

THE STAINLESS REBAR STANDARD



Kevin Cornell, Editor July 2011

Stainless Reinforcing Supports Bridge Superstructure

The New Hampshire Department of Transportation (NHDOT) began construction of a new bridge over Little Bay on the Spaulding Turnpike (NH Route 16) in Newington-Dover on September 9, 2010. The new four-lane bridge, in addition to the rehabilitation of the existing Little Bay Bridge, will double the traffic capacity and improve safety along this section of the Spaulding Turnpike.

Cianbro Corporation of Pittsfield, Maine, is the general contractor for the \$50.3 million project, which is expected to be complete in November 2013. Dimension Fabricators, Inc. of Glenville NY, a specialty fabricator of concrete reinforcing steel and related materials, constructed the pre-assembled stainless steel reinforcing cages. The stainless steel was supplied by Salit Specialty Rebar. Cianbro installed the cages.

The steel was used to manufacture drilled shaft reinforcing cages that are installed on the jobsite to reinforce concrete foundations known as drilled shafts. The drilled shafts are large round (drilled) excavations that are filled with steel-reinforced concrete to support the bridge superstructure. Shaft cages are 7 feet in diameter and up to 75 feet long. They contain up to 33 2-inch diameter solid stainless steel bars wrapped with $\frac{3}{4}$ -inch diameter continuous spiral rebar at 6 inch and 3 inch on center. The designers are VHB, Inc and the NHDOT.



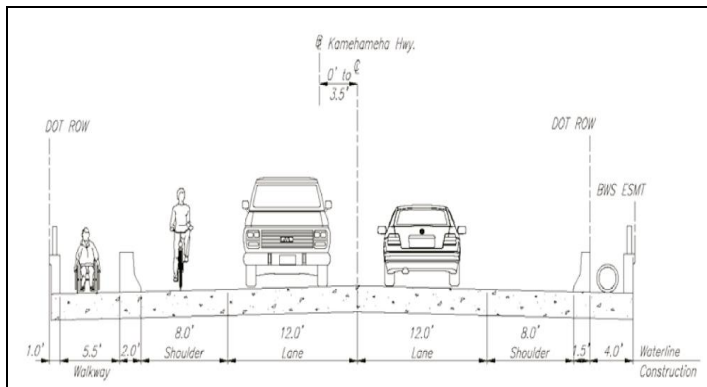
Photo: Roy W. Stevens and Dan Musselwhite (Cianbro Companies)

South Punalu'u Stream Bridge Goes Stainless

In 2011, the 83-year-old South Punalu'u Stream Bridge was replaced with a new structure reinforced with stainless steel rebar that will meet vehicular load, safety, and seismic standards. Construction for the project was 100-percent federally funded by the American Recovery and Reinvestment Act (ARRA).



Old Punalu'u Bridge photo. Source: Hawaii DOT



Rendering of cross-section of new bridge.
Source: Hawaii DOT

Phase I created a temporary diversion route that detoured traffic around the existing bridge. The bridge was replaced in Phase II with a three-span, reinforced-concrete bridge, 160 feet long, with two 12-foot-wide lanes and two 8-foot-wide shoulders. A shielded walk/bikeway complying with requirements of the Americans with Disabilities Act was included, and the roads immediately approaching the bridge reconstructed. When completed, traffic was returned to the original traffic pattern and the temporary route removed.

The bridge was designed to ensure that the structure could accommodate the volume of debris-loaded flow during major storms.

Built on Kamehameha Highway in 1926, the narrow bridge runs through the beachside town of Punalu'u and over the southern mouth of Oahu's Punalu'u Stream just a few hundred feet from the Pacific Ocean. The highway serves as the main thoroughfare connecting communities on the north eastern coast of Oahu and carries an average 10,000 vehicles every day.

Because of the marine environment of the bridge, The Hawaii Department of Transportation opted for stainless steel reinforcement. Salit Specialty Rebar supplied 30,000 pounds of Grade 2205 stainless steel. Grade 2205 is the most widely used duplex (ferritic/austenitic) stainless steel grade. It finds applications due to its excellent corrosion resistance and high strength



Source of image: <http://www.recovery.gov/Pages/default.aspx>

Stainless Steel Used in FDR Four Freedoms Park in New York City

The FDR Four Freedoms Park is an example where stainless steel rebar is used in association with special projects. Although it is common for stainless steel rebar to be used in bridge elements and building components, stainless steel is also used for special projects located in marine environments.

Salit Specialty Rebar (SSR) supplied steel to Port Morris Tile and Marble Corporation who won the \$1.8 million contract that involves the creation of a monolithic stone room at the tip of the island. The room is made up of roughly 125 solid limestone blocks each weighing 76,000 pounds, fabricated and quarried by North Carolina Granite Co. The steel was used in the foundation to support the architectural structure containing the FDR sculpture. SSR shipped about 5,000 pounds of #11 Type 2205 stainless steel to the site. Port Morris Tile and Marble Corporation was the installer.



Photo: Courtesy of Anthony Vespa, Port Morris Tile

The sculpture of President Franklin D. Roosevelt seated in a wheelchair, interacting with a disabled child, was under construction in the spring and summer of 2011 on Roosevelt Island in New York City. The Memorial is in Southpoint Park, south of the hospital where survivors of polio, the disease that disabled Roosevelt, benefited from the pioneering use of ventilators.

New Bridge on the Alaska Highway Reinforced with Stainless Steel



Widening of Highway 97 to four lanes.
Photo courtesy of Focus Corporation, www.focus.ca

The Stone Creek Bridge on the Alaska Highway was replaced with a four-lane bridge using stainless steel rebar in its columns, beams and deck. Built in 1957, the bridge had approached the end of its service life. The project included increasing 1.5km of Highway 97 (Alaska Highway) south of the bridge to four-lanes to connect with the existing four-lane section constructed in 2005 and 2006. Construction was completed in the spring of 2011.

Salit Specialty Rebar (SSR) shipped about 100,000 pounds of XM28 material. The steel was used in the wing walls, parapet walls, deck, abutment diaphragms, and parapets. The deck is 22.75m wide and 73m long. LMS Steel Reinforcing Group in Surrey, B.C. installed the rebar.

The Alaska Highway in Northern British Columbia stretches from Prince George north to Watson Lake and the British Columbia-Yukon border, a distance of just over 700 miles (1140 km). The highway runs through the northeast of the province, which remains mostly undeveloped and sparsely populated. It ensures the movement of goods and people across the region for the benefit of residents and travellers alike. The \$12million project was part of the \$290million infrastructure investment, announced by the Government of Canada and the Province of British Columbia.

Upcoming Events 2011-2012

2011

2011 PCI Annual Convention/Exhibition & National Bridge Conference

Salt Lake City, Utah
October 22 to October 25



2012

World of Concrete

Las Vegas, Nevada
January 23 to 27

The Precast Show (NPCA/ACPA)

Orlando, Florida
March 1 to 3

Concrete Reinforcing Steel Institute Annual Conference

Washington, DC
April 28 to May 1

2012 International Bridge Conference

Pittsburgh Pennsylvania
June 10 to 13

Wall of Shame



America's infrastructure should not be allowed to "rust in peace." There are options for repairing and replacing structures that include types of stainless steel reinforcement designed to suit any project.

This is the image of one of America's structures showing the affects of corrosion from 2006 to 2011.

