PILE DRIVING: TAPPAN ZEE CONSTRUCTORS’ COST-SAVING PLAN FOR NY BRIDGE PROJECT

DALLAS STEPHENS: OUR INTERVIEW WITH A PIONEER IN NUCLEAR POWER PLANT CONSTRUCTION

DALLAS

PLUS

DIFFERING SITE CONDITIONS
A “Backpocket” Check List

RETAINING STRUCTURE
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EFFECTIVE FLEET RISK CONTROL
For the Pile Drive Construction Industry
Like many lakefront properties, the Quail’s Restaurant on Lake San Marcos in Northern San Diego County was built decades ago on wood piles. Over the years, the water environment, marine borers and fungus damaged the 21 wood piles supporting the structure at the waterline. Heartwood rot is a common problem in marine environments around the world.

When new owners purchased the lakeside resort last year and embarked on a complete renovation of the restaurant and resort, they soon discovered they needed to find a way to repair the damaged wood piles or replace them completely. Their contractor, Skyline Services, recommended repairing the 14-inch diameter piles using the Simpson Strong-Tie® FX-70® Structural Repair and Protection System.

“The FX-70 system is a great alternative to ripping all the piles out and having to put brand new piles in. That’s much more disruptive and expensive,” said Roky Kriskovic, a Repair, Protection and Strengthening System specialist at Simpson Strong-Tie. “And, when you have to put new piles in, there are coastal and environmental permitting concerns that need to be addressed. It becomes much more complicated and expensive. If you can repair the piles in place, it’s a lot easier.”

Simpson Strong-Tie entered the repair, protection and strengthening industry after acquiring Fox Industries in late 2011. The FX-70 Structural Repair and Protection System was the first in-place repair solution for damaged concrete, steel and wood piles when it debuted in 1970, and many of those first repairs remain in service today. By eliminating the need to dewater the site or build cofferdams, the FX-70 system drastically reduces the overall expense and loss-of-use cost as the structure can generally remain in-service while the repair is executed.

In the Lake San Marcos project, Steve Young, owner of Skyline Services worked closely with Kriskovic and Simpson Strong-Tie representative Scott Gossman to create a viable repair solution using FX-70 jackets to restore the piles.

The tongue-and-groove jackets provide a corrosion-resistant shell to the repair site. They range from 1/8” to 1/4” in thickness and are UV resistant. Each jacket is custom-made to the precise specifications of each repair project and is available in round, square, H-pile and octagonal shapes. Spacers are provided to insure a consistent annulus.
The FX-70® jacket is filled with FX-225 Non-shrink Underwater Grout. The remaining gap will be filled with FX-70®-6MP Multi-Purpose Marine Epoxy Grout.

The finished FX-70® jacket system on all the piles.
Multi-Purpose Marine Epoxy Grout are poured into the sealed bottom. Once that cures overnight, the jacket is filled with FX-225 Non-shrink Underwater Grout, stopping 4-inches from the top of the jacket.

After the system cures overnight, the remaining 4-inch void is filled with FX-70-6 marine epoxy grout. The final step is to create a minimum 30-degree, tapered bevel at the top of the jacket with Simpson Strong-Tie® 763 Low-Modulus Trowel-Grade Epoxy adhesive to provide a water- and chemical-resistant barrier to the repair system.

For additional strength on the Quail's Restaurant project, the top and bottom of the jackets used 14 inches of FX-70-6MP Marine Epoxy Grout instead of the typical 6” and 4” respectively. The entire system is corrosion-resistant, so aging and new structures can both realize extended service life as a benefit of the FX-70 system.

In 2013, Simpson Strong-Tie, an industry leader in structural systems research, testing and innovation, conducted the first full-scale, cyclic tests of repaired wood piles using the FX-70 Structural Repair and Protection System. The tests verified that the FX-70 jacket system performs as intended and is an effective structural repair solution. The test results also provide engineers with real-world data to help them evaluate the FX-70 system as a potential solution for their structural repair applications.

A three-minute video, available at www.strongtie.com/video/library, shows how the test was conducted at the Simpson Strong-Tie Tyrell Gilb Research Laboratory in Stockton, Calif.

“When the piles were moved 18 inches in each direction, the jacket did not fail,” Kriskovic said. “The failure occurred when the wood pile failed and pulled away from the jacket and repair.”

Shortly after completing the pile repair at the Lake San Marcos resort, Skyline Services placed another order for 10 square jackets to repair concrete piles, Kriskovic said. “The contractor was impressed by how they worked, and realized they would offer a perfect solution for his next project.”

The Simpson Strong-Tie line of repair, protection and strengthening systems for concrete and masonry includes a wide variety of new products, including repair mortars, coatings, grouts, epoxies, sealants and the FX-70 structural repair and protection system. The new Repair, Protection and Strengthening Systems for Concrete and Masonry product guide features all of the new products and is available at www.strongtie.com/rps.

For nearly 60 years, Simpson Strong-Tie has been an industry leader in structural systems research, testing and innovation. We work closely with engineers to provide code-listed, field-tested products and value-engineered solutions that help people build safer and stronger homes and buildings. Our extensive product offering includes engineered structural connectors, fasteners and fastening systems, lateral-force resisting systems anchors, and products designed for the repair, protection and strengthening (RPS) of concrete and masonry.

The RPS product line includes repair mortars, coatings, grouts, epoxies, sealants, the FX-70® structural repair and protection system, and the FRP strengthening system. For more information, visit www.strongtie.com/rps.
Don’t replace. Repair in place.

With 40+ years of proven performance, our FX-70® Structural Repair and Protection System repairs concrete, steel and wood piles in service without dewatering while protecting against further deterioration. From custom-manufactured fiberglass jackets to underwater epoxies and cementitious grouts, we have cost-effective, practical, long-term solutions for your repair projects.

Since 1956, Simpson Strong-Tie has brought innovative solutions to customers’ construction challenges. To learn more about our products that repair, protect and strengthen, visit go.strongtie.com/rps or call us at (800) 999-5099.

Watch How to Install FX-70® Jackets in Water at strongtie.com/videolibrary and subscribe to our YouTube Channel at youtube.com/strongtie.