

CASE STUDY

Permanent Tiebacks

DATE: August 2001 – August 2002

JOB NAME: Crockett Interchange Project

OWNER: Caltrans

LOCATION: Crockett, CA

GENERAL CONTRACTOR: C.C. Myers, Inc.



Route 80 crosses the Northern San Francisco Bay at the Carquinez Straits. Two bridges were built across the Straits, one in 1927 and the other in 1958. During the late 1990's the decision was made and the funding appropriated for the construction of a new bridge to replace the older of the pair. With the tremendous traffic volumes crossing the bridges on a daily basis the California Department of Transportation, the owner of the structures, decided to sequence the project so that the new third bridge was constructed and operational before the original bridge was demolished. The construction of the new bridge was split into two contracts one for the South access interchange to the bridge and one for the construction of the new suspension bridge.

The South access interchange, called the Crockett Interchange due to the city it is located in, consisted of the construction of overpasses and off ramps for the new bridge. C.C. Myers, Inc. of Rancho Cordova, CA, USA won the \$64 million contract in late 2000. The new interchange required four major retaining walls be installed in the hilly area at the bridge's South end. Retaining Walls R1 and R3 were soldier pile / tieback walls with treated lagging facing. Northwest Cascade, Inc. won the contract with C.C. Myers for the installation and testing of the tiebacks for these walls.

Wall R3 was comparatively small in scale and scope. It ran along the freeway for approximately 300 meters ranging from 2 meters to 7.5 meters in height. Two rows consisting of 112 EA, 4 to 7 strand DCP anchors were installed through double WF-section soldier piles.

The anchors averaged 22 meters in length with 4 to 9 meter bond zones, designed to withstand forces ranging from 400 to 1200 kN.

Wall R1 was the largest wall on the site and one of the largest of its kind in the world. Standing nearly 20.5 meters at its tallest point and ranging 168 meters in length, the wall cut a massive face into the existing hillside. As a result of the unstable soils, variable water table and extreme seismic loads, due to its proximity to the San Andreas Fault, the anchors used in this wall had to be designed to reach far into the hillside and retain sizable loads. Of the 342 anchors 200 were over 30 meters in length with the longest at 40.8 meters. Test loads of these 6 to 8 strand anchors ranged from 1000 to 1500 kN in bonded lengths of 10 to 28 meters. The tiebacks were grouted in five stages. The wall was typical top down construction with 6 lifts total. The ties were installed through drilled double WF-Section piles. The wall was faced with creosote treated timber lagging.

Wall R1 also required temporary shoring at its Western end where longer wider spaced tiebacks could not be installed due to an existing off ramp and utilities in close proximity. Engineers of Ground Support LLC and Northwest Cascade designed a soil nail wall to safely shore up this end of the excavation. When completed during the first stages of massive excavation the soil nail wall was comprised of 80 each nails and 290 m³ of 100mm shotcrete facing.