Test Center Bridge Needs Special Care

Containment and coating system key to award-winning project

The box truss bridge at the U.S. Navy's Transducer Evaluation Center on the Point Loma peninsula in San Diego was losing its battle against corrosion until painting contractor Techno Coatings, Inc. (TCI), of Anaheim, CA, took up the fight. Located less than a mile from the Pacific Ocean, the entire bridge needed to be repainted after years of exposure to the elements. Removal of the original lead paint was a special concern. Given the scope of the project—which not only called for skilled painters and metal fabricators, but certified experts for lead removal and abatement—the Navy had explicit requirements for the job.

Underwater Testing

Part of the Space and Naval Warfare Systems Center San Diego (SSC San Diego), TRANSDEC is a large, contoured, ellipse-shaped pool that measures 300 ft by 200 ft and is spanned by the three-story, 200-ft long bridge. A small, enclosed laboratory that houses electronic measuring equipment used in testing and research is located midpoint on the bridge. TRANSDEC is one of the main locations used for testing and recalibrating acoustic devices for underwater warfare, and for the research and development of new technologies.

The TRANSDEC was built in 1964. It was designed to calibrate sonar transducers, a process done in a nearby freshwater lake until the lake dried up, requiring construction of a more permanent facility to support design of transducers to detect submarines. The bridge enables easy access to the man-made water basin. Known in the industry as a "Bailey Bridge," the structure supports itself on two weight-bearing pilings situated on either side of the pool. Locating the pilings outside of the water was important so the pool would be clear of objects that could interfere with sonar testing. The trusses on the sides of the bridge deck add to the rigidity of the structure and work to dissipate compression and tension. To facilitate testing, the bridge sits just four ft from the surface of the water, making it easy to lower equipment

After years of exposure to weather and salt spray from the Pacific Ocean the bridge's steel trusses needed repair. Prior to painting, workers pressure washed and sand-blasted metal surfaces to clean the substrate of rust, dirt, and old paint.

Containment was critical to preventing dirt, debris, and overspray from dropping into the pool where it could interfere with sonar testing. TCI wrapped huge plastic sheets over scaffolding and under the flooring to trap and catch debris, while surfaces inside the containment area were frequently vacuumed.

Echo-Free Space

The pool itself was designed to eliminate all extraneous man-made and natural biologic noises, and to permit precise control of the surface and subsurface conditions. As a result, it simulates an infinite expanse of water nearly free of echoes. Six MG of chemically treated fresh water continuously circulate throughout the pool to maintain isothermal conditions. Pool depth is 38 ft maximum.

The Navy's requirements stipulated that no debris from the maintenance work be allowed to fall into the pool. Keeping the pool free and clear of any materials that are not part of testing is necessary to maintain accuracy, according to Howard McManus, facility manager. "Since testing procedures are so exacting, we need to maintain an environment that is as clean as possible." The Navy also mandated that the contractor selected for the job have special certifications from the Steel Structures Painting Council (SSPC) including QP1 for large complex structures and QP2 for removal of hazardous materials.

TCI, one of the largest paint contracting firms in the U. S., was chosen to do the work based on the company's long history of success with large-scale projects in industrial and marine settings. TCI also had the distinction of holding the high level SSPC certifications.

Carefully Constructed Containment

For containment, TCI started by building scaffolding around the bridge. To reach the underside, a wooden drop floor was secured to the scaffolding. To make room for the flooring beneath the bridge, McManus lowered the pool water level by about four ft. Huge plastic sheets were tented over the scaffolding and under the flooring to trap and catch any loose paint, rust, or other materials that might fall from the bridge during the work. Disposable drop cloths were also spread across the flooring so that all the debris could be collected there. Workers kept the area neat by frequently sweeping, vacuuming, and disposing of waste materials.

Before any new coating could be applied to the bridge and the exterior of the test lab, all metal surfaces had to be pressure washed and sandblasted to clean the substrate of rust, dirt, and old paint. Workers also did a lot of hand scraping to make sure surfaces were as clean as possible. TCI hired mechanical welding experts to replace old welds and add new steel plates to various sections.

Selecting the right coating system was an important aspect of the job, according to Bruce Birney, TCI owner and contractor liaison, because of the bridge's constant exposure to weathering and salt spray from the Pacific Ocean, and because the truss section of the bridge posed challenges, due to hard-to-reach corners and angles. "When we're faced with intricacies in structures like this, we take special care in picking coating systems that will be forgiving of less than perfect surfaces," Birney says.

TRANSDEC, part of the Navy's Space and Naval Warfare Systems Center San Diego, is one of the main locations for testing and recalibrating communication acoustic devices for underwater warfare. After years of exposure to the elements, the bridge's trusses required rebuilding, repair, and repainting.

Three-Part Coating System

TCI selected a three-part coating system from Sherwin-Williams (www.sherwin-williams.com), including two types of epoxy primers designed to work together to provide maximum protection for the bridge structure. Macropoxy® 920 Pre-Prime Rust Penetrating Epoxy Primer was applied to selected areas that were especially prone to rust. The coating is a 100 percent solids, VOC compliant penetrating epoxy that is designed for surfaces that cannot be thoroughly cleaned due to location or surface condition. The coating was especially useful on heavily corroded areas since it penetrates tightly adhered rust, creating a sound substrate for the topcoat.

The entire bridge was then primed with Macropoxy 646 Fast Cure Epoxy, a high solids, high build coating that is also fast drying. This epoxy coating protects steel and concrete surfaces, has low VOCs, and provides good resistance to chemicals and abrasions. The high solids content of the coating helps ensure protection of sharp edges, corners, and welds, which is important because inadequate film build at edges and corners can result in premature rusting on a surface that is vulnerable to corrosion.

For the topcoat, TCI used Hi-Solids Polyurethane, a low VOC, aliphatic acrylic polyurethane resin coating. Because of its chemical composition, the coating is designed for projects that require high performance protection plus excellent color and gloss retention. The primers and topcoat were applied with airless sprayers and the entire project was completed in about 60 days.

The Navy has not been alone in enjoying the renovated structure. TCI was awarded first place in its division in the "Picture it Painted Professionally" (PIPP) contest sponsored by the Painting and Decorating Contractors Association. Tourists frequent the site, and the Navy has hosted the International Autonomous Underwater Vehicle Competition at TRANSDEC. The competition has challenged high school and college students from all over the world to navigate and survey a course using self-guiding underwater vehicles designed and built specifically for this contest. GE

Located less than a mile from the Pacific Ocean, the bridge allows easy access to all areas of the man-made water basin. Pilings are located outside the water so the pool is clear of objects that interfere with sonar testing.