Steel

Environmental Challenges

The wraps are off LaSalle bridge recoating

'See-saw' bridge approaching 100 years of service gets a new coat

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Bascule is the French word for "see-saw," which explains the operation of Kingston's LaSalle Causeway bascule bridge over the Cataraqui River at the southern entrance of the Rideau Canal.

The steel bridge is raised and lowered with the assistance of a counterweight, which balances the upward and downward swing of the bridge surface as it accommodates both passing marine traffic and vehicles driving along Highway 2.

The bridge, originally opened in 1917, was designed by Joseph Strauss, also responsible for San Francisco's Golden Gate Bridge. As it approaches a hundred years of service, the structure was treated to a repair and re-coating contract to extend its service life.

"We inspect the bridge every year, so there were no concerns about the bridge presenting operational problems," says Cherylynn Hunt, regional manager, engineering assets, Ontario region, with Public Works and Government Services Canada (PWGSC). "Basically, we wanted to deal with rust on the bridge, created as a result of the normal oxidation process from exposure to the elements, including road salt. About 80 per cent of the bridge paint was the original coating, with various degrees of overcoat applied in 1973 and 1983 to provide some touch-ups. Some of the paint was beginning to flake off, so the entire coating system had reached the end of its service life."

The entire causeway, including the bridges that cross it, is operated and maintained on behalf of the federal government by PWGSC. The $3.65-million construction contract to repair and re-coat the bridge was covered by funding under the federal government's Economic Action Plan. The construction contract was awarded through competitive bid to Harrison Muir, Inc. an Ajax, Ont.-based contractor specializing in industrial re-coating projects.

PWGSC

The LaSalle bridge carries 23,000 vehicles a day, as well as marine traffic passing below. Restoring and repainting the structure was a major logistical challenge.

The contract provided numerous challenges, including the environmental necessity to contain the ancient lead-based paint, and the need to accommodate as much road traffic as possible during the project. More than 23,000 vehicles use the bridge each day, and the lift bridge opens hourly for both commercial and industrial craft between 6 a.m. and 10 p.m. during the shipping season — about 900 lifts per year.

The construction process took from Sept. 29, 2009 to June 17, 2010. The navigation season for the causeway ended on Nov.14 and resumed on May 21, so construction minimized any challenges to marine traffic schedules.

"We actually adjusted the schedule slightly by a few weeks to allow a tour boat company to operate for the full length of the tourist season," says Hunt.

During the paint removal process, the bridge was wrapped in plastic and placed under negative air pressure to ensure that hazardous particles could be collected and disposed of without damage to the environment.

"The old paint was stripped off employing abrasive blasting, using a heavy copper slag particulate as the blasting medium," says Hunt. "All of the particles, both paint and copper, were collected in huge vessels for proper disposal."

The coating process involved three applications: an inorganic zinc primer, followed by a protective aluminum-flaked mid-coat, and a urethane top coat.

"Since most of the re-coating took place during winter months, we had to moderate the temperature and humidity inside the encapsulated area while applying the coatings," says Hunt.

By carefully and selectively wrapping the bridge components, road traffic continued to use the bridge during the stripping and painting process.

The contractor and coating manufacturer jointly submitted the project to an annual competition organized by the Society for Protective Coatings (SSPC).

"The project was chosen to receive the 2010/2011 SSPC George Campbell award for outstanding achievement in the completion of a difficult or complex industrial coatings project," says Hunt. "We received the award not only because of the tight scheduling constraints, but because we were able to minimize disruption and balance the needs of the various stakeholders, including vehicle traffic, marine traffic, the federal government and the City of Kingston."

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CFA piles chosen

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eliminate shocks or vibration.

CFA piles take more load (required for the heavy steel structure) than other foundation options the building team evaluated, explains Thompson, adding that founding each heavy steel column are nine augered piles that go about 30 feet below grade.

The expanded home for the Faculty of the Environment features a ground floor cafe, 150 seat auditorium, six new classrooms, a planning studio, student lockers and study areas. Separating the third and fourth floor faculty offices from the four-storey student area is a sky-lit atrium with a two-level living wall and a staircase cantilevering into the atrium.

Designed by Akitt, Swanson + Pearce Architects Inc., the project is targeting LEED Platinum certification.