "Light steel framing is cost effective, produces a straight wall and provides excellent sound ratings. For this project, it provided flexibility and it met our design needs."

CFS was used extensively throughout the project for many reasons. "It was chosen because it's a non-combustible material and the size of the building dictated that a non-combustible material be used to meet institutional standards, i.e. if evacuation of residents became an issue," explains Alex McGillivray, Sales and Marketing Coordinator with VanderWal Homes & Commercial Group, who installed the roof.

CFS contributed to the aesthetic value of the building as well. It allowed engineers to design a pitched roof keeping it uniform to the surrounding residential community and retaining the calming familiarity associated with residential living. "VanderWal is one of only a few companies to do pitch roofs using non-combustible material," emphasizes McGillivray.

There were 8,230m (27,000') of pre-engineered, pre-fabricated CFS trusses, with the longest spanning 16.76m (55') outside-wall-to-outside-wall. CFS sections in a variety of thicknesses were used on the Granite Ridge facility with trusses ranging from the lightest at .912mm (.036"), as well as, 1.22mm, 1.5mm, 1.91mm and the heavier 2.74mm (.048", .060", .075" and .108"). The building roof diaphragm is covered with .76mm (.0299") thick and 38mm (1.5") deep Galvanneal steel deck. The roof trusses were assembled into sections at grade level; the decking applied, and then hoisted into final position using a crane. This method of installation decreased the overall build time, due to the prefabrication process of CFS and grade level on-site assembly.

As McGillivray summarizes, "Overall, cold-formed steel makes a lot of sense to the owner in this application, due to its non-combustibility, residential aesthetics, savings on insurance, reduction in site time – because of the prefabrication and fast install." In addition, CFS is low maintenance as it reduces, if not eliminates, the chance of building movement, there are no nail pops and it is the highest strength-to-weight ratio of any building material – with no shrinkage, no warping and no twisting or cracking. Over the course of time CFS yields the greatest return on investment due to low maintenance and upkeep and boasts a significant savings on insurance premiums.

Cold formed steel sections were used on the Granite Ridge facility with trusses ranging from the lightest at .912mm (.036") as well as 1.22mm, 1.5mm, 1.91mm and the heavier 2.74mm (.048", .060", .075" and .108"). Also used for the canopy framing at front entrance.

DESIGN AND CONSTRUCTION TEAM

ARCHITECT:
Robert J Dyck Architect & Engineer Inc.
519-571-0224

GENERAL CONTRACTOR:
W.S Morgan Construction, 705-746-9686

STRUCTURAL CONSULTANTS:
Stephenson Engineering 416-635-9970

DRYWALL CONTRACTOR:
Mose Drywall; John Mantill 705-737-1911

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

ROOF TRUSSES AND DECK INSTALLER:
VanderWal Homes and Commercial Group
519-882-0721

DECK SUPPLIER:
Steelform Building Products 780-440-4499

ROOF TRUSS SUPPLIER:
MiTek Canada Inc. Trusses 1-800-268-3434

"Light steel framing is cost effective, produces a straight wall and provides excellent sound ratings. For this project, it provided flexibility and met our design needs."

Robert Dyck, President, Robert J Dyck Architect & Engineer Inc.

View of building showing the different projections.

Located in the hills outside of Adelaide in South Australia, this small environmentally sensitive home, created by Max Pritchard Architects, was designed to fit among the large eucalyptus trees. The house rises over three levels using the slope of the land to gain access by bridge to the main living area on the mid-level.

Steel provides a room with a view

The design of the house as a tower form minimizes the footprint on the site, limiting soil and vegetation disturbance, whilst reflecting the strong vertical form of mature trees. Projections or "saddle bags" from this tower, house cupboards, stair landing and balconies. These are clad in sheet plywood and prepainted corrosion resistant corrugated steel, reinforcing the colour and texture of tree trunks.

A mezzanine bedroom overlooks the living area creating a feeling of space with its two-storey high timber windows maximizing the views of the large adjacent eucalyptus trees and the distant views of the heavily wooded hills.

The roof shape was chosen to eliminate gutters which would be prone to blockage by leaves, while still providing for collection of roof water. A square roof dips to form a diagonal valley which continues out from the building as an aqueduct to the rainwater tank.

The naturally lit, finely detailed steel and timber staircase.

Front View, showing the bridge access to the main living area on the mid-level.

Paul Richards' house interior – the design provides tremendous views over the surrounding treetops.

DESIGN AND CONSTRUCTION TEAM

CLIENT: Paul Richards

ARCHITECT: Max Pritchard Architects PH: +61 8 8376 2314

STEEL SUPPLIER: BlueScope Steel

MATERIAL: 0.42mm (.017") corrugated Colourbond® steel coloured Dune
(In Canada and the USA, this would be prepainted galvanized or Galvalume steel)

PHOTOGRAPHERS: Paul Richards and Trevor Fox

When DA Architects chose a striking, dark-green steel for the roof of the Nicklaus Club House in Whistler, BC, they started a trend. The shade of green lead architect Mark Ehman had in mind didn't exist, so he went with a customized colour. Many people loved the shade supplied by Mercury Metals (now Vicwest) in their .61mm (.0239") Diamond Rib profile – so much so that it's now widely available and known as Nicklaus Green.

Prepainted steel tops centerpiece golf facility

"We wanted a deep green that would be a visual reminder of the colour of the golf course and the surrounding forests," explains Ehman. "steel roofs tend to appear to be a lighter colour than they actually are, so the green really comes through."

Ehman had three objectives for the club house, which he designed 16 years ago. The structure is two levels of wood frame over a ground floor and underground parking concrete structure. "We wanted to create a centerpiece facility for the golf course. It was important to create something of stature in the community. We also wanted to develop an architectural expression that would reflect the beautiful landscape that is Whistler. Third, we needed to develop a functional design for the facility," he says.

Steel was the first choice for the structure's roof from the very beginning, Ehman adds. "We knew that the roof was going to be an important design element, so we had to choose an appropriate material. We wanted a contemporary interpretation of a mountain lodge that is intended to be seen from a distance – form was very important," he says. "Steel roofs are also preferred in snow country because of their durability."

Aside from its low maintenance and durability, prepainted steel roofing provides a broad spectrum of design opportunities for dormers, valleys high and low slopes, mansards and complex profiles

Prepainted galvanized steel was the first choice for the structure's roof from the very beginning, we knew that the roof was going to be an important design element.

Steel roofing is durable and contains the highest amount of recycled content. Building products made with ArcelorMittal Dofasco steel can be credited with the maximum number of points for the materials credit aspect of the LEED™ rating system Sections 4.1 and 4.2.

DESIGN AND CONSTRUCTION TEAM	
CLIENT:	Jack Nicklaus Golf Course in Whistler, BC
ARCHITECTURE:	DA Architects + Planners Mark Ehman, Design Partner 604 685-6312
DEVELOPER:	Joint venture between Burrard International 604-681-8700 and International Land Corporation 604-986-3002
CONTRACTOR:	International Land Corporation Jim Cameron 604-986-3002
ROOFING CONTRACTOR:	Peter Pocklington Building Systems Pete Pocklington pbsltd@telus.net
ROOF CLADDING SUPPLIER:	Mercury Metal now Vicwest Steel 604-946-5316

The Tollendale Village Nursing home, located on Hurst Drive in Barrie, is a prime example of the effectiveness of steel for institutional construction. For multiple room/lodging requirements, steel is lightweight, easier to manage, requires less time to erect when compared to market alternatives and results in less on site clutter. The three-story, 2,600m^2 (28,000 sq. ft.) facility, which opened in July 2010, has a 160-bed capacity and is one of the largest nursing homes in the city.

Pre-assembled, lightweight, cold formed

Steel wall panel assemblies offer speed of installation

The building is a combination of structural steel in the larger open area and cold formed steel (CFS) in the residence areas," explains Dan Finelli, Project Design Engineer of Finelli Engineering. "One of the outstanding features is a protruding entrance canopy, extending over an existing building, which offers a visually appealing curved steel profile."

Commenting that traditional load bearing masonry walls were initially considered for Tollendale Village Nursing Home, Finelli emphasizes that CFS walls were chosen because they offered more benefits. "CFS panels are pre-made in the shop and installed on site, which speeds up construction." Magest Building Systems manufactured and pre-assembled the galvanized cold formed steel wall sections in their plant in Stratford then shipped them to the site ready for installation. All cold formed steel sections feature a protective corrosion-resistant galvanized minimum coating weight of G60 (Z180).

Craig Wood of Magest Building Systems emphasizes there are unlimited benefits to using pre-assembled wall panels on multi storey buildings, such as Tollendale. "The speed of installation is a major advantage. The wall panels are assembled in our plant under controlled conditions. They are assembled on compression tables to ensure the studs are seated tightly to both the top and bottom tracks to minimize settlement once the building is loaded. In addition to the swift assembly, there is reduced garbage disposal on site and the chance of material theft from the worksite is less with these wall panels."

Tollendale Village Nursing Home features galvanized steel framing, ranging from 33mm to 68 mm (1.3" to 2.7"), supplied by Steelform Building Products. Roland Jonker of OCA Architects, comments, "We chose the steel stud system for the efficiencies it would allow in the field".

The roofing system on Tollendale is an open web steel joist design, with Parapet 224.3m (736 lin. ft.) supplied by Canam Group. The Hambro D500 Series joists were used for the floor system.

Finelli emphasizes that CFS walls were chosen for the three-story, 2,600m^2 (28,000 sq. ft.) facility, because they offered more benefits. "CFS panels are pre-made in the shop and installed on site, which speeds up construction thus reducing insurance costs".

DESIGN AND CONSTRUCTION TEAM

ARCHITECT:	OCA Architects Incorporated 416-767-1441
GENERAL CONTRACTOR:	Melloul-Blamey Construction 705-792-5023
CONSULTING ENGINEER:	Finelli Engineering Inc. 905-639-5555
STEEL FRAMING SYSTEM SUPPLIER/INSTALLER:	Magest Building Systems 519-272-1001
STEEL FRAMING SUPPLIER:	Steelform Building Products 780-440-4499
FLOOR SYSTEMS:	Hambro Joist Systems 416-674-8031
ROOF JOISTS:	Canam Group 1-800-463-1582

For multiple room/lodging requirements, steel is lightweight, easier to manage, requires less time to erect, does not support combustion and is totally recyclable when compared to market alternatives and, it results in less on site clutter.

"One of the outstanding features is a protruding entrance canopy, extending over an existing building, which offers a visually appealing curved steel profile."

Dan Finelli, Project Design Engineer, Finelli Engineering Inc.

Light steel framing is a proven technology which reflects the superior strength and consistency of steel. Steel, being inorganic, does not support the growth of mould nor does it give off gas, thus contributing to excellent indoor air quality.

WALL SPECIFICATIONS OF THE TOLLENDALE PROJECT:

- The first floor load bearing interior and exterior walls are
  152.4mm (6") wide studs, 1.9mm (.075") thick, 412.3m (1,353 lin. ft.)
  Stud designation is 600S162-68 at 406mm (16") o.c.
  Wall height is 3.5m (11' 6").

- The second floor load bearing interior and exterior walls are
  152.4mm (6") wide studs, 1.52mm (.060") thick, 739m (2,425 lin. ft.)
  Stud designation is 600S162-54 at 406mm (16") o.c.
  Wall height is 3.5m (11' 6").

- The third floor load bearing interior and exterior walls are
  152.4mm (6") wide studs 1.22mm (.048") thick, 712m (2,336 lin. ft.)
  Stud designation is 600S162-43 at 406mm (16") o.c.
  Wall height is 3.53m (11' 6.75").
  Actual stud wall size is 406mm (6") wide.

Cold formed steel wall assemblies are lightweight, strong, fire resistant and easy to manoeuvre and they allow for the structure to be closed in more quickly than competing materials.

ArcelorMittal makes major investment in Hamilton Dofasco operation

A $100 million investment that began last year to improve Dofasco's primary steel manufacturing process as well as improving its environmental performance is being matched this year with a $150 million upgrade to the company's galvanizing and Galvalume coating operation.

The $100 Million Primary Optimization Program, which began last year, will allow Dofasco to produce more steel using less energy with a lower environmental footprint.

This year's investment of $150 million in upgrades to the galvanizing and Galvalume operations will see two old galvanizing lines shut down to be replaced by one state-of-the-art facility and one completely refurbished line. "This will greatly enhance our ability to make advanced high-strength steels that are demanded." said Dofasco Vice President of Technology and Continuous Improvement, Sean Donnelly. Donnelly also noted, "The parent company is willing to invest its money in Hamilton because we have a track record of implementing upgrades like these, on time and on budget."

New Galvalume capability:

- Produce 236,000 tonnes of Galvalume in widths up to 1538mm (60.5")
- Best in class product features
- Target first time prime Galvalume is May, 2012
- Servicing construction and service centre sectors
- Gauge range .25mm – 2.3mm (.0098" – .091")
- Width range 610mm – 1537mm (24" – 60.5")
- Metallic coating AZM001 – AZM210
- Galvalume Plus (Acrylic) and passivation treatment
- Strip cleaner to provide optimum surface quality
- This line will include furnace modifications, new coating pot equipment and strip tension control for high quality coating appearance and coating weight control
- In-line surface conditioning and tension levelling for high quality surface and flatness.

New Galvanizing capability:

- New heavy gauge galvanizing line
- Target first time prime is March 8, 2013
- 700,000 ton throughput (averaging 92.4TPOH)
- 1mm – 4.3mm (.040" – .168")
- 610mm – 1651mm (24" – 65")
- Galvaneal or Galvanize
- Coating 30g/m^2 – 375g/m^2 per side
- Tempering/Tension Levelling/Passivation
- Construction and Auto (structure and semi exposed)

Steel for green building solutions

As society mobilizes to reduce our ecological footprint, pressure is building up on the construction industry to increase its contribution to environmental sustainability. And for good reason, since it has been calculated that by 2050, energy savings in construction could easily have a greater impact on global CO_2 emissions than the combined environmental efforts of the entire transport sector. As a major supplier, ArcelorMittal is determined to play a key role in the 'green revolution' in the building industry.

Over the years, ArcelorMittal has continued to reduce the ecological impact of its steel manufacturing processes by drastically restricting waste generation, water use, greenhouse gas emissions and energy use. For example, ArcelorMittal has dropped its CO_2 emissions by more than 20% since 1990.

ArcelorMittal is making a substantial contribution to the development of breakthrough technologies designed to reduce CO_2 emissions from steelmaking by 30-70% by 2050.

Focusing on the use phase of buildings

The amount of energy required for lighting, heating and air conditioning a building over time far exceeds the energy used to build it. That is why ArcelorMittal is now concentrating on new technical solutions for reducing energy use over a building's lifetime.

A high proportion of energy use is devoted to heat control, by artificially heating or cooling the building. The combination of a steel structure with insulation drastically reduces energy losses. Combined with double skin systems and/or sandwich panels with pre-painted technology, it is possible to create a thermally efficient envelope, meeting the strictest energy standards. In addition, the outstanding air tightness of steel cladding and roofing systems eliminates air leakage that contributes to energy waste.

Steel makes it much easier to adapt buildings to new and innovative uses. A steel building characterized by the absence of load bearing walls is intrinsically more versatile and flexible than other types of structure. With its prefabricated, lightweight and fast-to-erect components, steel construction means buildings can easily be updated to new construction standards. Steel gives buildings a longer, healthier life. In other words: it helps the construction industry to pursue sustainability.

Cox Communications Distribution Center Topeka, Kansas

El Dorado architects of Kansas City designed a distribution centre to fit within the parameters of the owner's renewed lease terms. An additional constraint was the budget: the architects were given the challenge to work with $80 per square foot.

To work within their limited budget, the architects chose a pre-engineered metal building system for the 854.7m² (9,200 sq. ft.) distribution centre. This included a warehouse, equipment checkout, restroom and a loading dock.

WEST ELEVATION

An energy efficient design was important as well. A soaring cantilever shades the south metal wall system and provides shelter for the loading dock. A clerestory window allows indirect south light into the warehouse. The louvered vents of the north and south façades activate a convection cooling system, allowing outside air to enter the warehouse at floor level.

CLIENT: Henderson Developments Inc.

ARCHITECT:
El Dorado Architects 816-474-3838

STEEL BUILDING ENGINEERING:
Steelmaster USA 800-341-7007

GENERAL CONTRACTOR:
Kelly Construction Company 785-235-6040

ROOFING SYSTEM:
VP Buildings, Inc. 209-667-4951

CLADDING:
Firestone Metal Products 800-426-7737

MATERIAL:
Unaclad 601 Series Corrugated Galvalume

PHOTOGRAPHY: Mike Sinclair

Kejick Bay School, Ontario

The $2.5-million 900m² (9,685 sq. ft.) Kejick Bay School was created for this isolated First Nation community in northwestern Ontario. It was based on the communities' dreams for a representation of the loon and the medicine wheel. The final design illustrates the bird in flight with the two classroom 'wings' arching around the entrance circle and the library area as the body. The soaring entrance and stepping classrooms add dynamic movement to the design.

A circle of poles completes the form of the building and creates the ceremonial entrance to the facility. The building was designed with brick exterior and interior walls, a prepainted steel roof and a timber pole and glulam structural system supporting a wood deck.

ARCHITECT: Prairie Architects Inc. 204-956-0938

STEEL ROOF SUPPLIER: Flynn Canada 204-987-7444

GENERAL CONTRACTOR:
NDL Contractors 204-255-7300

Red Deer Recreation Centre, Alberta

In 2007, the Recreation Centre underwent a major renovation project. The renovation allowed the City to renew the building's space and appearance using environmentally-friendly design techniques and products, upgrade operating systems and provide energy efficiencies. The cladding on the project was supplied by Roll Form Group.

Entrance to the Recreation Centre with the Curve Clad profile in .61mm (.0239") prepainted Galvalume Slate Blue QC8260 and wall cladding in .19mm (.75") corrugated profile coloured Tile Red QC 8259.

Close-up showing the .61mm (.0239") prepainted Galvalume Curve Clad wall cladding.

Casa Buna – Steel House Moineşti, Romania

Casa Buna is a model house for antiseismic, low cost and energy-efficient residential building in Romania, constructed entirely with lightweight steel frame construction. This project was financed by the ArcelorMittal Foundation in collaboration with the NGO Habitat for Humanity.

The construction principle is simple and makes use of modern and traditional products. It is designed so as to be extrapolable, transposable and also appropriate. Limited number of components facilitate easy assembly and the simple plan allows it to be assembled by non-professionals.

The frame structure is made of 1.5mm (.059") lightweight galvanized cold-formed steel framing mounted on a 60 cm (24") conventional frame.

In this part of Romania, buildings must be able to withstand earthquakes measuring 7 to 8 on the Richter scale. The bracing is provided by St. Andrew's cross. Furthermore, the continental climate, characterized by abundant snowfall in winter, must be taken into account when calculating the dimensions of the structural framing.

The model has been designed for affordability and energy efficiency and carefully assessed to ensure family comfort and adequate living space. It is both earthquake- and hurricane-resistant and complies with European fire resistance standards. As well, all house elements are easily transportable as a "flat pack".

Edited from the text by: Eve Jouannais for ArcelorMittal's Constructalia. Photographs and designs: © LSK–Habitat for Humanity.

DESIGN AND CONSTRUCTION TEAM

ARCHITECT: SAM IMPEX S.R.L.

CLIENT:
ArcelorMittal Foundation & Habitat for Humanity

ENGINEERING FIRM:
COBIM & ArcelorMittal R&D Liège

CONSTRUCTION:
Habitat for Humanity volunteers with technical assistance by ArcelorMittal

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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1039 South Bay Road
Kilworthy, ON P0E 1G0
Or email:
davidfollis@vianet.ca

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