

Market Application Focus

Bridges
**Post Tension Grouting &
Evacuation of Precast Segments**

Safety & Conformance to New Building Code

Project:	Bay Bridge - Northern California
Owner:	Caltrans
Contractor:	Kiewit Pacific, FCI Construction & Mason Construction Co.
Year:	2004-2007



The Problem

San Francisco's Oakland Bay Bridge was constructed at the same time as the Golden Gate Bridge and opened for traffic in 1936. Although the Golden Gate Bridge gets most of the public's attention, particularly from tourists visiting San Francisco, the Oakland Bay Bridge was the largest and most expensive bridge in the world at the time of its opening. In 1956, it was named one of the seven engineering wonders of the world. Today, it remains the busiest bridge in the United States, carrying more than 270,000 vehicles a day.

On October 17, 1989, an earthquake measuring 7.1 on the Richter scale severely damaged the double-decker truss structure east of Yerba Buena Island (the famous suspension bridge portion) knocking down a portion of the upper deck. Caltrans initiated a study to determine if the bridge could withstand another earthquake, which experts predicted a high probability of occurring within the next thirty years.



Caltrans' study concluded the western portion connecting San Francisco and Yerba Buena Island could be retrofitted to withstand a major earthquake. They also determined it would be far more cost effective and safer to build a new eastern span rather than retrofit it. The new structure would be designed to meet current seismic codes as well as other codes pertaining to roadway shoulders, lane widths, stopping sight distances and other factors to substantially improve public safety.

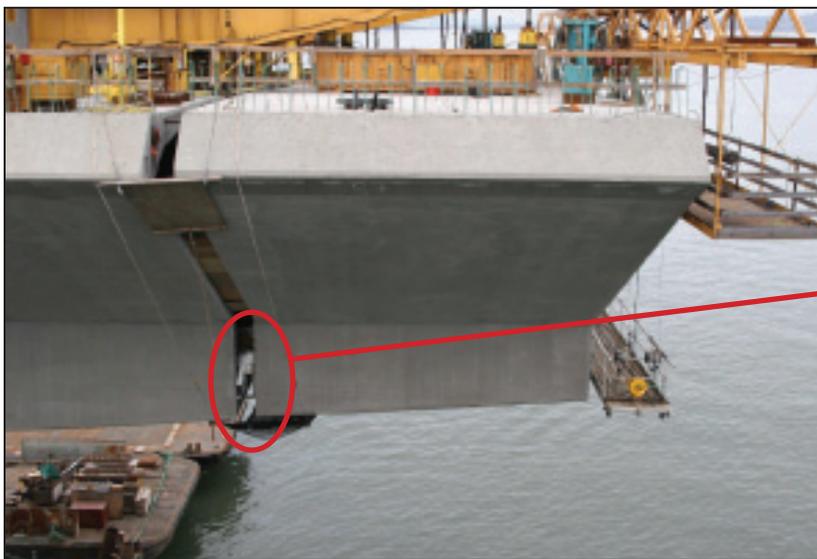


The Sika Solution

Caltrans identified five separate projects which would be called *East Bay Bridge Project*. The "Skyway" project, which was one of the five projects of the *East Bay Bridge Project*, involved connecting the Oakland touchdown structure to the suspension section. The Skyway project included Sika products which are offered as a part of a package for bridges - Sika's Comprehensive Product Solution.

Sikadur 31 SBA (Structural Bridge Adhesive)

16,250 gallons (61,588 liters) of Sikadur 31 SBA were 'smeared' to each side of every precast segment prior to final placement and tensioning. Sikadur 31 SBA served as a lubricant to allow for adjusting the placement of the segments during erection and as waterproofing for joints after placement of the segments and tensioning of the cables.

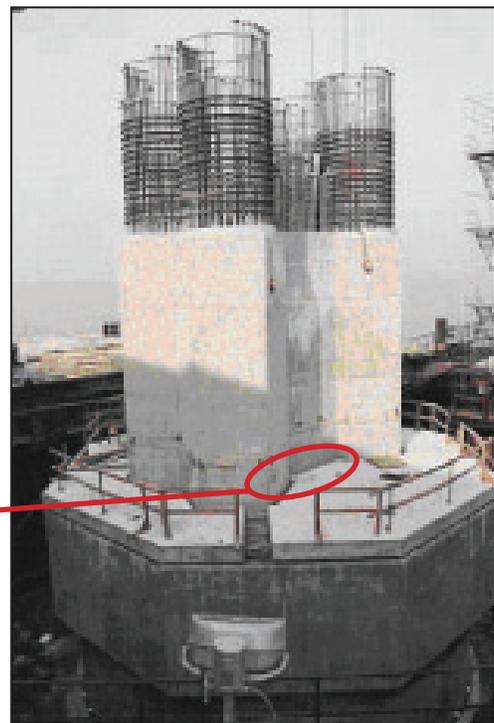


SikaGrout 300PT (2004-2007)

216,000, 50 lb. (22.7 kg) bags of SikaGrout 300PT were supplied to fill the ducts containing the post-tensioned cables. The grout provided additional protection to the steel cables as well as enhanced bonding of the cables to the duct and precast concrete segments. In order to service the demand for grout, a local manufacturing facility was established. Every six months, a random sample of material was tested by an independent testing company to ensure that the produced material complied with the strict project specifications.

**Sikaflex-2c SL**

Approximately 1,500 gallons (5,685 liters) of Sikaflex-2c SL were poured into the joint between the pile caps and pier columns to provide a waterproof seal between these two critical structural elements.



Sika Products Used

Sikadur SBA: A unique high modular structured adhesive for bonding hardened concrete to hardened concrete for segmented bridge construction. SBA's are available in different temperature ranges in regular and slow set categories.

SikagROUT 300 PT: A state of the art, sand free, zero bleed cement based grout. This grout is used for horizontal and vertical grouting of ducts within bonded post-tensioned systems.

Sikadur 42 Grout Pak PT: A three component epoxy grout used to protect the anchorages of post-tensioned tendons/bars on segmented bridges.

Sikaflex-2c SL: Sikaflex-2c SL is a 2-component, premium-grade, polyurethane-based, elastomeric sealant. It is principally a chemical cure in a self-leveling consistency. Meets ASTM C-920, Type M, Grade P, Class 25, use T, NT, M, G, A, O, I and Federal Specification TT-S-00227E, Type I, Class A.

SikaQuick 2500: A 1-component, very rapid hardening, early strength gaining, cementitious, patching material for concrete.

Sikadur 55SLV: Sikadur 55 SLV is a 2-component, 100% solids, moisture-tolerant, epoxy crack healer / penetrating sealer, having a fast tack-free time to minimize downtime. It is a super low-viscosity, high-strength adhesive formulated specifically for sealing both dry and damp cracks. It conforms to the current ASTM C-881 and AASHTO M-235 specifications.



References:

www.newbaybridge.org

Caltrans

Bay Bridge Public Information Office

The last picture is courtesy of www.hnu.edu

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