



THE SAN FRANCISCO-OAKLAND
BAY BRIDGE
SEISMIC SAFETY PROJECT

BATA Oversight Committee – April 10, 2013

CALTRANS BAY AREA TOLL AUTHORITY CALIFORNIA TRANSPORTATION COMMISSION

- AB 144 established the ***Toll Bridge Program Oversight Committee***, composed of Director of the California Department of Transportation (Caltrans), and the Executive Directors of the California Transportation Commission (CTC) and the Bay Area Toll Authority (BATA), to be accountable for delivering the SRP.



MALCOLM DOUGHERTY
Director
California Department of
Transportation



STEVE HEMINGER
Executive Director
Bay Area Toll Authority



ANDRE BOUTROS
Executive Director
California Transportation
Commission



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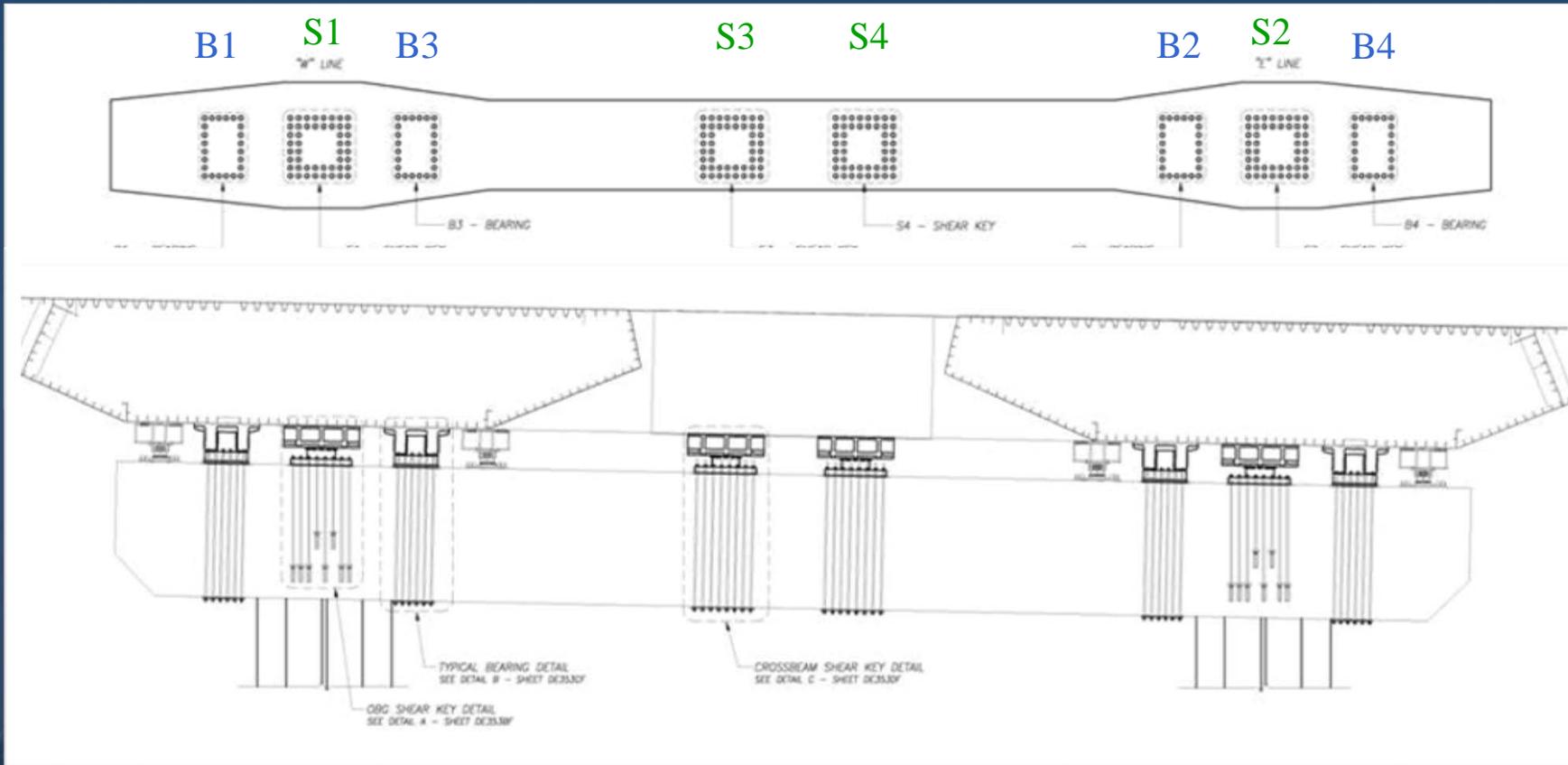
Toll Bridge Program Oversight Committee



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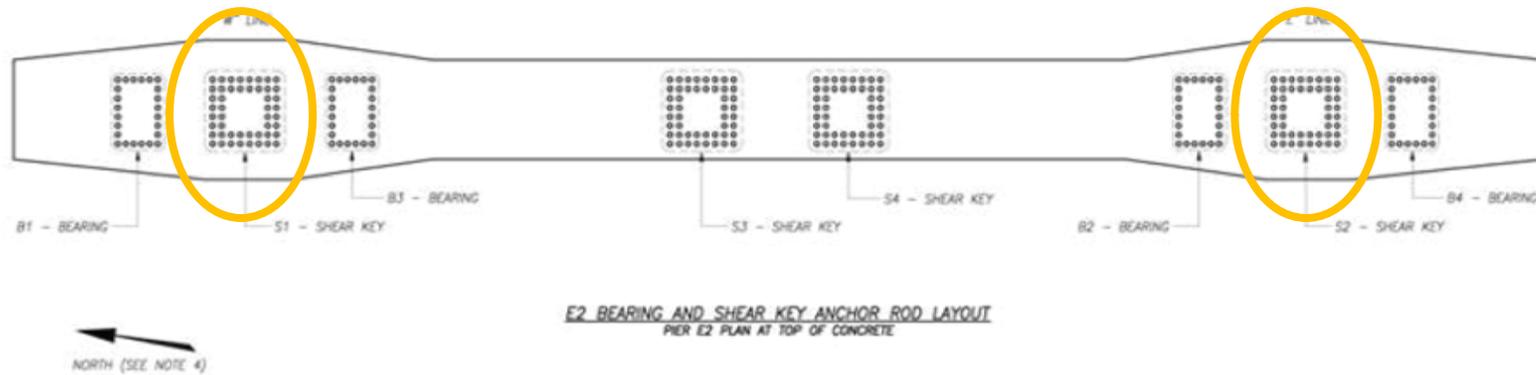
Pier E2



Bearings and shear keys are secured to Pier E2 by 3 inch diameter anchor rods, ranging from 9 feet to 24 feet in length

Each bearing has 24 anchor rods and each shear key has 48 anchor rods for a total of 288 anchor rods





Shear key and bearing anchor rods could not be stressed until completion of load transfer.

Stressing began on March 1 of this year, starting with anchor rods fabricated in 2008 (total of 96 rods) for shear keys S1 and S2.

32 fractured rods were discovered between March 8 and March 15.



■ Quality Control By Contractor

- Mill Certifications
- Independent Laboratory Testing of Material Properties
- Certificates of Compliance

■ Quality Assurance By Caltrans

- Pre-fabrication facility audits
- Regular inspections during fabrication
- In-house laboratory testing
- Non-Conformance Reports



- **Non-Conformance Reports (NCR's) are a normal part of Quality Assurance process and reflect variances in process or testing.**
- **Two Non-Conformance Reports were issued for fabrication of the 2008 rods**
- **This level of Non-Conformance is reflective of the thorough Quality Control/Quality Assurance process.**
- **First NCR related to a paperwork issue**
- **Second NCR related to the test results for two components of the 2008 rod assemblies: hardness of the nuts and elongation of the rods.**



- **Out of over 150 individual results for the rods obtained from both quality control and quality assurance testing; only 5 results were below specifications.**
- **All 5 involved one mechanical property – elongation.**
- **The specification requires a minimum of 14% elongation, and 5 results were in the range of 12.5-13.6%, or 1.5-0.4% below specification.**
- **These results for the rod assemblies were reviewed by design and construction engineers and the material was determined to be suitable for use.**





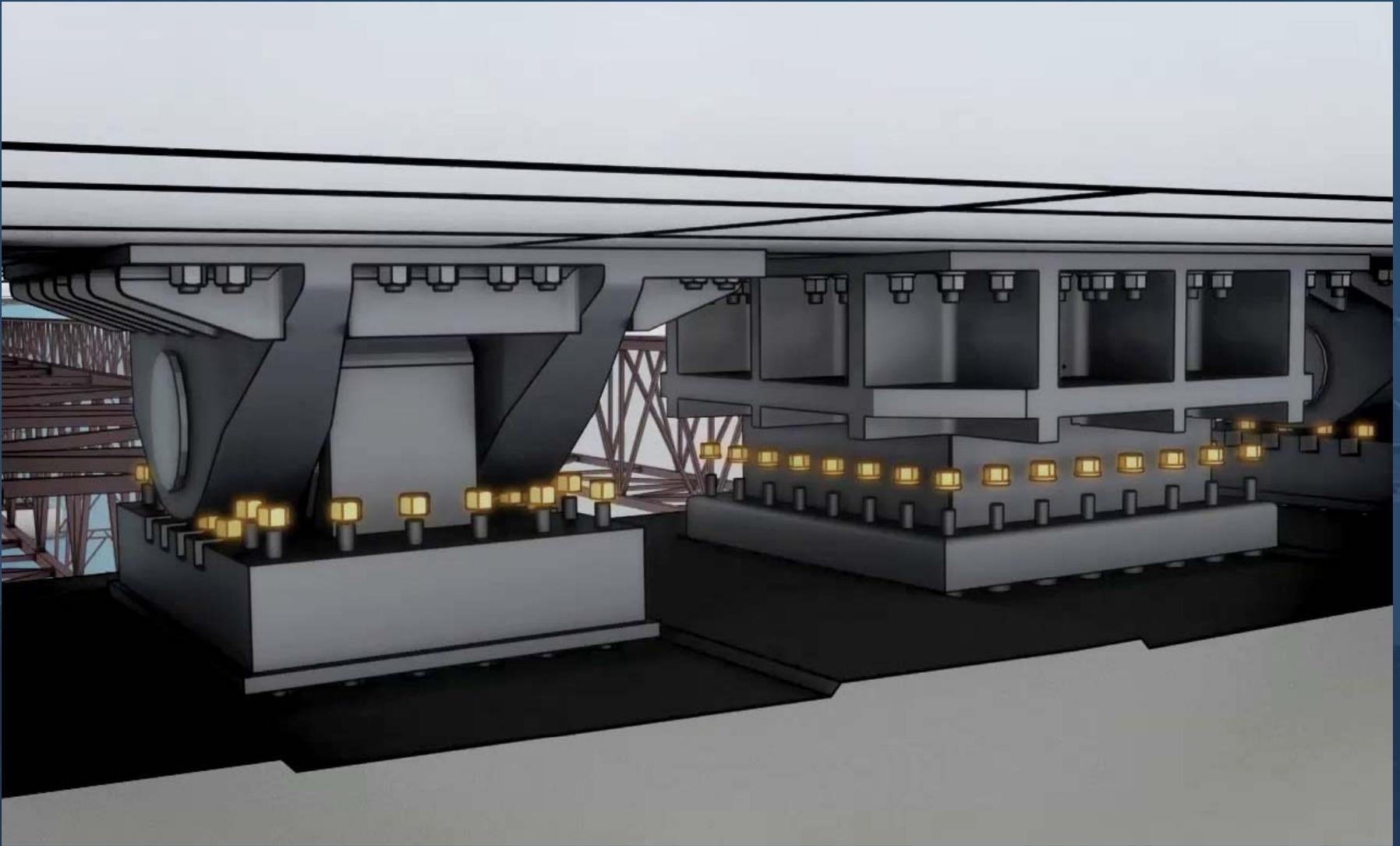
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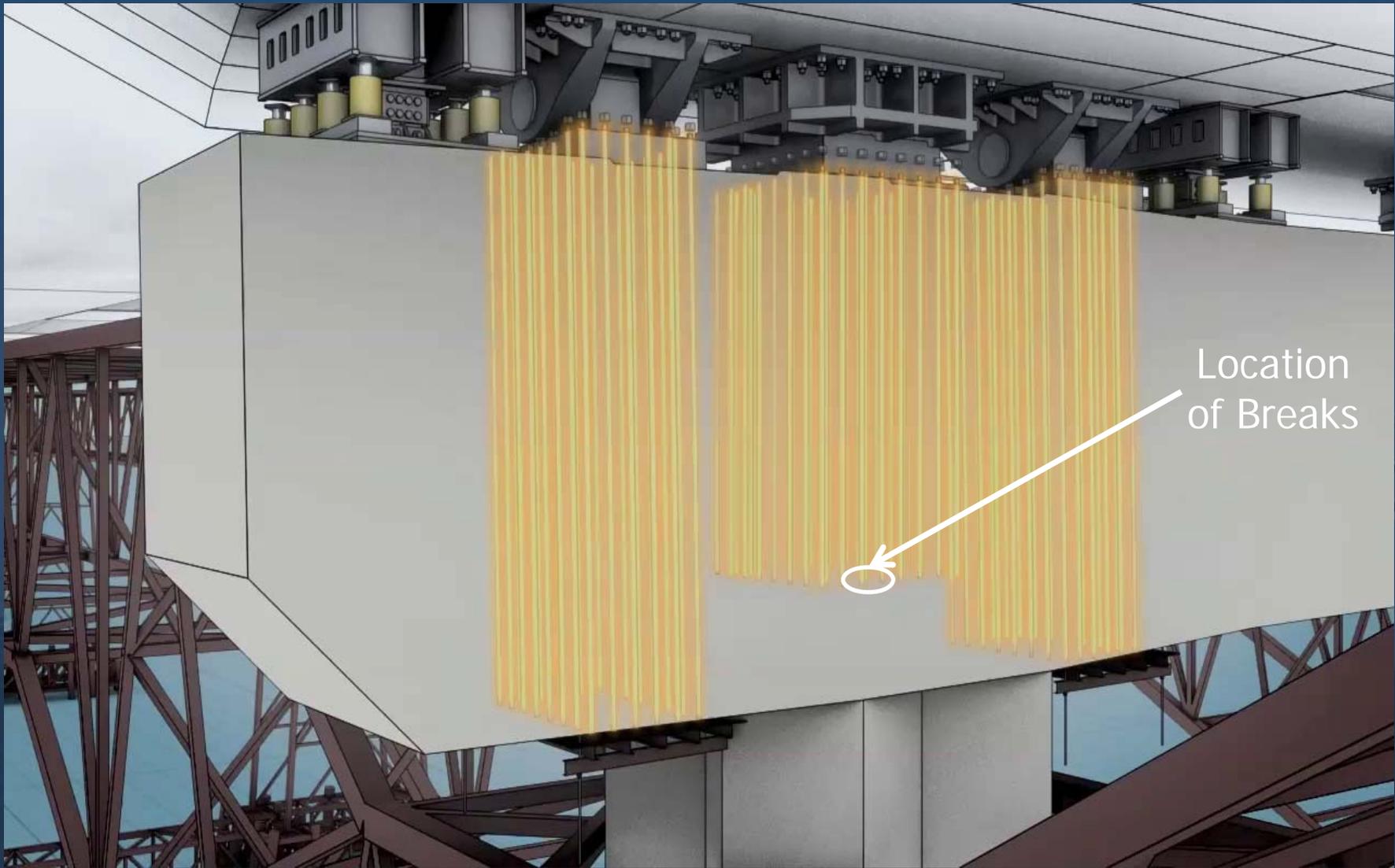
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Location
of Breaks

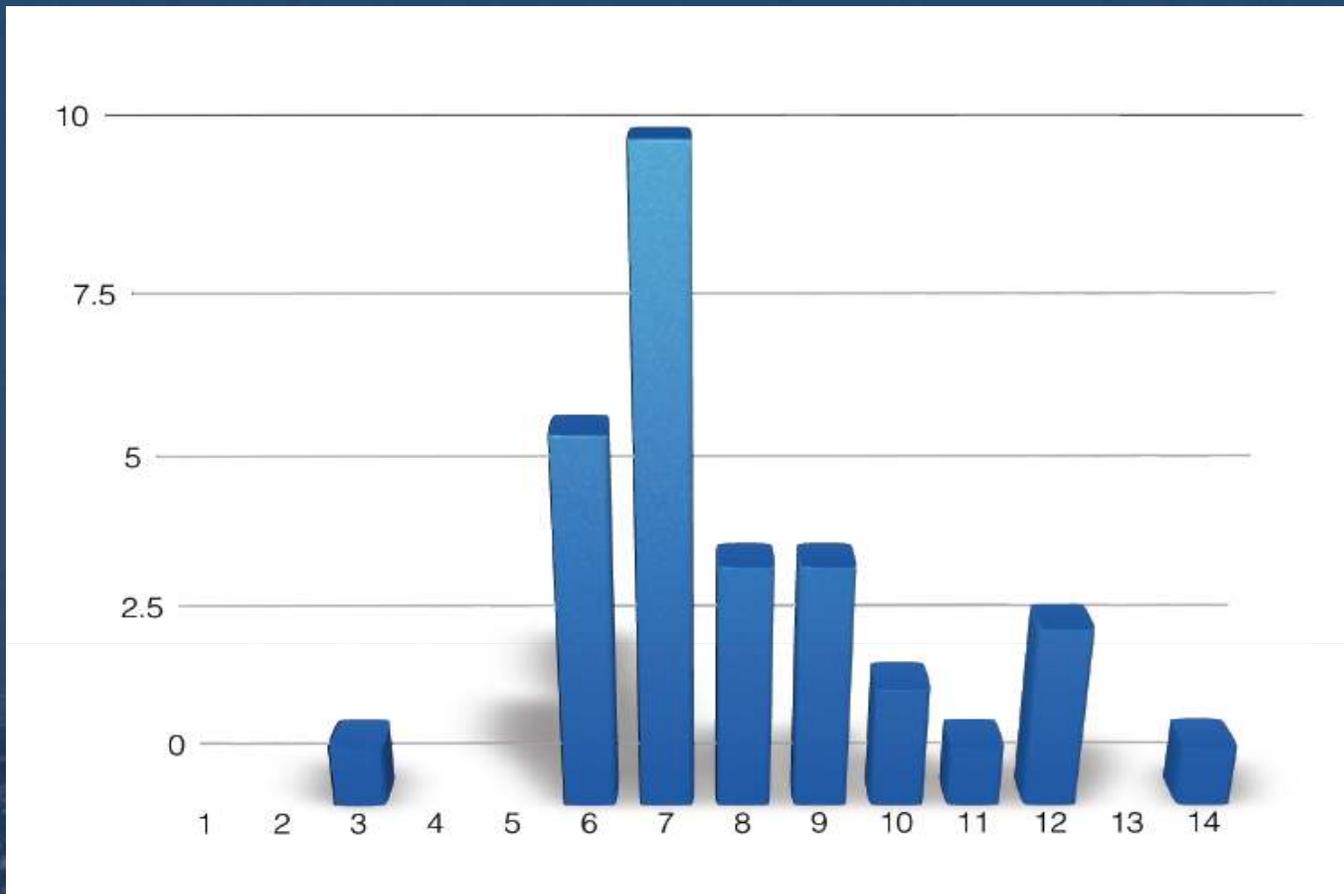


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DAYS AFTER STRESSING

- Remaining rods were detensioned after 14 days.





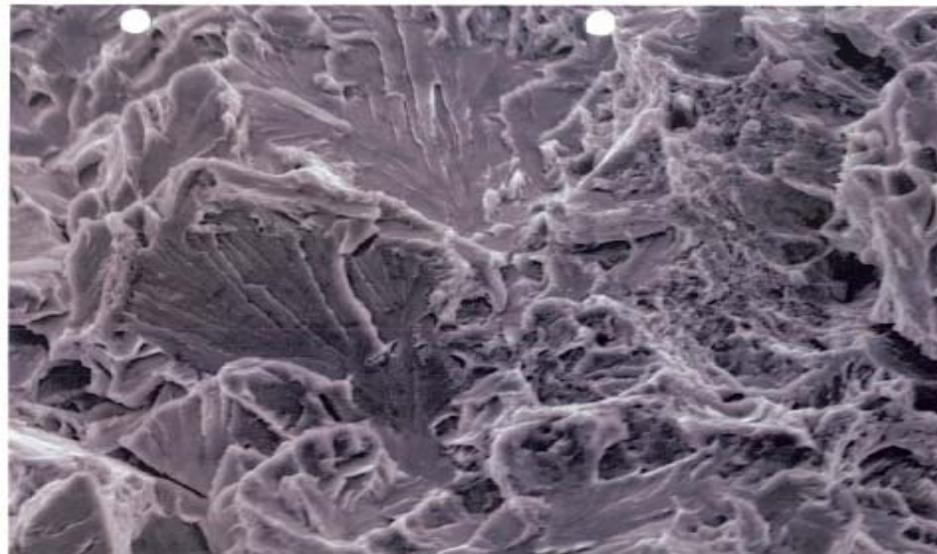
**One fractured rod
sent to lab for
testing**

**Testing included
electron
microscopy and
mechanical
property tests**

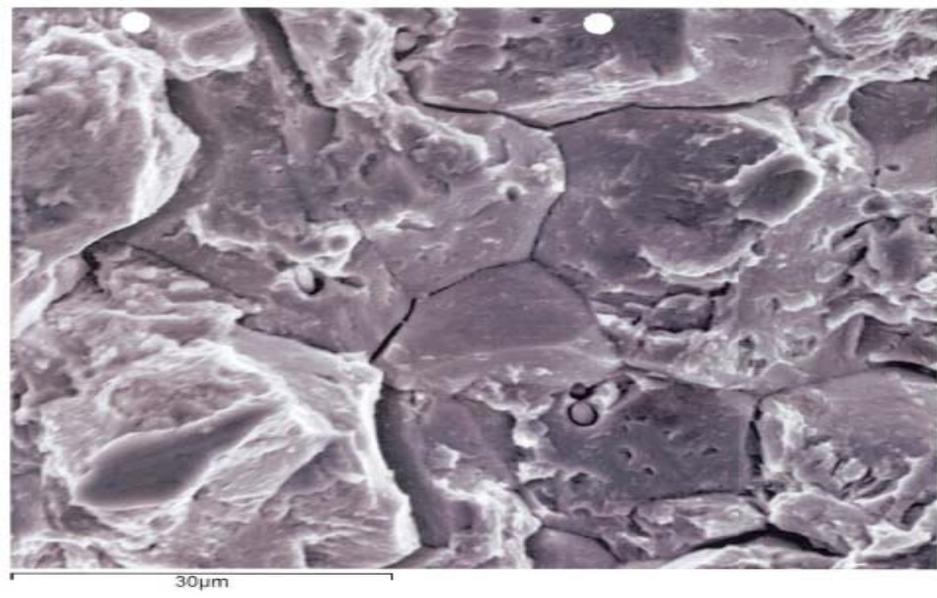


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SEM 5



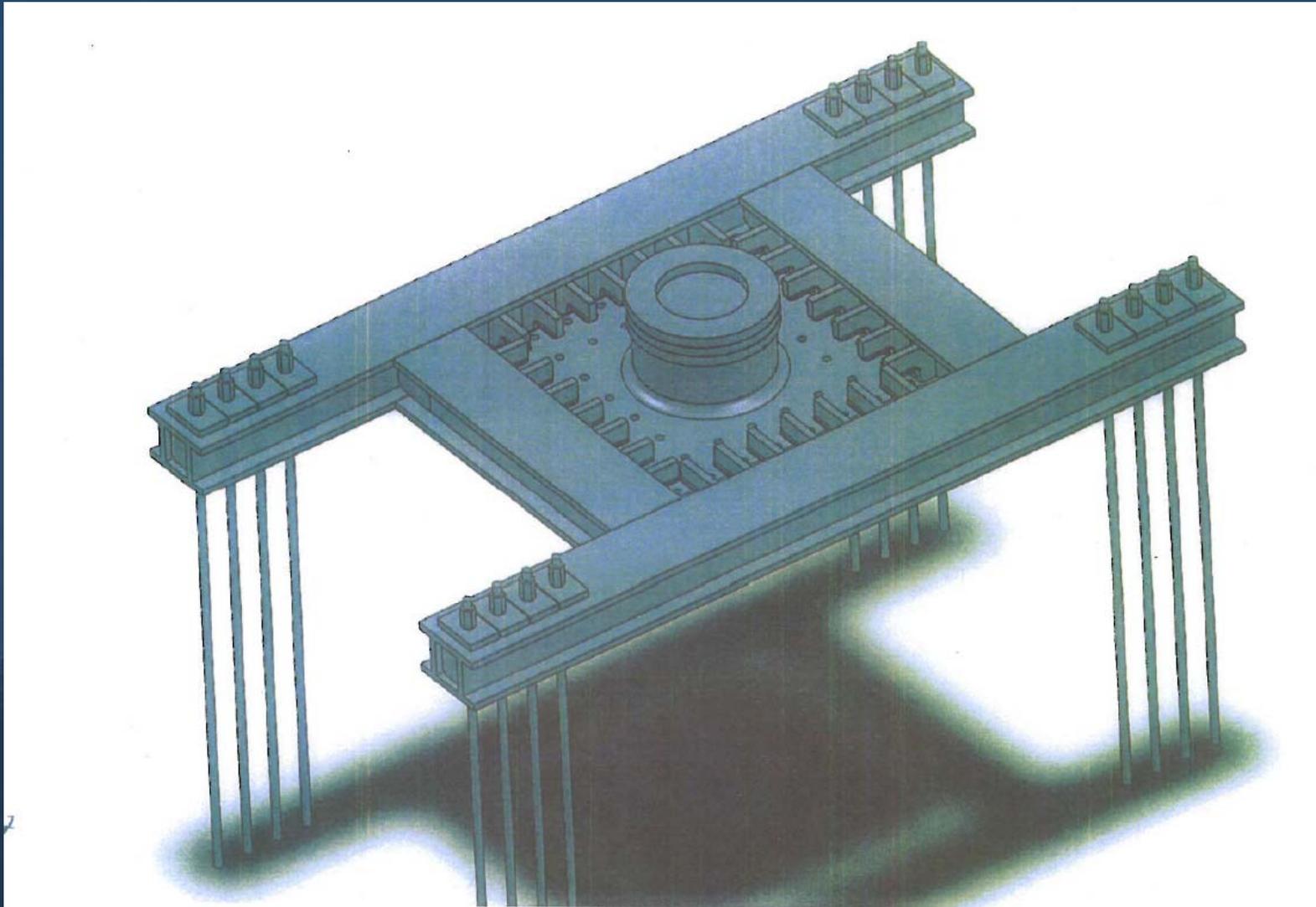
SEM 2

1000X Magnification



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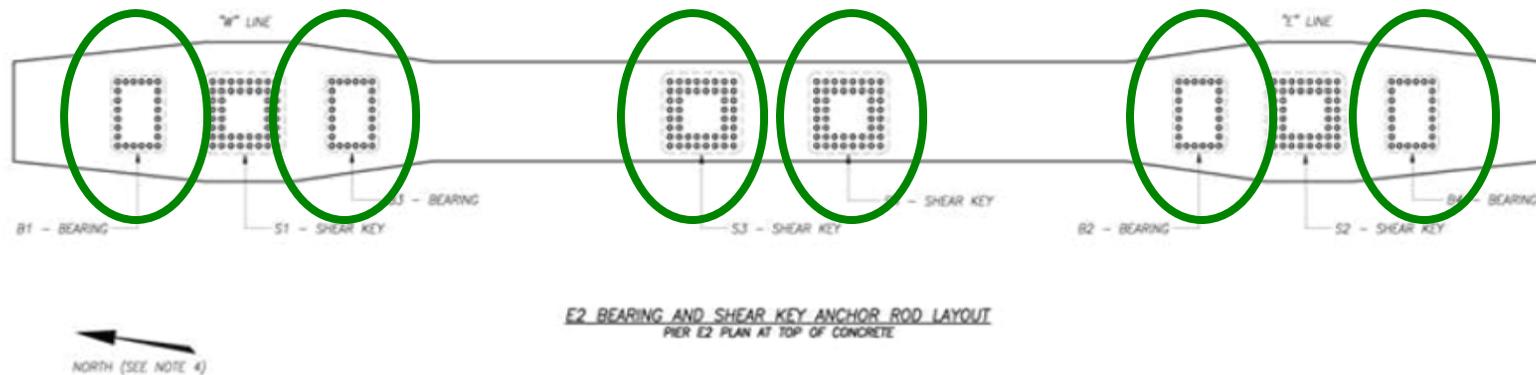


Conceptual design – steel collar



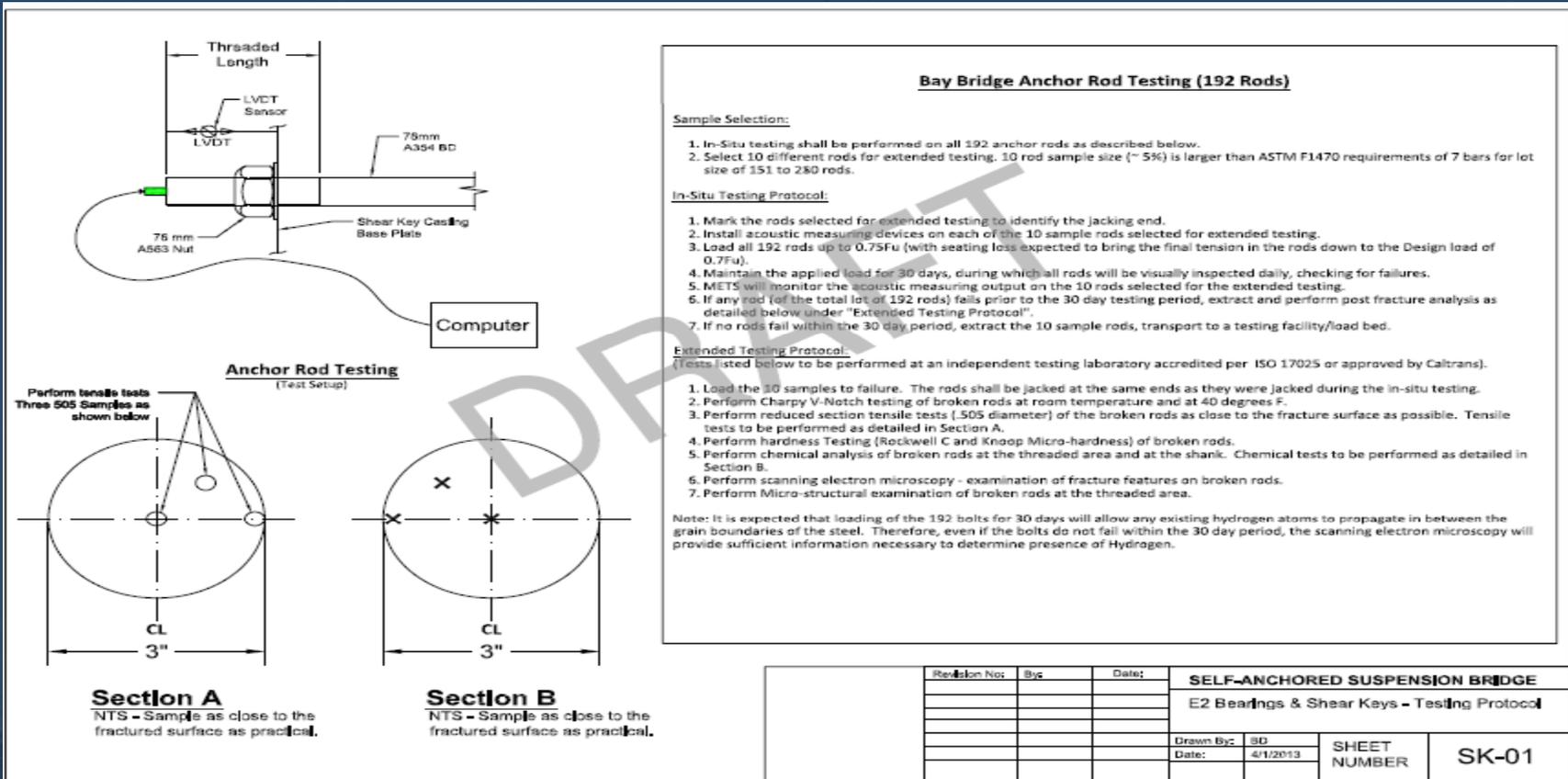
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- Remaining 192 anchor rods for other shear keys and bearings were fabricated later in 2010 and installed in 2011.
- These rods have passed all Quality Control/Quality Assurance steps and testing.
- As of April 9, these rods have all been stressed.
- Rods are inspected daily.
- To date, no rods have fractured.



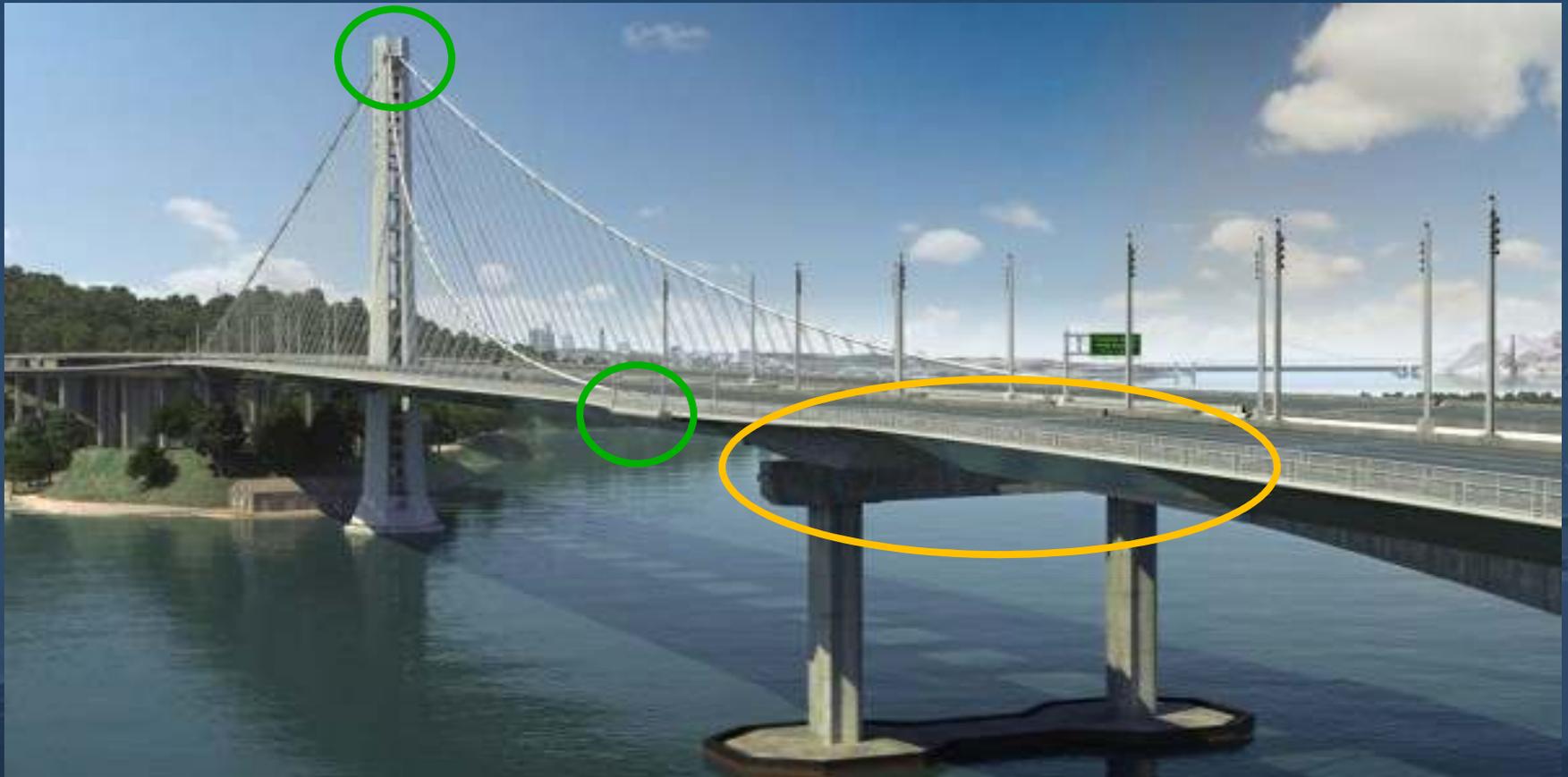


10 sample rods selected for instrumentation

All 192 rods stressed per plan

10 sample rods will be removed for destructive testing





- **Visual inspections of similar rods by the same manufacturer have been completed with no abnormalities.**
- **A desk audit of QC/QA results still underway**



Summary

**Continuing investigation on cause of failure in
2008 anchor rods**

Continuing design of shear key retrofit

Tensioning and testing of 2010 anchor rods

Continuing communication at BATA meetings

