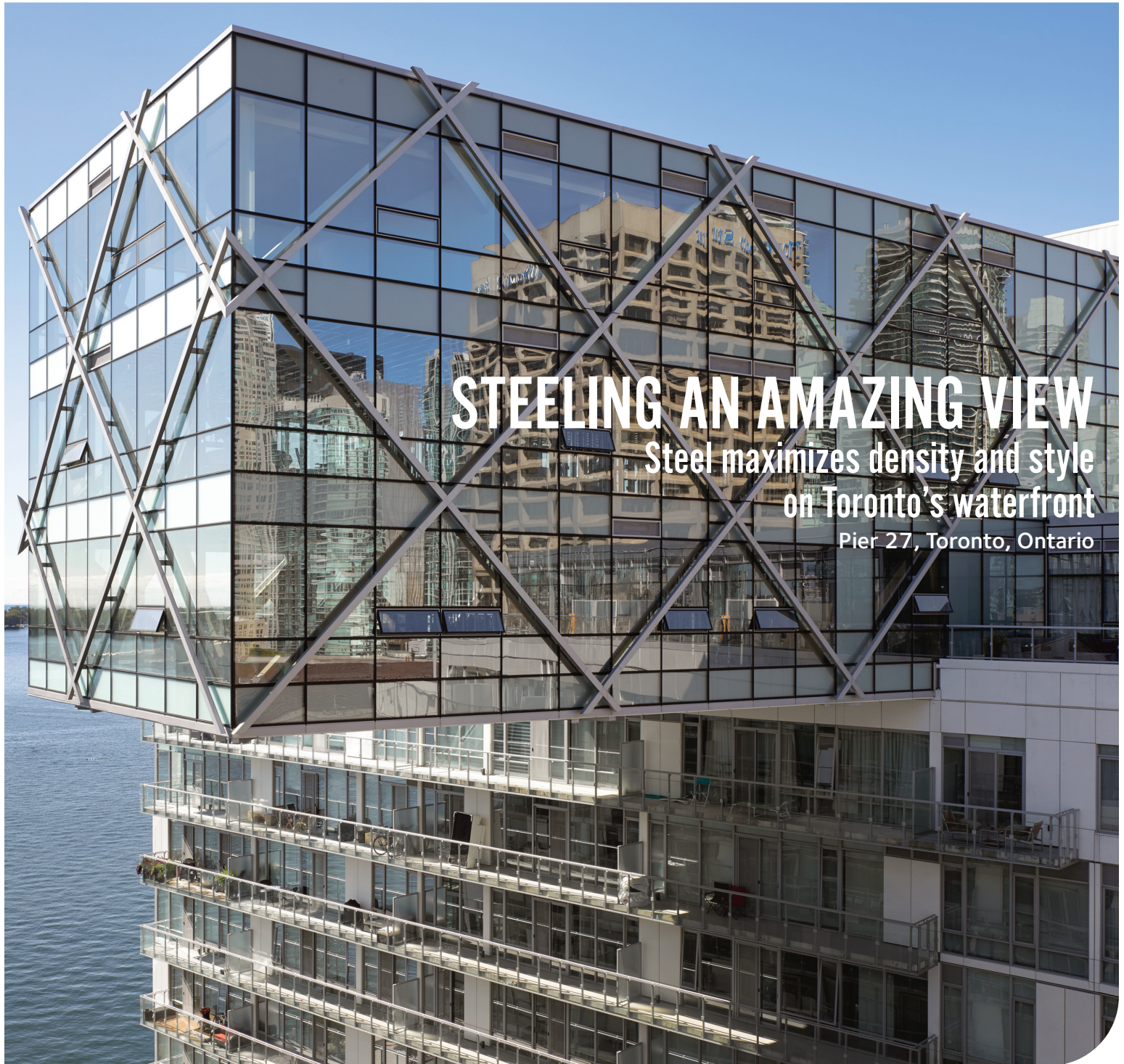


STEEL DESIGN

SOUND INFRASTRUCTURE

ISSUE ONE, VOLUME 52
SPRING 2020



STEELING AN AMAZING VIEW

Steel maximizes density and style
on Toronto's waterfront

Pier 27, Toronto, Ontario

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BRANDON AIRPORT

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E-PASSIVATION

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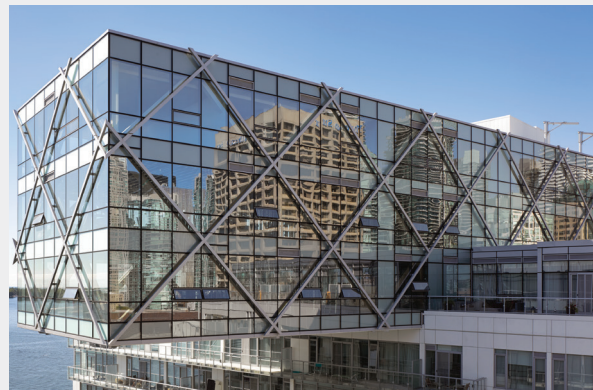
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COVER PHOTOGRAPH
Pier 27, Toronto
by Ben Studio

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**“We use less concrete, less materials, less reinforcing materials, less labour,” he explains.
“This is the evolution of where this type of construction needs to go.”**

Structural engineer Raymond Van Groll on Seasons Retirement Residence construction in Cambridge, Ontario.
See full article on page 17.



STEELING AN AMAZING VIEW

Maximizing density with steel creates panoramic vistas to Lake Ontario

Pier 27, Toronto, Ontario

Photo: Ben Studio

Pier 27 is a multi-phase, large-scale condo development on Queens Quay, in Toronto's central waterfront. As one of the last undeveloped lakefront parcels in the downtown core, Pier 27 is an important component in the revitalization of the Toronto shoreline. The massive undertaking will offer residential and commercial spaces that celebrate life on the shores of Lake Ontario.

Steel Design Magazine caught up with Pia Heine, the project architect, to discuss the construction and design process.

The development is located on a former marine warehouse site. The architects honoured the history of the site by designing buildings that interpret the historical industrial uses on the site.

A goal of Heine and the Pier 27 design team was to demonstrate that increasing density can align with the objectives of waterfront revitalization. The architects worked to create iconic architecture that enriches the public realm and raises the bar for future development on the lake.

"The site is being built out sequentially in three phases," said Heine. "Phase one was completed by 2017 – that's the most southerly buildings, located right by the water.

The four articulated pier buildings are arranged in pairs on a north-south axis. Each pair of piers is connected by a three-storey cantilevered 'bridge' that evokes the gantries used to load and off-load ships in Toronto Harbour. "The bridges are basically enormous steel trusses that cantilever off each end of the piers," explained Heine.

By using the bridges as density carriers, the architects were able to reduce the mass of the piers, enabling better views of Lake Ontario and pedestrian access to the public promenade that will run along the water's edge.

The bridges are a signature element in the design of Pier 27. While most of the buildings are constructed of concrete, the gantries use steel. All of the gantry units have views of the lake or the city.



Photo: Norm Li, architectsAlliance

Heine said that the approach to massing and form evolved from the original plan. "The property had already been re-zoned from industrial to residential development, but the proposed massing set out in the zoning blocked views of the lake from Queens Quay. Our four pier, or slab, buildings are oriented perpendicular to the shoreline so that they actually frame views down to the lake from Queens Quay."

To maximize the view, the piers also pivot slightly off the north-south axis on upper floors.

While the initial phase is completely residential, subsequent construction will be located closer to Queens Quay and the foot of Yonge Street and will include retail and a City of Toronto daycare at ground level.

Phase two of the project, now under construction, comprises a 35-storey residential tower anchored by a 12-storey base with space for retail tenants at grade and residential units on floors 2-12.

Marketed as The Tower at Pier 27, the building is located on the northwest corner of the site, where Queens Quay meets Yonge Street. It offers panoramic views of the city and the lake and will achieve occupancy in 2020.

For the outside of the building, the architects specified a white metal panel system that creates an impression of lightness appropriate to the waterfront setting. Extensive glazing on the north and south facades as well as the inside faces of the pier buildings allows maximum light to penetrate into the building, optimizes views for residents and gives pedestrians views through the building to the water.

The interior demising walls are framed in various dimensions explained Edward Verag of Cobell Drywall. "The size of the framing members differed from one floor to another due to different spans, finishes, designation and deflection criteria."

Sound transmission between individual dwelling units has been a long-standing issue for condominium and apartment residents and owners. Most sound energy is transmitted across the surfaces abutting the separating assembly, but a significant percentage of noise can also be transmitted through the junctions where these surfaces join the separating assembly. Occupants of the

OPPOSITE PAGE TOP:

This view from the lake shows the four slender pier, or slab, buildings oriented perpendicular to the shoreline so that they frame views down to the lake from Queens Quay. The three-storey gantry elements bridge each pair of piers.

THIS PAGE:

The 35-storey residential tower, marketed as the "Tower at Pier 27." The Tower is anchored by a 12-storey base with retail at grade and residential units in floors 2-12.



adjacent room can actually hear a combination of the direct and flanking sound transmissions.

The National Building Code of Canada (NBCC) has responded to the demand for improved acoustic separation by introducing a new measure of sound transmission, the Apparent Sound Transmission Class (ASTC). The previous method to assess acoustic performance only considered the direct sound transmission though the wall or floor (STC) and ignored any flanking transmissions.

The 2015 edition of NBCC has addressed this situation by requiring ASTC ratings of assemblies. The North American sheet steel industry has completed a multi-year research program at the National Research Council of Canada in Ottawa measuring the direct and flanking sound transmission in light steel frame construction. The results are accessible through NRC’s web-based acoustic prediction tool, “sound PATHS.”

At Pier 27, sound mitigation was driven by the project’s acoustic engineer. Between units, partition walls (drywall assembly) meet the Ontario Building Code requirements for STC ratings. Floor underlayment is also used to dampen sound transmission.

In addition to mitigating sound between units, the designers also considered sound transmission from outside the building, specifically the Redpath Sugar refining plant immediately to the east of the site. The point tower was rotated 20 degrees to create a buffer for noise from the refinery. ■

SPECS:

LIGHT STEEL FRAMING INSTALLED

Light gauge steel studs and track
G40 galvanized - 0.457mm (.018”)–15.875mm, 63.5mm, 92.075mm (1-5/8”, 2-1/2” and 3-5/8”)
Heavy gauge steel stud & track
G60 galvanized - 152.4mm (6”) x 1.22mm (.048”)

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Light Steel Framing Supplier
Bailey Metal Products Limited, 905-248-3536



VERSATILITY LEADS TO EFFICIENCY

Using pre-painted Z275 (G90) galvanized insulated steel panels provides sustainability, energy efficiency along with durability

SMS Equipment Inc- Laval, Quebec

When SMS Equipment was constructing a new facility just outside Laval, Quebec, the company was looking for a distinctive structure that reflected its business.

SMS is the leading Canadian heavy machinery distributor for the construction, forestry, mining and utility industries and is Canada’s largest Komatsu dealer.

The new building had to house offices, warehouses, workshops and a client service centre for consolidated staff from eastern regional offices along with Dorval and Mirabel branches. It also had to include a garage and big open yard for Komatsu equipment.

The architects conceived a contemporary, rectilinear building in one tonality of colours – shades of light and dark grey – punctuated with Komatsu’s recognizable trademark yellow. “We wanted to design a discreet building with the main colour highlighting the entrance with a double-height element,” said project architect, Normand Côté of GKC Architects in Montreal.

Completed in 2017, the two-storey, 5,481m² (59,000 sq ft), L-shaped building is a conventional steel frame structure with galvanized steel deck. Its entire envelope is clad in pre-painted insulated metal panels (IMP) supplied by Norbec Inc. and installed by Distribution Styro.

ABOVE:

The superior insulating properties, increased spanning capabilities and single-step installation make Norbec panels efficient and cost-effective, particularly when compared to other wall assemblies.



The architects chose these high-performance Norex panels for a variety of reasons, speed and ease of installation among them. “Because of a tight construction schedule through winter, the pre-finished panel installation facilitated sequencing and allowed us to quickly enclose the building with a single trade,” said Côté.

The panels come as a single unit, incorporating a pre-painted Z275 (G90) galvanized interior liner, factory-applied air and vapor shield, insulated foam core and finished exterior surface of pre-painted Z275 (G90) galvanized steel. Having the interior, exterior and insulation layers all complete at installation enabled interior trades to start work immediately after the building elevations were complete.

Norbec’s insulated steel Norex panels are versatile, which makes it easy to coordinate them with other products – such as the yellow aluminum panel used for the main entrance.

IMPs are available in various profiles, colours and gauges for different applications. Norbec’s profiles (striated, micro-ribbed, fluted or no profile) and finishes (smooth and embossed) are washable as well as weather and corrosion resistant, factors that must be considered when choosing materials that can withstand Quebec winters.

Norex panels are insulated with a polyurethane core, which offers unparalleled thermal performance. The 76.2mm (3 inch) thick panel has an R value of 7.27.



Norex-H is bent in factory to accommodate the corners of a building creating a seamless look. This procedure eliminates the need for finished moldings. This particular project was done in Norex-H (horizontal joints) as well as Norex-L (vertical joints). The use of contrasting colors and the windows create a coherent design. The micro-ribbed profile on the panel finishes gives a smooth effect from afar while adding structural integrity to the panels.

Using a panel with such a narrow profile allowed engineers to reduce the foundation wall thickness, resulting in significant budget savings. The steel structure was also minimized.

In addition to providing fire and rain protection, the panels resist wind and tears because of their exclusive anchoring system. The lightweight, rigid unit has exceptional spanning capacity.

“The core strength of the panel allows girt spacing to be 3.05m (10 feet) on centre, as opposed to 1.22m (4 feet) on centre as with typical metal panel,” said Distribution Styro’s Maxime Bergeron. As well, these steel panels with their even sheen resemble aluminum, without the hefty price tag.

The SMS building’s north and west elevations feature light and dark grey panels (Norex H) with strong horizontal reveals, while the remaining elevations are clad in light grey panels (Norex L) with vertical joints. A continuous dark grey horizontal band (Norex L) wraps the entire complex.

To provide a different aesthetic for the highway and public-facing facades, the IMP enclosure is clad with cement board coated with a light grey textured acrylic finish to resemble precast concrete, an appropriate material for SMS’s industry.

- ADVANTAGES OF NORBEC INSULATED STEEL PANELS:**
- Superior insulation – thermally efficient
 - Durability – maintain their appearance for years
 - Ease of installation – installed in one simple step
 - Design flexibility – versatile with a variety of colours and finishes
 - Available for both horizontal and vertical applications
 - High strength-to-weight ratio
 - Recyclable and reusable at the end of its service life

The architects designed the building elevations by creating architectural compositions of interlocking modules and aligned joints. “I think we were able to create a harmonious whole within a modular system, despite working with a predefined (‘restrictive’) panel width,” said Côté. The factory prefabricated modules ensure strict quality control.

Generous curtain wall and punched window openings bring light deep into the building. The white coating on the inside of the panels helps to distribute and reflect light around the interior, providing a general luminosity, particularly in the service garage where Komatsu equipment is maintained. The design of the facility enhances the safety and well-being for all employees.

The building recently received LEED® NC certification. Sustainable strategies include LED lighting, electric vehicle charging, 35 per cent use of local materials, white roof coating to reduce heat island effect, low VOCs and low-flow fixtures, which reduced water consumption by 73 per cent. The building’s energy use is reduced by 50 per cent as compared to ASHRAE 90.1, representing a savings of 1.5 million kWh per year.

“We were trying to be cost-effective without compromising on the aesthetic of the finished product,” explained Côté.

“With this architectural look we were trying to achieve a nice design with nice finishes while bringing engineering value to the building and being conscientious of our budget.” ■

NORBEC INC. INSULATED STEEL PANEL INFORMATION: NOREX® PANELS

Norex is a (polyurethane) polyisocyanurate core panel designed for highly efficient buildings. In addition to offering unparalleled thermal value, this panel provides fire and rain protection barriers as well as being wind and tear resistant because of its exclusive anchoring system when installed. This product is designed with an equalization compartment preventing water from being aspired inward therefore reducing the risk of penetration and moisture.

SPECS:

NOREX-L 42.5” INSULATED STEEL PANEL, WITH 3” POLYURETHANE INSULATION

Exterior Steel Panel .7239 mm (.0285”)
Colour: 17-1627 Bright Silver, 17-1626 Pewter, QC28229 Brown, QC9789 Rigel II Grey
Profile Silkline Plus (striated)

Interior Steel Panel .483mm (.019”)
Colour QC7973 White
Profile Silkline (striated)

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Roof Installer
Toiture Couture, 514-238-8310

Roof Supplier
Fransyl, 450-477-4423

Structural Steel
Structures Sim-Con Inc., 450-658-8514



Indaten™

Weathering steels blend strength and raw beauty

Weathering steels bring versatility, visual interest and innovative design to building exteriors. Used in facades or roof applications, weathering steels allow architecture and infrastructure to blend with natural and urban landscapes.

Like unprotected carbon steels, weathering steels will oxidize and corrode (rust) when exposed to outdoor environments and climate. However due to the unique chemistry, the corrosion rate of weathering steels is generally much lower than a typical carbon steel.

These steel building panels will satisfy the requirements of ASTM A606 Type 4 and can be shaped into a wide range of geometries, including roll formed and single sheet panels.

What are weathering steels?

Weathering steels offer improved atmospheric corrosion resistance thanks to the addition of copper during the steelmaking process. Additional alloying elements are included to increase the steel's tensile strength and formability. Weathering steels are classified as a type of high strength low alloy (HSLA) carbon steel. Flat rolled weathering steel characteristics are defined in the ASTM standard A606/A606M and supplied with no mill applied metallic or organic coatings.

Development of the patina

A unique aspect of weathering steels is how the exposed surface changes over time. The initial dark grey mill finish transitions to an orange patina in a matter of weeks. The patina continues to evolve, reaching a final dark brown colour after several years – dependent on local weather conditions. Its distinct brownish, non-uniform patina, with coarse texturing creates an innovative and unique aspect to building exteriors.

Usage considerations

For the best results weathering steels must be exposed to alternating wet/dry cycles, with no permanent wet or damp conditions. Weathering steels should not be in contact with stagnant water, constant humidity, sheltered damp locations, soil or covered by vegetation.

Aggressive atmospheres, such as coastal areas, should be avoided as the high concentrations of chlorides are detrimental to the patina layer and cause an increased rate of corrosion. Atmospheric pollution and industrial fumes, particularly sulfur dioxide, will also negatively affect the patina and increase the corrosion rate. As weathering steel ages, small amounts of corrosion (rust) are washed off by rainfall. The discharge diminishes over time, but never stops completely and can stain neighbouring material, such

as stone or concrete. Special consideration is needed to ensure that any discoloured rainwater is properly collected and directed away from exposed surfaces.

The patina is made up mainly of stable iron oxide which is not harmful to the environment, vegetation or wildlife. ■



Key benefits of Indaten™

Attractive, aesthetic appearance

- Authentic, natural colour
- Evolving patina over time
- Blends with natural and urban environments

Economic advantages

- No need to re-protect surface, no painting costs
- Minimal maintenance
- Structurally sound

Processing

- Easy to process with the same tools and equipment as structural steels
- No extra processing or equipment costs
- Can be formed into a variety of shapes for different applications

Sustainability

- 100% recyclable
- No additional corrosion protection needed, no repainting
- No volatile organic compounds (VOCs) emitted
- Reduced carbon footprint

Indaten™ supplied from ArcelorMittal Dofasco is produced as flat cold roll sheet in coil form.

In both new and refurbishment projects, weathering steels create an innovative and unique aspect. This versatile steel enhances exterior aesthetics.



Panels at installation



Panels after two months

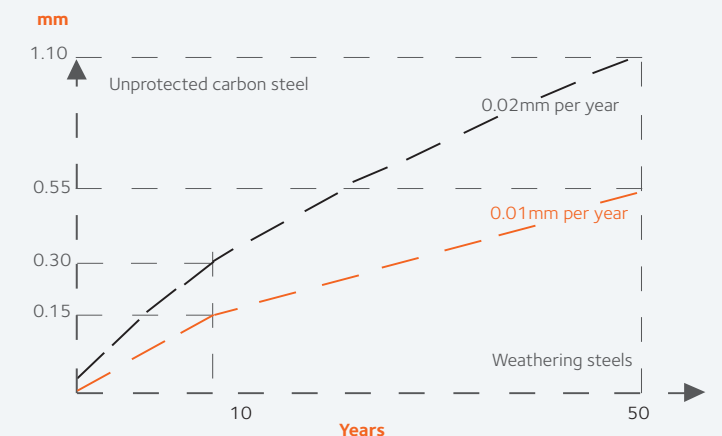


Panels after two years

Weathering steels exposed surface changes over time, transitioning from dark grey mill finish to an orange patina in a matter of weeks, continually evolving until reaching a final dark brown colour.

Weathering steel will integrate perfectly into both urban and natural environments.

Figure 1: Annual steel loss due to corrosion (in mm) measured in accordance with ISO 12944-2 for a C4 environment.



To learn more about Indaten™ contact
customer-inquiries.dofasco@arcelormittal.com
 or call 1-800-816-6333



Photo: Lindsay Reid Photography

CELEBRATING THE PRAIRIE LANDSCAPE

Steel blends old and new structures, while providing speed and cost-savings

Brandon Municipal Airport, Manitoba

The Brandon Municipal Airport needed a major upgrade. First constructed in the 1970s, the building was out-of-date and small. Prairie Architects, Inc., the firm that was contracted for the project, faced a challenge: the airport needed to remain open and operational while a new expansion and overhaul of existing facilities was completed.

ABOVE:

The durability and speed of installing steel cladding is an advantage, and as a result was an integral part of keeping costs manageable. Steel was used for the structural systems, cladding, roof deck, and joists. Light steel studs were used as infill on the walls.

"The original airport was largely underused, but Brandon had a major commercial airline that was going to be using the facility. It needed to be upgraded to modern standards," recalled Damien Fenez, principal architect. "The flights began before the construction began."

The \$8.4 million project was completed between 2014-2017, in three phases, to minimize disruption to the airport's customers, crew and staff.

Phase one entailed construction of an 864 square metre addition to the east of the existing 500 square metre terminal. In phase two, the original terminal was renovated. The final phase of construction joined the new and old sections, an operation which was accomplished in one night so as to have zero impact on daily operations.



Photo: Lindsay Reid Photography

"Airports are very process-driven facilities. The expansion had to be cohesive with the old terminal in terms of materials and design"

ABOVE:

The City of Brandon commissioned Prairie Architects Inc. for the expansion and redevelopment of the aging 1970s municipal airport in order to accommodate larger airline carriers and modern passenger check-in, screening, boarding, luggage and arrival services. The multi-phased approach maintained seamless daily operation of the existing terminal during construction.

"Airports are very process-driven facilities. The expansion had to be cohesive with the old terminal in terms of materials and design," Fenez said. "We wanted to capitalize on some existing buildings that were there and refresh the building in an economical way."

Steel was integral to managing the costs and was used for the structural systems, cladding, roof deck and joists. Steel frame posts and beams with light steel studs were used as infill, with a combination of glued laminated timber in the arrivals hall and OWSJ and metal deck roof everywhere else. The steel studs were 0.91 mm zinc-coated (galvanized), while all interior-exposed steel columns were powder coated. Exterior columns were hot dipped, galvanized and powder coated.

More than 95 per cent of the original walls, floors and roof of the existing terminal were maintained. Fenez and his team ensured that the old and new sections were unified aesthetically through finishes and features.

Black metal cladding and fascia were strong visual elements in the original building design. By using the same steel for the sloped roof finish and the building's face cladding, Fenez and his team were able to achieve a seamless transition from the new addition to the existing terminal.

Another hallmark of the original terminal is a series of round porthole style windows. At various sizes and heights, they bubble along the wall. The newly constructed terminal sports its own bubbles. Glowing circles float on the wall at one end of the baggage claim area and circular light fixtures seem to hover above the carousel.

Fenez highlights the windows when discussing the cladding. "We've been pleased with the performance of the pre-painted steel cladding, its rapid installation and clean finish. It also met our expectations with challenging elements, such as the round windows on the airport. The durability and speed of installing steel cladding is an advantage when working in harsh conditions."

The most stunning feature of the Brandon Municipal Airport is its setting. Located approximately two kilometers north of the City of Brandon, the airport is surrounded by open prairie.

“Our design for the airport was intended to celebrate the vastness of the prairie landscape,” explains Fenez.

As people enter the building and check in, the spaces are smaller with lower ceilings, creating a slight experience of compression. Then the terminal opens to the view, expanding to a large curtain wall of windows.

“We used south-facing glass for natural light, focusing on the prairie horizon, which is a very dramatic focal point as you enter the building,” Fenez said. “The building flairs out toward the prairie side, catching the vista of the landscape.”

The Brandon Municipal Airport was completed in 2017 and has gotten rave reviews. It has also established a construction technique and style for Prairie Architects Inc. which has used similar standing seam vertical steel cladding on some of its other projects—and is now adapting this style to the airport’s garage and office. ■



Photo: Lindsay Reid Photography



SPECS:

Cladding
0.76mm (.0299”) pre-painted G90 galvanized, 406mm (16”) wide panel, Profile RR7

Paint System
Perspectra Plus- coloured Black QC18262

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Cladding Roll Formed by
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Photo: Ami3co Design Build

ComSlab® long span floor system prior to concrete being poured showing both wind bearing cold formed steel sections (CFS) and axial-load bearing CFS.

A NEW SEASON OF STEEL CONSTRUCTION

Light steel frame construction
delivers precision, efficiency and savings

Seasons Retirement Residence, Cambridge, Ontario

Located in a heritage neighbourhood in Cambridge, Ontario, the new Seasons retirement residence looks like it belongs. Stone and brick clad the bottom two floors, reflecting the architecture and scale of the street. Above, the tower that rises from the podium is a lighter, more modern stucco. But don your x-ray glasses to look beyond the exterior cladding and you’ll see the structure inside the eight-storey building is even more modern—light steel frame construction (LSF).

Light gauge steel is proving to be a logical and efficient way to build many projects. The ease of assembling a ready-made structure combined with the significant savings this approach allows makes light steel frame construction a no-brainer.

Structural engineer Raymond Van Groll explained that Seasons Cambridge was originally intended to be an all concrete structure, but his firm redesigned it to LSF. The decision to use a light steel framing system was simple for Van Groll—LSF offers a level of precision, efficiency and cost-savings that is unmatched.



The building’s architects, **Glos Associates**, also agreed that LSF was the way to go. “The light steel frame is a popular system nowadays. We can use it to erect a building quickly by panelizing walls in a plant before they go up on-site, and then drop them in place with a crane,” said **Shane Mitchell**, the architect on the project.

The redesign involved making the transfer floor a combination of steel and concrete framing and then switching to an all light gauge steel system with concrete cores for stability. Floors three to eight are strictly light steel framing. For the interior, the partition walls between units are load bearing, while the exterior walls are both load and wind bearing.

The load-bearing steel stud walls on the outside were made as pre-finished panels including the exterior stucco finish. “The stucco system is pre-installed onto the panel so it goes up like a Lego [block],” said **Van Groll**. “We’re putting the load-bearing walls on the inside, they put the floors on and then they enclose the outside with a similar load-bearing element that’s actually finished stucco wall. Some were a finished faux-brick.”

A-LINX Building Technologies, a manufacturer of light framed steel buildings, was selected for the Seasons build. “This typology of building adapts itself perfectly for stacked units,” said **Dino Fantin**, the project’s construction manager. “It’s perfect for student residences, retirement homes, hotels, condos, etc. because they’re all smaller... footprints that move up vertically.”

There are four key requirements for mid-rise light-frame steel construction: structural, fire, thermal and acoustics. Each of these requirements is addressed under existing building codes, but these codes are constantly evolving.

Van Groll highlights that **ArcelorMittal Dofasco** has been supporting the light gauge industry for years. The company has been focused not only on ensuring the materials it manufactures meet or exceed building standards, but it has also been involved in the evolution of building codes as technology advances.

Fantin is confident that LSF construction will become far more popular as time goes on. “With light steel framing and pre-fabricated panels, we build as much of the building as we can off-site. This is all the light gauge interior steel walls and pre-fabricated exterior panels with the sheeting on it. They are built in the shop so you have 100 per cent quality assurance.”

For **Van Groll**, LSF represents a new stage of engineering. He likens LSF construction to how cars are built on assembly lines. The controlled environment of the plant allows for a level of precision that cannot be achieved when building on-site. And cars roll off the line fully assembled, not in pieces that have to be put together elsewhere.

“We use less concrete, less materials, less reinforcing materials, less labour,” he explains. “This is the evolution of where this type of construction needs to go.” ■



ABOVE:
The building envelope is made up of prefabricated and prefinished EIFS (exterior insulation finishing system) and #1 panels using steel stud frame backup.

LEFT:
Prefabricated EIFS wall panels, exposed interior axial-load bearing cold formed steel sections (CFS) wall framing and in the background the composite floor (concrete over the ComSlab floor system).

- SPECS:**
- COATED STEEL PRODUCTS**
- Cold Formed Steel Sections used on floors 3 through 8 of the superstructure
- Axial-Load Bearing Cold-Formed Steel Sections
 600S162-43 152.4mm (6") Structural Steel Stud - Web 41.4mm (1-5/8"), Flange 43mil (1.70").
- Axial-Load Bearing Cold-Formed Steel Sections
 Sizes vary by floor and range from 600S250-97 152.4mm (6") Structural Steel Stud -Web 63.5mm (2-1/2"), Flange 97mil (3.8") lowest floor level to 600S162-54 152.4mm (6") Structural Steel Stud Web 41.4mm (1-5/8"), Flange 54mil (2-1/4") on the highest floor level.
- COMSLAB Steel Deck Floor System
 1.22mm (.048") Z275 (G90) galvanized, 11,148m² (120,000 sq ft).
- DESIGN AND CONSTRUCTION TEAM**
- Owner
Seasons Retirement Residences, Oakville, ON
- Architect
Glos Associates Inc., Windsor, ON 519-966-6750
- Structural Engineer
Atkins + Van Groll Consulting Engineers, North York, ON 416-489-7888 X237
- Construction Manager
Ami3co Design Build, Windsor, ON 519-737-1577
- Structural Subcontractor
A-LINX Building Technologies, Windsor, ON, 519-564-297
- EIFS Fabricator
Durabond Products Inc., Toronto, ON 416-759-4133
- Light Steel Framing Supplier
Bailey Metal Products Limited, 1-600-668-2154
- ComSlab Floor System Supplier
Bailey Metal Products Limited, 1-800-668-2154

E-Passivation™

New process provides environmentally responsible protection against storage stain

Steel and other metals are in a constant battle with their environments. Rust, tarnish, corrosion, oxidization are ongoing enemies that impact steel's integrity and appearance.

With galvanized sheet products, a discoloured white, grey or black corrosion stain on the surface can occur with the presence of moisture in coils or stacked sheets/parts.

To combat the potential for surface or storage stain, a chemical treatment or passivation film is applied to the galvanized surface to reduce its chemical reactivity.

ArcelorMittal has developed E-Passivation™, an environmentally responsible, hexavalent chromium-free passivation or temporary protection surface treatment.

This passivation is applied by means of a continuous process on several of ArcelorMittal's hot dip metallic coating lines in North America.

This technique provides temporary protection of galvanized, galvalume and Galvalume™ steel coils for a wide range of industry applications, including domestic appliances, IT electronic components, electrical boxes and other metallic parts. E-Passivation™ provides corrosion protection during normal handling, transportation and storage.

E-Passivation™ complies with the European directives restricting the use of hazardous substances: Restriction of use of Hazardous Substances (RoHS) for the electrical and electronic equipment market and the End of Life Vehicle (ELV) directive.

A level of care similar to that of traditional passivation is recommended in handling and inventory practices to ensure that coils are not exposed to moisture or a humid environment.

E-passivated coils should not be interchanged or mixed with standard passivated coils for exterior use, as they may show visual differences during installation and after weathering, though the variation will not impact the metal's performance. For example, do not mix cladding from standard and RoHS compliant passivation on a single building/job site.

In a condensing humidity cabinet test according to ASTM D4585, galvanized and Galvalume™ showed not more than five per cent rust on the surface of the metallic coating after 500 hours. In an in-house resistance to rust in wet stack test conducted by



ArcelorMittal samples taken from within the stack did not have more than five per cent rust on the surface of the metallic coating after six weeks.

Currently, E-Passivation™ is available on commercial, structural and HSLA grades, thicknesses between 0.33-4.3mm, and widths 600-1,829mm. Not all grade/thickness/width combinations are possible, and customers are encouraged to contact the company for information about availability.

Development work is on-going to offer E-Passivation™ for Galvalume Plus™ and LustreLok™.

With the wide range of applications for metallic coated steels, E-Passivation™ is an important tool for manufacturers to ensure quality and compliance. ■



“We are pleased to offer E-Passivation™ as a significant environmental and health and safety improvement on our coated products, and to meet our customers’ needs for a legislation compliant passivation,” says Karen Bell.

Overview of the performance of E-Passivation™ on hot dip galvanized, Galvalume™ and galvalume coated steels

Protection during normal handling, transport and storage applies to galvanized, Galvalume™	Condensing Humidity Cabinet ⁽¹⁾	500 hours
Protection during normal handling, transport and storage applies to galvanized, Galvalume™, galvalume	Wet Stack Test ⁽²⁾⁽³⁾	6 weeks

(1) Resistance to rust in condensing humidity cabinet test according to ASTM D4585 (Evaluation: product should not have more than 5% rust on the surface of the metallic coating after 240 hours)

(2) Resistance to rust in wet stack test per ArcelorMittal in-house test (Evaluation: samples taken from within the stack should not have more than 5% rust on the surface of the metallic coating after 3 weeks)

(3) Protection during normal handling, transport and storage

Product availability (steel grades, coating weights and sizes)

	Steel Grades	Thickness (mm)	Width (mm)	Metallic Coating
Hot Dip Galvanized Steel + E-Passivation™	Commercial, Structural & HSLA	0.33 (0.013") - 4.3 (0.168")	600 (24") - 1829 (72")	Z90 (G30), Z120 (G40), Z180 (G60), Z275 (G90), Z350 (G115), Z450 (G150), Z610 (G200) and Z720 (G235)
Galvalume Steel + E-Passivation™				ZF75 (GA25) up to ZF120 (GA40)
Galvalume™ Steel + E-Passivation™				AZM100 (AZ30), AZM150(AZ50), AZM165(AZ55), AZM180(AZ60), and AZM210(AZ70)

Want a steel expert on your team?

Visit our Architect's Corner website - it's like having our steel experts on your team and at the table. You'll find product information, specifications, building information modelling and all the steel resources you need to help bring your building design to life. Plus, we are just a phone call away to talk through your need!

Visit and bookmark:

dofasco.arcelormittal.com/what-we-do/architects-corner.aspx

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