

FAST PANEL PLACEMENT WITH LIGHT COMPOSITE OPTION

The use of composite materials on the deck of a new 305m-long pedestrian suspension bridge in Canada has enabled the tower-to-tower placement of FRP panels in just ten days.

The Columbia River Skywalk in the city of Trail, West Kootenay in British Columbia celebrated its official grand opening in May this year. The suspension bridge is almost 280m long abutment to abutment, making it one of the longest of its kind in North America.

The Columbia River Skywalk project was initiated when the nearby Old Trail Bridge was closed in 2010 by the Regional District of Kootenay Boundary, due to its deterioration. The heritage bridge, a rivet-connected, multi-span truss structure that had been constructed in 1911, had combined deficiencies to the steel truss members and support piers, which made continued use of the bridge structure unsafe for pedestrians and vehicles. In addition, a study had concluded that it would be too costly to rehabilitate or replace the Old Trail Bridge, which in addition to traffic also carried a sewer pipeline underneath.

The newly opened pedestrian crossing had been identified as a vital component to the community's downtown revitalisation plan as well as the development of an esplanade and pedestrian trail development. It also serves to carry the redirected sewer line in addition to fibre optic cabling and water piping.

Lightweight, prefabricated panels that could accommodate multiple features were required for the deck; a mountainside worksite and zero access from the Columbia River beneath pointed towards a solution composed of prefabricated FRP panels.

Conventional precast concrete was an option that was considered but, according to bridge designer Cowi, there were significant benefits to keeping the superstructure lightweight.

Initial concerns around the use of FRP included its capability to accommodate varying deck geometry, drainage, handrail connections and panel connection to the supporting steel.

The higher upfront cost of the FRP panels



was considered to be offset by quicker and easier installation and the use of smaller supporting elements such as cables and cable anchorages, towers and pile foundations.

Trail City Council awarded the US\$12.23 million construction contract to Graham Infrastructure, which in turn selected

Composite Advantage to provide the FRP elements. FRP panels were specified in four different shapes and including a trapezoid shape for transition as well as cut-outs to accommodate the steel towers.

The panels were prefabricated with features that included a crown, kerbs, drainage scuppers, access hatches and rail

connections. Insets were moulded into the undersides of the FRP panels to clear bolted splices for the steel stringers that provide support below deck.

Deck width for the bridge's tower section was 7m. The structure's span section was 4m wide and tower deck panels had a variable thickness from 79mm to 145mm with a 2% crown in the centre of the deck panels. Span sections were prefabricated with a variable thickness ranging from 109mm to 145mm with a 2% crown in the centre of the deck panel.

Due to the size of the project, FRP panels were shipped on four flatbed trailers, which travelled more than 3,218km to reach the construction area in British Columbia.

To begin constructing the bridge deck, a personnel basket capable of holding three to four people was constructed. With the steel superstructure and sewer pipe and utility lines already in place, the basket was used to pick up to three FRP panels at a



time, and move them over the bridge where they could be dropped into place. The low weight of FRP meant it was possible to place the panels from tower to tower and along the two back spans in around ten days.

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