

# BC Place Stadium Revitalization

BY DAVID M. CAMPBELL



**T**wenty-six years ago last October in downtown Vancouver the roof of BC Place was inflated covering the first domed stadium in Canada. Construction of the state-of-the-art facility was being completed on the north shore of False Creek amidst stacks of lumber, barges and log booms moored along the shore. The stadium was the first of many developments that transformed the eastern False Creek basin from an isolated industrial enclave surrounded by, but separated from, the city to the vibrant mixed-use urban area it is today.

As the stadium was knitted into Vancouver's urban fabric, the demands, norms and needs of the events and users of the stadium evolved. State-of-the-art venues and user expectations have changed dramatically in the last two decades. When BC Place opened it was one of only six domed stadia in the world suitable for professional field sports, all of which were in North America. Today, while the building type is still quite unique, there are 20 some domed stadia in North America and others in Japan and Europe. Almost half of these venues have retractable roofs. Many professional sports stadia in North America, domed and open, have been

## The new roof covers 40,000m<sup>2</sup> with a retractable center.

either abandoned by their anchor professional sport tenants or have been raised and replaced with new facilities.

Throughout this period of unprecedented growth and evolution of the domed stadium as a building type, BC Place has remained a strong venue hosting in excess of 200 event days a year and providing a home for BC Lions football. However, as the expected service life of the air-supported roof's membrane fabric was approaching and the world's attention was about to be focused on the facility for the 2010 Winter Olympic Games, it became clear to the owners, BC Pavilion Corporation (PavCo), that a revitalization of the stadium was needed to assure its utility, stature, and relevance in the decades to come.

In revitalizing the stadium, PavCo sought to strengthen the spectator experience while reinforcing the presence of the building in the city-scape. These goals drove the design of the new roof. The new roof will be the most visible manifestation of the revitalized facility and will dramatically enhance the stadium interior, especially for field sports, while increasing the venue's capability to host events such as concerts. The new roof covers 40,000 m<sup>2</sup> with a retractable center of nominally 7,500 m<sup>2</sup> "floating" over a large clerestory creating a new open airy interior. The roof is designed to carry approximately 7,000,000 kg of snow on clear spans of 227 x 186 m. The primary structure is a radial cable truss post-tensioned within a new steel compression ring. The new roof is supported by 36 perimeter steel masts rising 47.5 meters above the existing roof's concrete ringbeam. The masts are supported on a reinforced concrete girder in the channel cross-section of the existing ring. This was completed by Dominion Fairmile Construction Ltd. in September of last year as part of the first phase of renovation.

The roof masts are prominently featured exterior to the stadium as is the new compression ring, providing a new iconic image for the sta-



dium. Below the roof eave is a 12.5 clerestory façade clad in ETFE (Ethylene tetrafluoroethylene) membrane — a clear fluorocarbon film. This is the first use of this material in Canada. The material is widely used in Europe and is the cladding the Beijing Olympic venues, the “Water Cube” swimming venue and the “Bird’s Nest” stadium.

The fixed roof is a PTFE (polytetrafluoroethylene) coated fiberglass tensioned membrane similar to the material of the existing air-supported roof. In the new roof the membrane is supported on steel tube arched purlins carried by the primary cable truss.

The retractable roof is a pneumatic tensile structure of fluoropolymer coated woven PTFE fabric. The space between two layers is pressurized to create cushions that span between the radial cables. Pressure in the cushions is automatically modulated in response to roof load. The roof is opened by evacuating the cushions and contracting the membrane into the center gondola of the roof above a new center-hung video scoreboard.

PCL Constructors Westcoast Inc. is constructing the new roof as part of the second phase of stadium revitalization work. Fabrication has begun and the dramatic and challenging erection

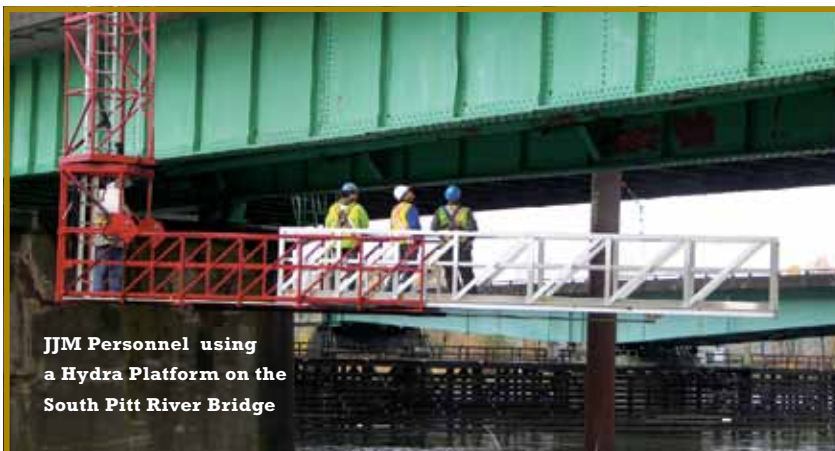
The clerestory façade will be clad in ETFE, the first use of this material in Canada.

of the new steel atop the existing stadium superstructure will be underway in the third quarter of this year. **CB**

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