

Market Application Focus

Ports

Timber Pile Repair

Waterproofing

Project: NYC Passenger Ship Terminal Rehabilitation
Owner: City of New York
Engineer: DMJM and Harris
Contractor: Trevcon/Phoenix Marine
Year: 2002

The Problem

Built in the 1920's on wood pile construction in the Hudson River, the NYC Passenger ship terminal runs from 40th street to 58th street in Manhattan. This is where all the great ocean liners docked during the hay day of oceanic travel. This facility is still being used to dock today's great liners and cruise ships. During the days of the first Queen Mary and Queen Elizabeth liners, these buildings were long enough to safely nestle their entire length. However, with today's larger and longer ships they can jut out into the Hudson River by as much as 150 feet.



The wood timber piles of the original construction were of green untreated wood which at that time was in vast supply. With the cleanup of the river came the return of the marine life. One such organism were the marine worms that made their home in the piles and also used them as a food supply. They bored holes throughout these piles, deteriorating and weakening them. Also noticeable was the fact that the piles were sinking into the mud line on the bottom of the river.

The Sika Solution

Several methods of restoration were tried. First, a type of floating jacket was wrapped around the pile to create an isolation barrier. With the stretching of the cloth-like fiber of the jacket, a void was created in between the jacket and the pile. Unfortunately, this allowed the surging of the tides to aerate the void creating an even friendlier environment for the marine worms to thrive. Secondly, replacement and encapsulation of the pile was tried with conventional concrete. This was an economically sound solution, however with the added



Sika®



weight, the building sank to even greater depths.

Replacement with newly cut timber was not an environmentally or politically popular solution. The engineers decided that a fiberglass jacket with an epoxy grout was the answer. The reduction of added weight to decrease settling and control costs were the major deciding factors. This system could maintain a smaller annular space between pile and jacket. Sikadur 35 Hi- Mod LV LPL (Long Pot Life), a two

component 100% solids epoxy was mixed with a well-graded oven dried sand to make an epoxy mortar. A three gallon pail of the epoxy was mixed with 100 pounds of C 404 sand resulting in a epoxy mortar that was flowable in consistency and could be pumped with a peristaltic pump. Sikadur 35 Hi Mod LPL mixed with sand was pumped through the connections at the bottoms of the jackets. The mixed epoxy mortar was able to displace the standing water and harden to the necessary requirements of the job. The ability of this material to push the water without compromising its ability to chemically react and harden was the reason it was selected by engineers.

The result was a watertight pile jacket with no void between the pile, and a strong protective layer against debris and ice flow. The impermeable nature of the fiberglass jackets coupled with a dense thick section will ensure protection to the wood timber piers for many years to come.

Sika Products Used

Sikadur® 35 Hi- Mod LV LPL (Long Pot Life) is a two-component, 100% solids, moisture-tolerant, low-viscosity, high-strength, multi-purpose, epoxy resin adhesive. It conforms to the current ASTM C-881 and AASHTO M-235 specifications.



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