
SPECIAL FEATURE
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Orangutans to climb higher at Toronto zoo thanks to steel

DAN O'REILLY
CORRESPONDENT

National and provincial building codes do not include clauses dealing with orangutan climbing poles which highlights one of the many design and planning complexities of a new $9.9 million orangutan exhibit at the Toronto Zoo.

Construction by general contractor Midome Construction started in July on this project with an extensive steel component.

Designed by Zeidler Architecture Inc. in association with Jones & Jones Architects & Landscape Architects Ltd, a firm with a specialty in zoo design, the exhibit will include two outdoor habitats housing a total of eight cantilevered HSS steel poles with three 25-mm-thick steel cables extending from pole to pole for orangutans to walk/climb over the zoo visitors.

There will also be slight modification to the indoor existing Orangutan holding/exhibit areas within the zoo's Indo-Malaya Pavilion

The Orangutan Outdoor Exhibit will be a modern facility that provides outdoor access that has never before been available before to the zoo's six resident orangutans, says zoo project manager Ben Knoop.

"Orangutans are arboreal or tree dwelling creatures" says Knoop, explaining that, in this setting, the steel poles will be the trees.

There are also primarily solitary animals that don't live in large groups — which is the reason Habitat One will have two separate spaces, allowing the orangutans to comfortably distance themselves, while seeing the others. To maintain that social distance, not all the poles will be climbing ones, but there will be resting/landing spots allowing them to return from where they started, he says.

Orangutans have been at the Toronto Zoo since it opened in 1974. At that time, the exhibit was considered state-of-the-art. Since then a lot has been learned about them including their need to climb higher and experience the outdoors, says Knoop, in explaining the rationale for the exhibit.

A considerable amount of research and input from the various partners including the Zoo's animal experts was invested into the project. After an initial brainstorming session, it took approximately six months to refine initial concepts to the point that detailed design could commence with the whole process taking about a year, says Knoop.

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Pictured is a rendering of the viewing shelter of the orangutan forest exhibit at the Toronto Zoo. The project's design team and zoo management worked closely together to determine maximum steel cable sag and pole deflection.

"There aren't any Ontario Building Code (OBC) requirements to determine how much load to put on a cable structure supporting an orangutan," says Nathan Bissell, a project engineer with Read Jones Christoffersen Ltd. in underlining the structural design issues that had to be resolved.

"Nor are there any OBC deflection requirements for the sag in the cable, or the deflection at the top of the poles supporting the cable."

To determine the loading requirements, RJC relied on the Toronto Zoo management to provide answers on the orangutans' weight and how many could be allowed on the cables at any one time.

"We designed the cables to support the most critical scenario of a male, female, and baby orangutan being on the cable at the same time — approximately 250 kilograms maximum."

Then it was case of using engineering judgement to determine maximum cable sag and pole deflection, says Bissell, admitting there was lot of "gut feeling" involved.

While the cables have to deflect somewhat, it was critical to maintain a 10.7-metre-height distance from spectators who will be watching the orangutans. As there won't be any netting, the height distance is intended to protect both humans and orangutans, who might be tempted to jump on to trees or other objects.

"They're intelligent enough to know not to jump from such a height."

To be supported on 850mm diameter by 50mm thick stiffened base plates, the six poles to be erected in Habitat One will have a height of 13 metres, with 610mm diameters and 59.5mm thick walls. Reaching a height of 20 metres, the two poles slated for Habitat Two will have 915mm diameters with 25mm thick walls and will be supported on 1170 diameter x 50mm thick stiffened base plates, says Bissell.

Most of the poles will be on single caissons, but a caisson and bridge plate system will have to be used for one in area of unstable slope stabilization, he points out.

There are other interesting steel elements as well, including a mesh-clad chute or bridge which permit the orangutans to walk from the interior pavilion to Habitat Two and back again. A similar, smaller chute will be built at the opposite end of the pavilion allowing the orangutans to enter Habitat One, says Bissell.

In addition to loading and sag calculations, another issue that had to be resolved before construction could proceed was how the poles would be manufactured and which firm would do. An Alberta firm was eventually obtained.

"This is not something you call your local fabricator for," says Bissell.

Besides the climbing poles, the exhibit will have other features including a small research/observatory station, as well as interpretive panels to provide a "fun but educational experience for visitors," says Knoop, the Zoo project manager.

Because of the destruction of the rainforests in Indonesia through human activity, such as the creation of palm plantations, orangutans are a critically endangered species. One of the messages the Zoo intends to promote is the need for consumers to purchase only sustainable-sourced palm oil, says Knoop.

Construction of the exhibit will be completed sometime in 2021, but an opening date hasn't been determined, he says.

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Orangutans have been at the Toronto Zoo since 1974. At that time, their exhibit was considered state-of-the-art. Since then it has been observed they need to climb higher and experience the outdoors more often.

Revival formula for university prep school in Toronto includes steel

DAN O'REILLY
CORRESPONDENT

M&G STEEL LIMITED

A 500-tonne crane was used to lift and install the room beams for the roof of a below-grade gymnasium for the expanded University of Toronto Schools. Each beam weighs 10 tonnes and the centre beam weighs about 15 tonnes.

In an undertaking that could be considered as historic as the institution itself, a landmark private school in downtown Toronto is being given new life through a massive renovation/expansion.

Underway since March 2019 and not scheduled for completion until the end of 2021, the transformation of the University of Toronto Schools includes the construction of a 5,574-square metre (60,000-square-foot) addition and a similar sized renovation/restoration of the school's existing wing.

Located at the intersection of Bloor and Huron streets, that wing occupies the most easterly portion of a large University of Toronto-owned heritage masonry building stretching along the south side of Bloor Street.

It's a project encompassing heritage brick repointing and cleaning, the installation of 500 heritage style wooden windows along Huron and Bloor streets in the older portion and a substantial amount of steel work in the addition ranging from the fabrication and erection of a two-flight cantilevered staircase in a new skylight atrium to the installation of deep and heavy beams in a 700-seat auditorium and a below grade gymnasium.

Oakville-based M&G Steel Limited is the detailer/fabricator and it has submitted an application to be considered for the Canadian Institute of Steel Construction's 2021 Ontario Steel Design Awards of Excellence. The erector is Niagara Rigging Erectors Company Ltd.

The project partners include project architect and master plan developer Diamond Schmitt Architects, structural consultant Read Jones Christoffersen Ltd., electrical/mechanical consultant Smith + Andersen, and heritage consultant E.R.A Architects.

Design work started in 2016 but was predated by more than a few years of planning and a community approval process, says Diamond Schmitt Architects principal-in-charge Donald Schmitt.

"That (the planning) is a saga in itself," says Schmitt, who a personal connection with the school as one of its graduates.

First built in 1910, with a number of subsequent additions including one in 1925 which the school occupies, the University of Toronto Schools is a Grade 7 to Grade 12 university preparatory school affiliated with — but independent — of the University of Toronto.

The school is a "sprawling complex" and the project is intended to modernize the building and make it more compact. "It will create new and refreshed space," says Schmitt.

The interior of the 1925 wing is being reconfigured to create academic space for both the University of Toronto and the school to support an interdisciplinary curriculum. The university will continue to occupy the area west of a shared corridor.

Some of the work being carried out in the old section includes the conversion of an existing gymnasium into a blackbox theatre and a below grade swimming pool into music rooms, plus the creation of new classrooms and the installation of complete new mechanical and electrical systems, says project architect Diana Saragosa.

To be connected to the existing building by way of a skylight atrium, the addition will feature a wide-ranging array of program spaces including the auditorium which will cantilever over the Huron-Washington Parkette immediately to the south. Maximizing the tight urban site and preserving the popular parkette was the rationale for placing the now completed below grade gymnasium right below it, says Saragosa.

Supporting a green space above, the roof structure of the gymnasium consists of a 250-mm thick concrete slab on eleven 1100mm deep steel beams spanning 24 metres across the width of the gymnasium to the perimeter concrete foundation walls, says Read Jones Christoffersen associate Matt Deegan.

Installation of the 10-tonne beams — and one 15-tonne center — beam occurred this past summer. They were hoisted into place by 500-tonne crane with the entire operation taking about half a day, says M&G Steel project manager Brian Thompson. "It (the installation) went fairly well."

While acknowledging the role performed by Niagara Rigging Erectors and emphasizing he didn't want to "underplay" the erection challenges, Thompson says the really difficult task was transporting the extra-long beams from Oakville on two successive mornings.

Special Ministry of Transportation permits were required and the drivers had to navigate some "really tight turns" in downtown Toronto.

For M&G Steel the most complicated portion of the project, however, will be the fabrication and erection of long inventory of intricate components for the now-under construction auditorium. Fabrication began in early summer and will continue into October, says Thompson.

"The auditorium is an elaborate steel structure," says Read Jones Christoffersen's Matt Deegan.

There will be no columns on the east facade below the second floor. Instead, the auditorium will be supported by a two-storey truss spanning 26 metres to another two-storey cantilevered truss along the south facade. The trusses also support 1,100mm deep roof beams that will clear-span 25 metres across the auditorium, and there will also be a steel "Y-frame" structure cantilevered from the east truss that supports the balcony level seating, says Deegan.

The $60-million project is being carried out under the provisions of an 'affiliation agreement' with the University of Toronto which allows the school to retain its name and facilities a number of joint research initiatives, says UTS principal Rosemary Evans. At one time the school was part of the university but became independent in 2004.

The project is being entirely financed by the school and its supporters. In return, it will have a 50-year rent free lease agreement with the university, says Evans.

DIAMOND SCHMITT ARCHITECTS/DOHERE DIGITAL TECHNOLOGY

Pictured in this rendering is the view of the expanded University of Toronto Schools from Huron Street.

MIG Structural Steel specializes in the fabrication and erection of structural steel, miscellaneous metals, steel joists and decking. Since 2015, Kevin Meilleur, Patrice Mainville and David Dumont, all predecessors of Mr. Roch Bercier, (original founder of MIG Mobile Welding in 1986) are dedicated to continuing the reliable and confident service that MIG Structural Steel has built. Located just east of Ottawa, MIG has had the opportunity of working on projects extending as far as the Greater Toronto area, and currently employs over thirty (30) full-time staff dedicated to quality, cost and timely completion of all project needs. Proudly certified with the Canadian Welding Bureau, as well as a member of the CISC (Canadian Institute of Steel Construction), our skilled fabrication and erection crews make us uniquely qualified to fill any requirements you may have for your project.

Canam celebrates 60 years of steely excellence

GRANT CAMERON
CORRESPONDENT

Nearly six decades have passed since Marcel Dutil started his career at Canam Steel Works, but his recollection of those early days is still vivid.

"I started work at the plant in May of 1961," he recalls. "I was working on the assembly line. I was 18 years old. I've worked at Canam since that time except for a period of five months between January 1963 and June 1963 when I went back to school to get my high school diploma."

The plant, in Saint-Gedeon-de-Beauce, Que., was only 32 by 400 feet. Dutil was one of 10 employees at the company. He started as an assembler-welder and soon became an evening shift foreman.

The company was founded by his father, Roger Dutil, and mother, Gilberte Lacroix-Dutil, and partners from Boston, Mass. That first year, about 2,000 tonnes of joists were manufactured at the plant.

This year, the company is celebrating its 60th anniversary. Dutil, meantime, is now chairman of the board of Canam Group and also chief operating officer of the bridges division of the company.

Much has changed since those early days. The plant where he worked has been expanded and the company, which specializes in designing and fabricating metal components for the North American construction industry, has more than 2,600 employees and eight plants in Canada and the U.S.

Dutil has been at the helm for most of that growth. He worked at the Boston office for a few months before taking over the company. He also formed Manac, another company, in 1966 out of the backyard of his house because Canam needed means to transport its products.

In 1972, Manac purchased Canam and the Canam Manac Group was born. Canam is derived from the words Canada and America. Manac is the letters in reverse.

Dutil, whose son Marc Dutil is now CEO and president of the company, says his father and mother would be astounded at the growth of the firm.

"None of us ever thought that it would grow like that, not even myself."

Canam has now participated in the construction of more than 350,000 buildings in North America and elsewhere.

"We are participating in supplying about 10,000 projects a year," notes Dutil. "We do a lot of Walmarts and stadiums and bridges but we do a lot of small projects as well."

It hasn't all been smooth sailing, though. Over the years, the company has faced its fair share of adversity and recessions but has survived.

Four fires marked the company's early years. The first fire destroyed part of the Saint-Gedeon-de-Beauce plant in April 1964. Others occurred in September 1968, February 1973 and February 1974.

CANAM

Construction of the first Canam plant in Saint-Gedeon-de-Beauce, Que., in 1960.

Each time, the company bounced back and continued to expand. In the 1970s, the company built a plant in Boucherville, opened a sales office in the Toronto, and in the 1980s started a new steel joist plant in Mississauga, Ont. and acquired a number of companies in Canada and the U.S. Canam was also listed on the Montreal Stock Exchange and acquisitions continued in the 1990s and 2000s.

Earlier this year, the Dutil family, Caisse de depot et placement du Quebec and the Fonds de solidarite FTQ acquired all of Canam Group's Canadian operations, all overseas assets and certain ones in the U.S.

The company continues to modernize equipment and make acquisitions to grow its business. This year, a major, $15-million expansion of the St. Gedeon plant is expected to be completed. The amount includes the purchase of several pieces of equipment as well as an expansion.

Dutil, who's seen his fair share of ups and downs during his many years in the industry, says business cycles are inevitable and the secret to success is providing good service and treating employees right.

"Every seven or eight years you have a downcycle. It goes up and then, bang, it goes down for a period of 18 months," he says. "But that's the business we are in. You learn to live with that.

"For any company, if you have integrity, and you give good service, you give good products at the right price and you have good people, that makes the difference. We have good people everywhere. You treat your people right and do the other things right and people react the same way."

Dutil also believes a company's reputation is also built on honesty and giving back to the community.

"You never make a mistake by telling the truth," he says. "You never make a mistake by admitting a mistake."

Over the years, Canam has been generous in supporting organizations in communities where it operates.

"That's the way I grew up," explains Dutil. "My parents and grandparents have always been part of a community. We are in a small town; we all live together and that's a must. You have no choice. If you don't do it, you are not fair. We all have to participate in the community and you need to be there."

As for his most memorable work experiences, the elder statesman of Canam says there are too many to count.

"I'm 78. I started work at 18. That's 60 years ago. I've worked 60 hours a week and you have surprises every week. I'm still learning."

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