

## TOLL BRIDGE SEISMIC RETROFIT PROGRAM

### San Francisco-Oakland Bay Bridge East Span Replacement Project Former East Span Bridge Dismantling

#### Marine Foundations

#### E3 Foundation Removal Demonstration Project

Approved Capital Outlay Budget: \$18.5M  
Contractor:

The original east span of the San Francisco-Oakland Bay Bridge was supported by 21 in-water bridge piers, Piers E2 through E22, along with land based piers at Yerba Buena Island and Oakland. Part of this project is the demolition of Pier E3, which is located 1,535 feet east of Yerba Buena Island and on the east side of a 50-foot deep navigation channel.

As shown in the illustration on the facing page, Pier E3 is a cellular concrete caisson approximately 268 feet tall containing 28 total chambers. Fourteen of the chambers occur only below an elevation of approximately -51 feet and occur in two separate rows of seven chambers on each length side. Exterior walls of the caisson are four feet wide, while the interior walls comprising the chamber are three feet wide.

The structure has 12 angled buttress walls, six on each side, that are approximately 51 feet tall that begin at -51 feet and run up the caisson to 0 feet. Weep holes in the foundation located at an approximate elevation of -5 feet have allowed the caisson chambers to fill with water. Nearly 175 feet of the pier is buried in bay mud.

Pier E3 also contains a pier cap, which is 80 feet by 167 feet, excluding the fender apron. The pier cap, fender apron, and upper most portion of the caisson extend above the water line and support the steel superstructure of the bridge and are visible from the Bay.

Pier E3 is a pilot/demonstration project for the effective use of controlled charges to remove the marine foundations of the original SFOBB. The original authorization covered the dismantling of the piers via mechanical means such as saw cutting, flame cutting, mechanical splitting or pulverizing, and hydro-cutting, but did not cover the use of controlled implosion.

Dismantling of Pier E3 using controlled charges would be completed in four phases: 1) mechanical dismantling of pier cap and fender system, 2) drilling of bore holes into caisson and buttress walls and installing a blast attenuation system (BAS), 3) installing charges, activating the BAS and imploding the pier, and 4) management and removal of remaining dismantling pier debris. When completed, the pier would be removed to -51 feet.

Mechanical dismantling would have required the installation of a cofferdam around Pier E3, which would have required 394 piles of various types. Pile driving alone would take approximately four years, while the four phases of the demonstration project would occur within six months.

For more detailed information on the phases of the project, and compliance with state, local and federal laws, please see the US Army Corps of Engineers San Francisco District Public Notice: PUBLIC NOTICE NUMBER: SPN-1997-230130

**Status:** Completed the fender removal & work is underway with above water concrete pier removal projected to be completed the first week of August 2015. Pier E3 Implosion is scheduled for November, 2015, pending getting environmental permit in September, 2015. Successfully completed the first test of the bubble curtain mock-up on July 25th, 2015.



E3 Foundation Removal