Storage tanks in Vancouver, BC (Canada)

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4. Storage Tanks in Vancouver, BC (Canada)

Owner: *Vancouver Airport Fuel Facilities Corporation*

Desing and build package: *Canron Inc. – Western Bridge Div. – Vancouver*

Construction: *November 1982–July 1983*

Increase in air traffic at Vancouver International Airport has made it necessary for their recent storage facilities to be increased by 12.8 million litres. To that end, the Vancouver Airport Fuel Facilities Corporation awarded a design and build package to Canron Inc. – Western Bridge Division – Vancouver, Canada, for four steel storage tanks 18.28 m diameters × 12.19 m high.

The design requirements set out by the owners engineers, A.D. Williams Engineering Ltd. from Edmonton, called for the tanks to be designed to API650 with the tanks having a self-supporting roof, and an internal floating aluminum pan, to minimize product losses due to vapourization.

Removal of preload, preparation of the gravel and sand bases and excavation of the pond area started in November, 1982. The gravel area under the floors of the tanks were carefully prepared to a slope of 1:100 and compacted 100 % standard proctor. Laying of floor plates started in December, 1982. The plates were lapped and welded sloping toward a small central steel sump. Tank wall construction started in the new year.

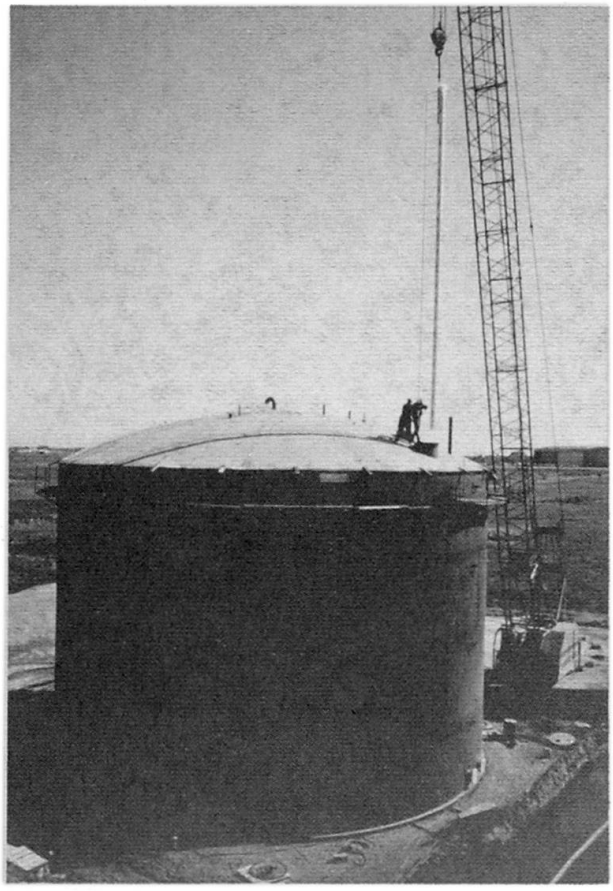

Plate thicknesses for the shells were carefully computed to produce the minimum size allowable by code, thus reducing field welding and material costs.

Courses are 3.048 m high with the first course being 7.14 mm thick and the remaining 3 at 6.35 mm. Each course has 7 plates. Two tanks proceeded while roofs were laid out and welded adjacent to its own particular tank. The roofs are dome shaped with 24-7.93 mm plates welded to a single central dollar plate. These pie shaped sections were precisely shop cut to maintain geometry in the field. Total steel weight is 341 tonnes.

Because of the large size of the wall plates it was not necessary to pre-bend and edge preparation was left square. Welding the horizontal joints was performed by a semi-automatic 3 o'clock welder using the submerged arc process. Sufficient penetration allowed the process to be completed with two passes and no backgouging. The verticals were completed by hand. Radiographic x-ray testing requirements were stringent, and all vertical tee intersections were tested in addition to the standard API requirements.

After completion of the shells the hydrostatic testing took place. To obtain the amount of water required became a problem. The nearest fire hydrant was 500 meters away and had very little pressure. Therefore, 20 wellpoints were driven and water was pumped from the ground. To fill one tank took approximately 24 hours. The water was then pumped from tank to tank.

Erecting the roofs was accomlished by a 113.6 tonne (125 Ton) mobile crane with a 12 point pick-up on the roof. After each roof was installed the vertical stillwell and ladder were lowered through the roof hatches.

The roofs were sandblasted near white underneath and spray painted with 3 coats of epoxy before erection. The same application was repeated inside the tank on the walls and floors. Care and attention was taken on applying the paint due to the nature of the future stored liquids.

While the outsides of the tanks were being sandblasted and painted the internal aluminum floating pans began to be assembled. The pans were prefabricated by Alcan Canada Ltd. and shipped to the site for installation by Canron Crews. Their construction was of several sealed circular pontoons bolted together and then a thin skin of aluminum bolted over the top. The pan was installed on permanent posts, elevating the 'rest' position 2 meters off of the tank floor.

The contract also called for various appurtenances including water draw off and valves, shell manholes, inlet and discharge pipes and valves, heat detector nozzles, emergency valves and height indicators. The contract was completed in July, 1983.

(W. Radtke)