

A MARK ON THE CANADIAN SKYLINE

by RICH PORAYKO

The Bow is an award-winning, world-class building guaranteed to impress. It is a project of many firsts for Canada including largest continuous concrete pour (three shifts, five hundred people with up to 95 trucks continuously pouring), tallest building in western Canada and largest urban excavation outside Toronto (17,000m²).

More recently, the German-based building and construction project database company Emporis ranked The Bow as one of the "world's most spectacular corporate buildings," rubbing shoulders with the likes of the Hearst Building in NYC and Kuala Lumpur's Petronas Towers.

In addition to a striking, graphical presentation on Calgary's skyline, the Bow's diagonal grid (diagrid) system provides superior structural efficiency. This diagonal and vertical steel frame significantly reduces the overall steel weight, as well as the number and size of interior columns and thickness of the elevator



Photo credit: Tom Kessler

The Bow is simply one of the world's most advanced and impressive glazing projects.

shaft walls. Visually, the diagrid pattern is repeated every six stories, and a single unit of the pattern is referred to as a node. This is the first time a triangular diagrid system has been applied to a curved building design in a North American skyscraper. James Barnes, an associate with the design architect, Foster+Partners of

London, said that "by using the triangular diagrid structure, we were able to create a near column-free space within the building that allowed for a very flexible floor plate." The aerodynamic crescent shape significantly reduces exterior wind resistance, downdraft and the urban venturi effect. Inside, the shape creates

a floor plan that maximizes access to views and natural light. It also creates a collaborative and open workspace for Encana and Cenovus employees.

"The most significant energy efficient feature is quite obvious when you look at the shape of the building and that is the side-facing atrium," says Rob Eley, partner at project architect Zeidler Architects. "Generally, the intention was, when appropriate, to try to bring the sun's warmth and energy into the structure and use it for air movement and heat gain. The building is actually cupped, facing the south, with the actual angle of the direction determined by the optimal orientation where the highest benefit would be gained. The fact the building isn't entirely perpendicular with any of the surrounding streets actually is determined by the optimum orientation."

There are two facades facing south. One of them is an interior facade, which is single-glazed with operable windows. "The approach for much of the height of the south facade is a double skin about a metre apart," explains Eley. "The intention is to allow for natural air circulation within the interior of the building, which is provided by the heating of the volume of air in the south. This air movement permits offices behind the single-glazed wall to operate a window and get a sense of circulating air."

Within the atrium are Sky Lobby levels whose locations have been determined in part by the efficiency of the elevator system. Eley elaborates: "One of the ideas that Foster+Partners was working with from the very beginning was these community floors act like a village centre where everyone within that atrium space would get out of the elevator at the same location and share common facilities such as coffee stations or meeting rooms. It's almost like a miniature city."

Eley continues, "Sota Glazing took on the interior and exterior wall for the atrium, which was quite a technical challenge because of the shape and the diagrid that is embedded into it." Antamex installed the north facade, which had diagonals expressed in it as well, and

the east and west curved corners of the building. "The two of them together as a joint venture were able to deal with the contract but either of them singly or any other major glazing contractor would have had difficulty arranging the time and having the capacity to deal with this size of contract."

Sota Glazing teamed up with Calgary-based Alberta Glass to take on the south facade with a custom curtainwall system that Sota developed to anchor to the horizontal steel members with a proprietary pivot mechanism designed to eliminate any tolerance issues with the structural steel. "We locked into the diagrid extrusions to build up the one-metre-wide panels and followed the pattern of the structural steel," says Harry Nickel, vice-president of sales and marketing for Brampton, Ont.'s Sota Glazing. "The complexity was the fact there was no floor slab behind the outer curtainwall on the south facade apart from the first slab, which was 24 floors up, then only two more floors make up the next 34 stories before the roof," explains Nickel. "In many regards, we were installing curtainwall in space. That was a challenge."

The interior wall is a single, six-millimetre, tempered monolithic system with perforated panels to help absorb sound and improve acoustics in the atrium areas. "Every office has a floor-to-ceiling, inward-tilting vent window," says Nickel. "With the two walls, there was approximately half a million square feet of glazing in the south facade alone."

"We went to Viracon for the glass because each IG unit was 3,920 millimetres tall and they were the only company that had the equipment to coat and fabricate insulating glass units that size," says Nickel.

Sota Glazing glazed Canada's tallest skyscraper, Toronto's First Canadian Place, from the top down using a staging system developed to work from the exterior of the building. "We took some of the knowledge from First Canadian Place and partnered up with Alberta Glass, who installs curtainwall for Sota," states Nickel. "They designed and developed a double-

SOUTH FACADE/ATRIUM

Glazing contractor

Alberta Glass

Curtainwall supplier

Sota Glazing

Glass Fabricator

Viracon

Exterior glass

5/16" heat strengthened Viracon VE-2M on #2, 1/2" A.S. black stainless spacer, 5/16" clear heat strengthened
Interior glass: 6 mm clear tempered

NORTH, EAST AND WEST FACADES

Glazing contractor and curtainwall supplier

Antamex International

Glass fabricator

Oldcastle BuildingEnvelope

Glass

PPG Solarban z50

Aggregate/diagonal architectural panels

Spandreltech

Building size

1.7 million square feet

Glass

900,000 square feet

Stories

59

Design architect

Foster+Partners, London, U.K.

Project architect

Zeidler Partnership

Development manager

Matthews Development (Alberta) Inc.

Construction manager

Ledcor Construction Limited

Owner

Encana Corporation

Height

774 feet

level stage that extended across the whole facade. It followed the curved profile of the exterior wall. As they hung the curtainwall, it crawled up the building."

"The design and installation were the big hurdles; however, everything worked out great. That's one of the reasons we team up with Alberta Glass is because they have a good, solid labour force. And that's why Matthews Development and Ledcor came to us." •