

Please Join Us... November 10, 2015

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Date	Location
Tuesday, November 10th	Zio Fraedo's Restaurant 611 Gregory Lane, Pleasant Hill, CA. (925) 933-9091

Time: No Host Bar 5:30 pm • Dinner 6:30 pm • Program 7:15 pm

**Cost: \$15 NACE members, NACE retirees and students
\$25 non-members**

Please RSVP by Thursday, November 5th by email to Michelle Anderson at mlanderson@corrpro.com, or by phone at (510) 381-1414.

Cancellation deadline is Friday, November 6th.

Location / Directions: Please see attachment "Meeting Location"

The San Francisco-Oakland Bay Bridge: Root Cause of Anchor Rod Cracking

Yun Chung

Materials Engineer (Retired from Bechtel)

The new Eastern Span of the San Francisco-Oakland Bay Bridge (SFOBB) cost \$6.4B, more than \$1M per stride (2-ft). Six months before the opening in September 2013, 32 of the 96 hot dip galvanized (HDG) 3-inch Grade BD (high strength steel) rods failed due to environmental hydrogen embrittlement (EHE). Caltrans spent \$25M in retrofit engineering/construction and \$20M in tests. Caltrans' "bolt consultants" assured no more EHE failures would occur in the remaining 2,200 HDG BD rods on the SFOBB. Notwithstanding their assurance, one 3-inch BD rod failed due to EHE in the tower base and two more 3-inch BD rods there were found to have "tiny cracks." Seawater intrusion there has been confirmed. These "new problems" raise serious concerns about the validity of their test data. Chung will present two different versions of the root cause of the 3-inch HDG BD rod failures by the "bolt consultants" of Caltrans. One of the "bolt consultants" stated that the root cause of the anchor rod failures is high pH [water] and that a coat of paint and grease on HDG BD rods can prevent them from "HE/SCC" failures. Chung will explain (1) why high pH [water] can never be the root cause, (2) why the "paint and grease" should never be allowed as a preventive measure of EHE, (3) why the "bolt consultants" must differentiate EHE from SCC and stop saying "HE/SCC," which is confusing. He will discuss why they have been unable to present a solution to the anchor rod cracking problems for two years, notwithstanding the \$20M test. Finally, Chung will discuss the true root cause of the BD rod failures: the Engineer's failure to have corrosion engineers on the project. The new SFOBB will not live out its design life (150 years) because of corrosion of the main suspension cable at six vulnerable locations.

Yun Chung, retired from Bechtel Corporation in 1995 and from Anamet in 2013. While at Bechtel, he provided materials engineering consulting services on materials selection, fracture prevention, ASME/AWS welding procedures, and corrosion control for engineering/construction projects such as power plants, seawater treatment, copper mines, and pipelines. During the 1980's, Chung participated in the Atomic Industrial Forum on bolting issues in nuclear power plants. He authored several reports on high strength steel bolt failures. After graduating from Seoul National University in Korea in mechanical engineering, Chung attended the University of California, Berkeley, where he obtained BS/MS degrees in metallurgy.

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