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A Review on Port Mann Bridge

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ABSTRACT

This paper shows that, it carries 10 lanes of traffic with space reserved for a light rail line. In order to connect Coquitlam and Surrey in British Columbia, a steel arch bridge that crossed the Fraser River and was part of the Vancouver metropolitan region, was replaced by a cable-stayed bridge. The previous bridge was destroyed through reverse construction, a procedure that took three years to complete, after its replacement was made accessible to traffic. At 2 km long and featuring a 470-m-long main span and 52-m-wide deck, the Port Mann Bridge is currently the second longest cable-stayed bridge in North America and one of the widest bridges in the world.

Keywords: Port Mann bridge, metropolitan city and cable stayed bridge.

I. INTRODUCTION

In Vancouver, British Columbia, the Trans-Canada Highway (TCH) crosses the Fraser River with ten lanes of traffic on the 2,073 m (6,801 ft) long Port Mann Bridge. The crossing features 1,223 m (4,012 ft) long precast concrete segmental box girder approaches and an 850 m (2,789 ft) long cable-stayed main span unit. 470 metres (1,542 feet) of main span and 190 metres (623 feet) of side spans make up the cable-stayed building. The two five-lane decks that make up the 65 m (213 ft) broad superstructure are divided by a 10 m (32 ft) median where the centre pylons are situated.

II. DESIGN

Each distinct roadway has a composite construction made of steel edge girders, floor beams, and precast concrete deck panels, and is held up by two planes of stay cables. All four planes of the cables have anchorages inside the single-mast concrete pylons. The composite steel-concrete stay anchorage housings are in the upper 40 metres (131 feet) of the pylons, which extend roughly 160 metres (524 feet) above the

ocean. The approach spans are made up of three parallel precast segmental box girders that were built on land and above water using span-by-span construction and cantilevering, respectively.

Foundation:

The Port Mann Bridge's foundations are typically made of 1.8 m (5.9 ft) steel piles or 2.5 m (8.2 ft) drilled shafts, both of which are supported on a solid ground till layer that is buried beneath the loose sand deposits at a depth below the river. Design-build undertaking.

Demolition of old bridge:

It is the old bridge, which will be the demolition of original bridge.

the reverse construction option was chosen because it would have been considerably quicker but would have adversely affected the river, which is a busy shipping route and has abundant fish stocks. In December 2012, the historic Port Mann Bridge's demolition work got under way. The road deck, the bridge approach girders, and finally the steel arch were all dismantled one part at a time by the crews in the reverse order in which they were originally built. By October 21, 2015, it has been completely taken down.

Fig-1: old port Mann bridge

New bridge:

The new bridge has a 42-meter (138-foot) clearance above the river's high-water mark, is 2.02 kilometres (1.26 mi) long, up to 65 metres (213 ft) broad, and carries 10 lanes of traffic (the same length and clearance as the old bridge). The towers are about 75 metres (246 feet) tall above deck level, and their overall height, measured from the top of the footing, is around 163 metres (535 feet). The main span (between the towers) is the second-longest cable-stayed span in the western hemisphere at 470 metres (1,540 feet) in length. [Reference needed] The main bridge includes two towers, 288 cables, and a length of 850 metres (2,790 feet) from end to end.

To help relieve traffic congestion on the old bridge and shorten travel times, a new bridge was built. The bridge is a component of the wider Gateway Initiative for the province, which was put in place by British Columbia to manage the growing congestion in the area and enhance mobility within Metro Vancouver. The project's funding will come from tolls collected at the new bridge.

Fig-2: New Port Mann bridge

III. CONSTRUCTION

The 850-meter-long cable-stayed main span, one of the longest in the world, was constructed using the balanced cantilever method. Steel field sections, pre-cast deck panels, and stay cables make up the North and South main span superstructure. Superstructures with pre-cast segment decks are used in both the North and South approaches. Each of the 535-foot-tall towers projects 144 cable stays. On both sides of the Fraser River, the project also involved updating a total of 23 kilometres of Highway 1.

Workers employed four specially adapted Deal gantry trusses that were put on the pier table of the bridge's north pylon to raise the Main Span deck pieces into position. An overhead crane and two winches, each having a 52,000-pound capacity, make up each of the 92,000-pound specially built Deal gantry trusses. The cranes moved longitudinally along the gantries, and the winches moved transversely and dropped down hooks to lift the loads. While the winches moved transversely and dropped down hooks to lift the Main Span deck components into position, the cranes moved longitudinally along the gantries.

Two approaches surround the main bridge, linking Surrey to the south and Coquitlam to the north. A 720-ton self-launching gantry assembled the 1,158 segments that made up the combined north and south approaches. Each segment weighed 80 tonnes.

The goal of building the new bridge was to speed up travel times and ease traffic congestion on the old one. The bridge is a part of the province's bigger Gateway Initiative, which was put in place by British Columbia to solve the city of Metro Vancouver's growing traffic problems. The project will be funded through tolls collected at the new bridge.

Fig-3: Port Mann bridge

IV. CONCLUSION

This study investigates a possible substitute for a significant public investment in motorway expansion. It demonstrates that using the funds now set up for building a new Port Mann Bridge. There is no question that this would reshape the landscape as it develops and serve as a powerful incentive for people to switch from relying on their cars to relying more on public transportation.

V. REFERENCES

1. News Staff (September 18, 2012). "Three eastbound lanes open on new Port Mann Bridge". CityNews. CityNews. Retrieved December 2, 2022.
2. Nagel, Jeff (September 5, 2012). "Sept. 18 set for first crossings of new Port Mann". Peace Arch News. Peace Arch News. Retrieved December 2, 2022.
3. Luba, Frank (November 13, 2012). "Drivers switch to new Port Mann Bridge as of this Saturday". Wilderness Committee. Wilderness Committee. Retrieved December 2, 2022.
4. British Columbia Office of the Premier (December 1, 2012). "New Port Mann Bridge opens to eight lanes of traffic". British Columbia Government News. Government of British Columbia. Retrieved December 2, 2022.
5. "Facts & Trivia". Pmh1project.com. Archived from the original on September 17, 2012. Retrieved December 7, 2012.
6. British Columbia Department of Highways (1961). Minister of Highways Report for the Fiscal Year 1959/60 (Report). Victoria: Government of British Columbia. pp. 48 (F48), 49 (F49).

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