




Accelerating Bridge Construction

- Seismic Connections

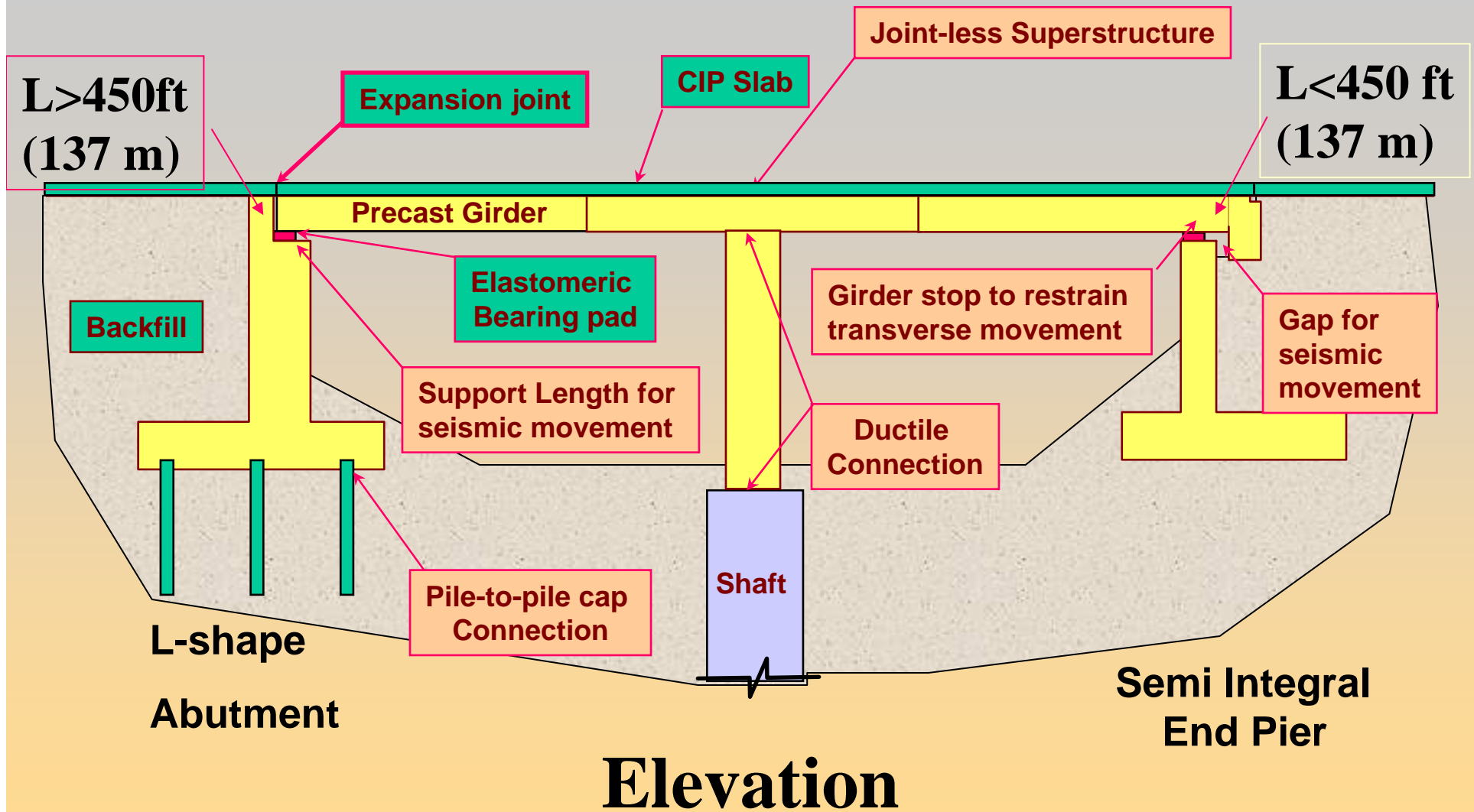
TRB Research Proposal Webinar



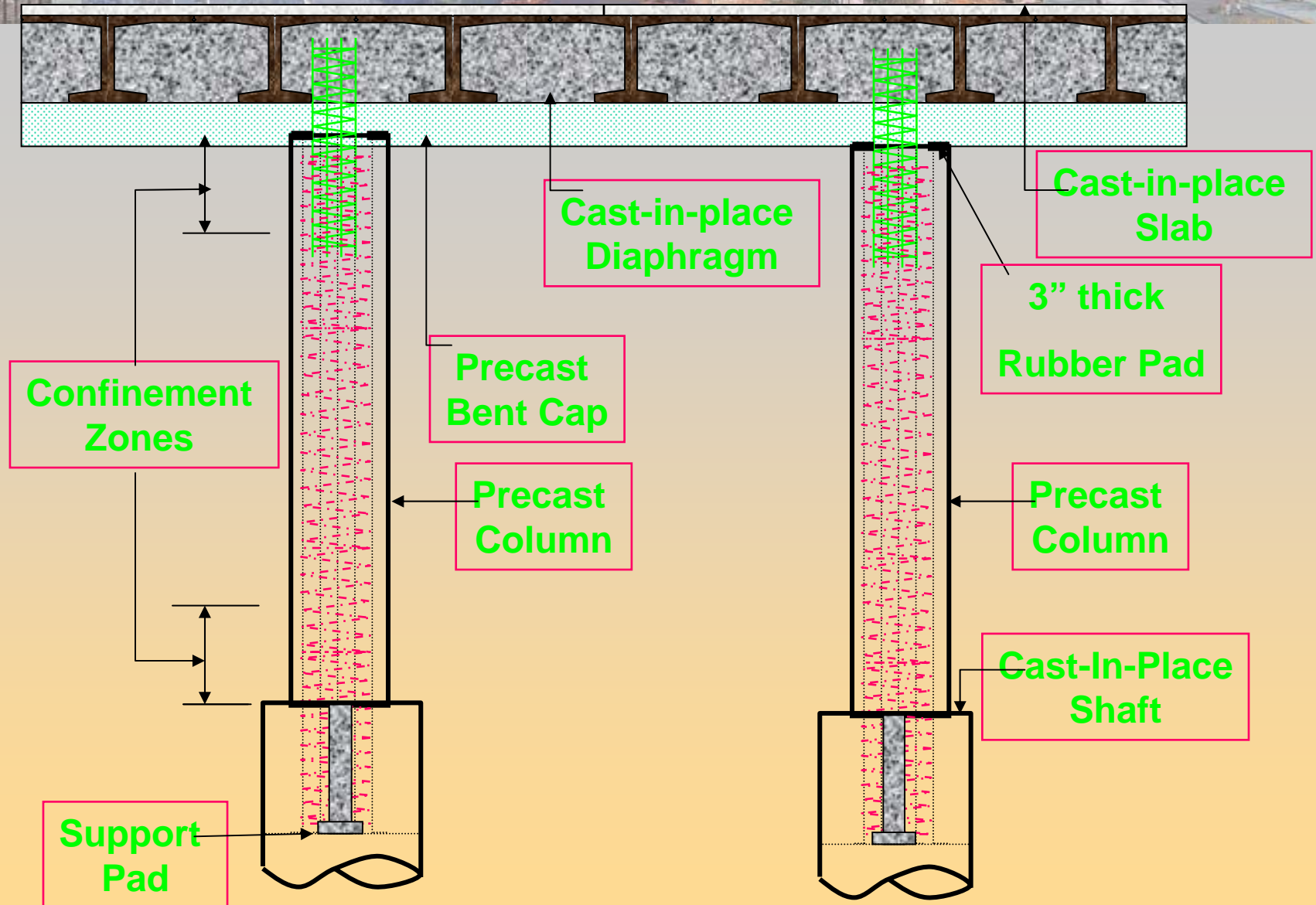
Objectives

- 
- Review and discuss connection details considered good candidates for immediate use in regions of strong to moderate seismic hazards following testing.
 - Discuss proposed connection details and formulate an updated research problem statement with specific research goals and timelines at the 2009 TRB meeting.
 - Once funded, work would conclude rapidly, facilitating rapid technology deployment.
 - Will seek national funding through AASHTO and NCHRP or other avenues within FHWA.
 - In the absence of these options, consider pooled funding project(s).

Washington DOT



Washington DOT- Precast System



Washington DOT Precast Bent cap SR 202 / SR 520



Tolerances - Tack Weld



Duct Template



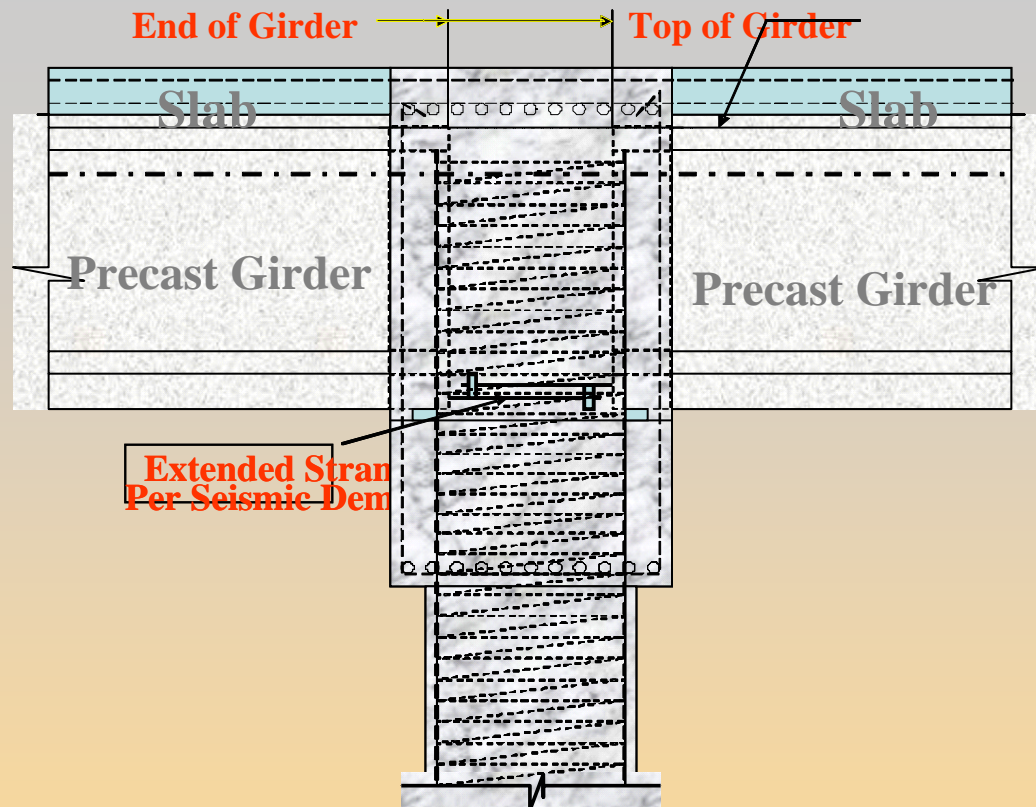
Spirals

Washington DOT Precast Bent cap SR 202 / SR 520

**1^{1/2} Hours +/-
Bent Cap Erection**

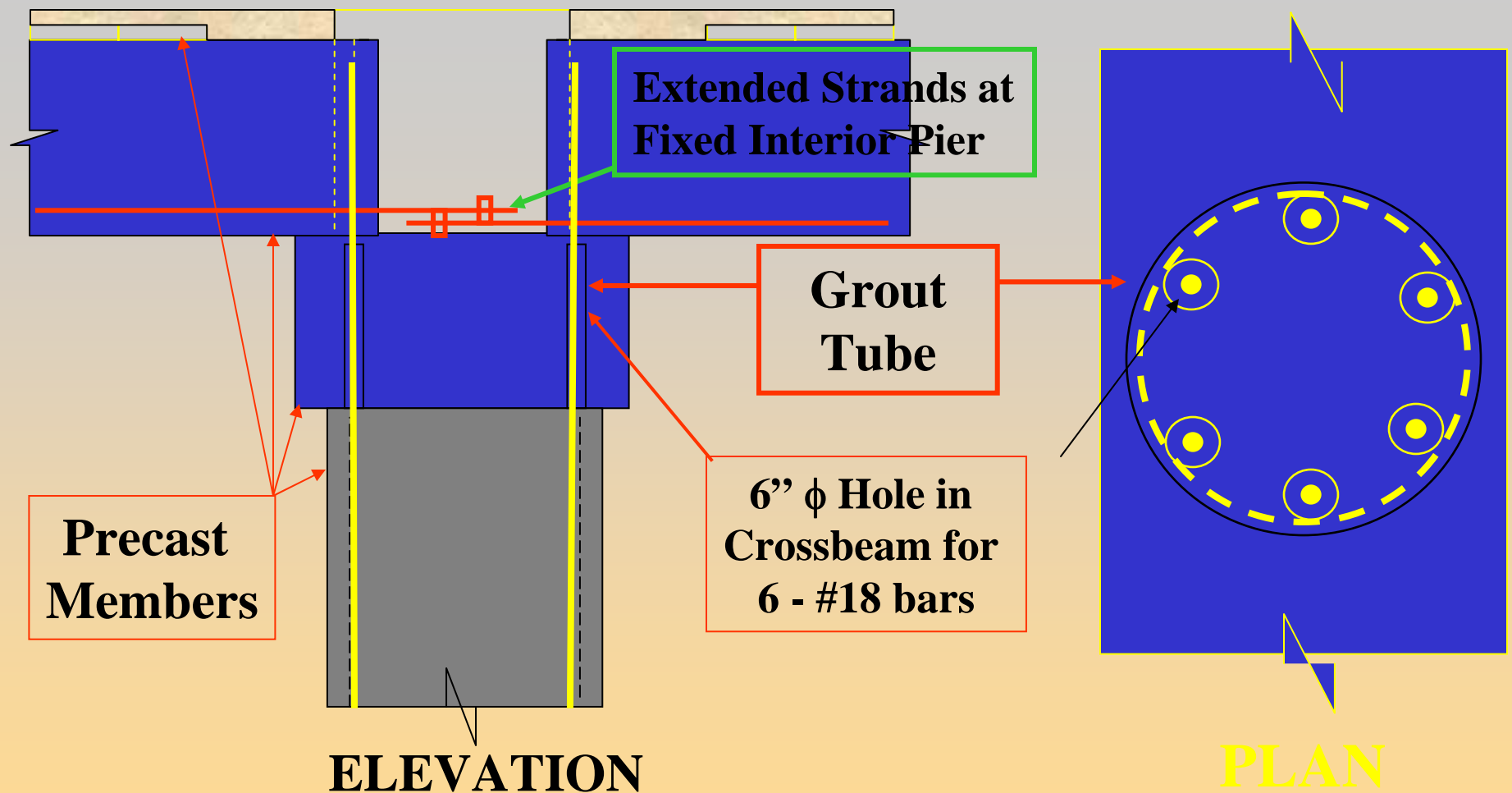


Washington DOT- Fixed Intermediate Pier Connection



Precast Substructure Research

U of Washington



Precast Girder to CIP Bent Cap

- Used by Washington DOT

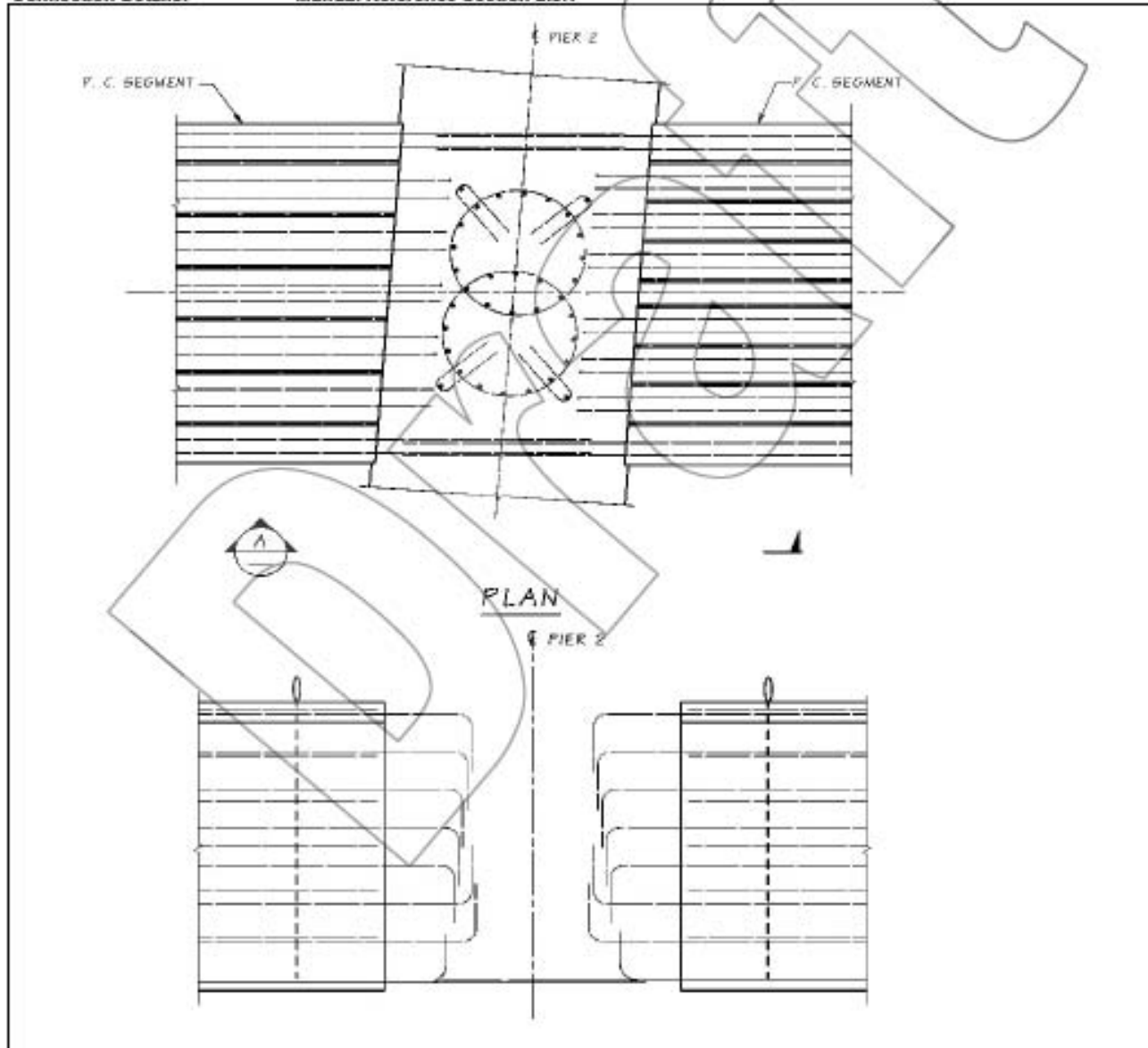


Precast Girder to CIP Bent Cap

Components Connected: Precast tub girder segment to Interior pier

Name of Project where the detail was used: SR5 - 38th Street Interchange - Tacoma, WA

Connection Details: Manual Reference Section 2.5.1





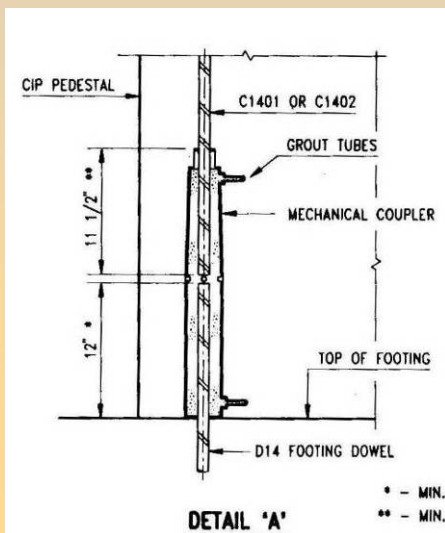
Why consider grouted couplers?

- They are very versatile
 - We can connect virtually any 2 precast elements together
- Connections can be made very quickly
- They can transfer axial, moment and shear forces
- They have been used for many years on bridges under traffic and in severe exposed environments
- Is it cost effective and easy to construct
- It is not proprietary
 - There are 3 companies that produce similar connectors
- We don't need to change the way we design and detail bridges



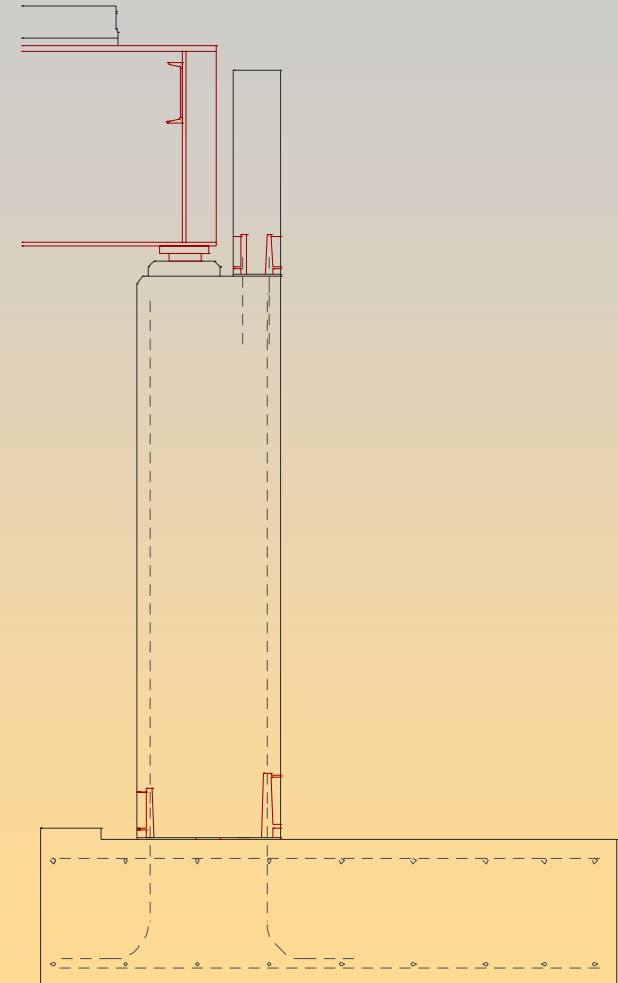
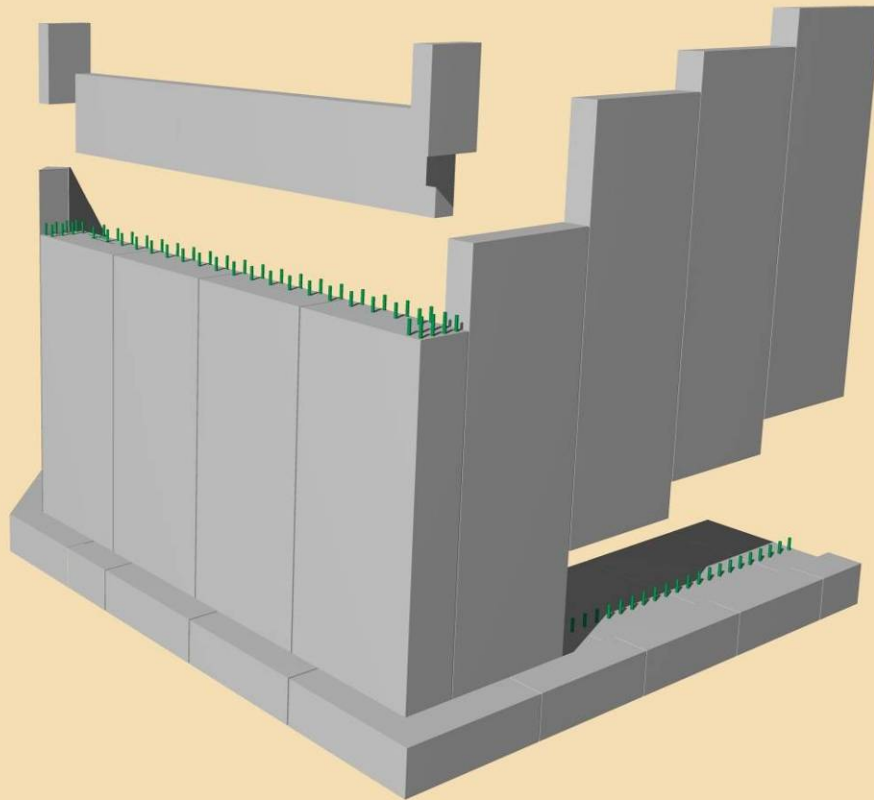
Grouted Reinforcing Splice Couplers

- Emulates a reinforcing steel lap splice
- Used in precast parking garages and stadiums and bridges





Precast Cantilever Abutments



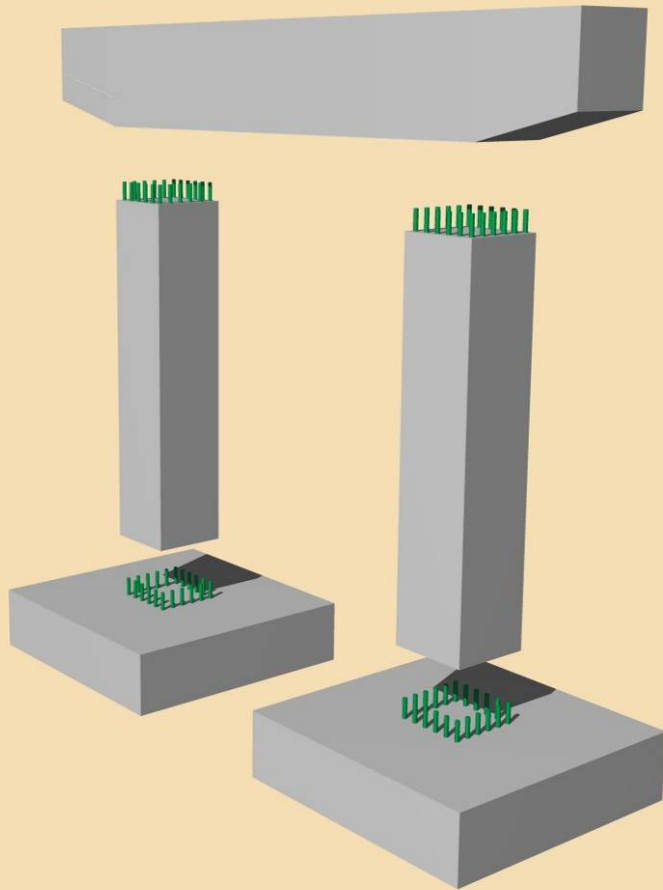
Mill Street, Epping NH





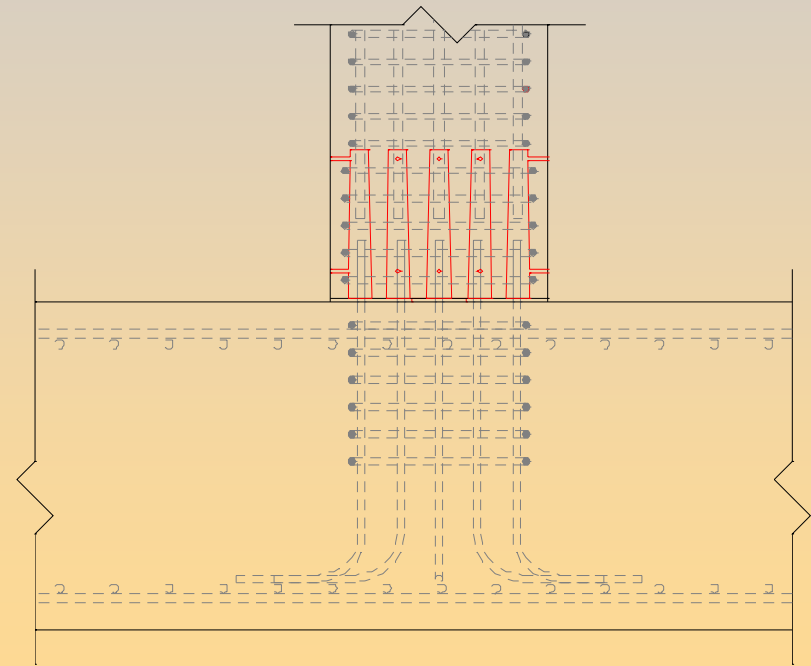
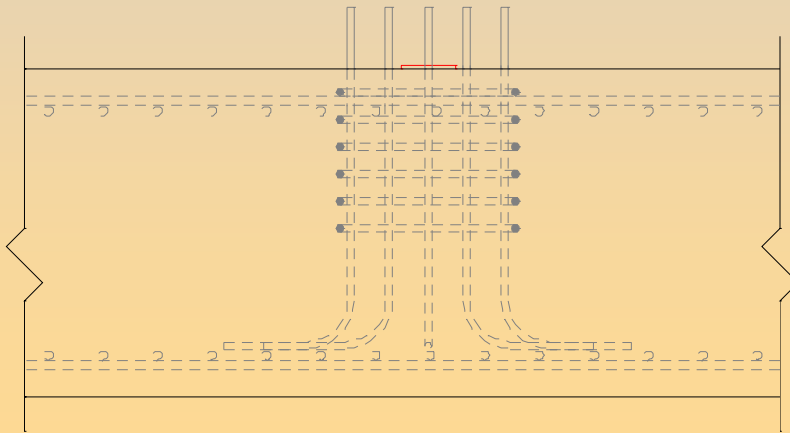
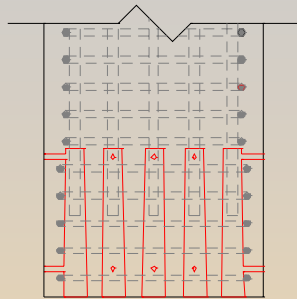
Precast Piers

- Florida DOT Detail
 - Edison Bridge
 - Highly corrosive environment
 - Excellent performance
- Also used in Georgia and Northeast PCI



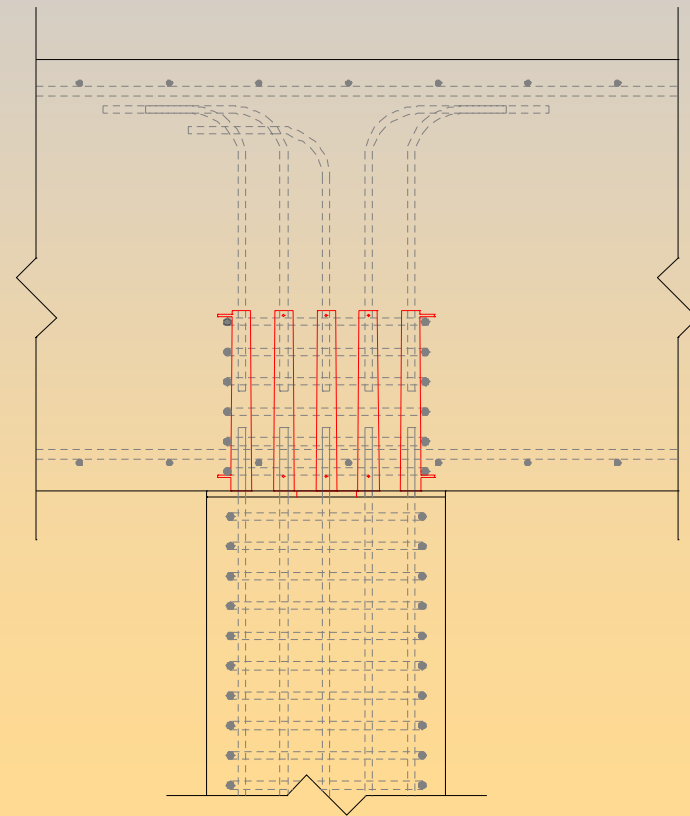
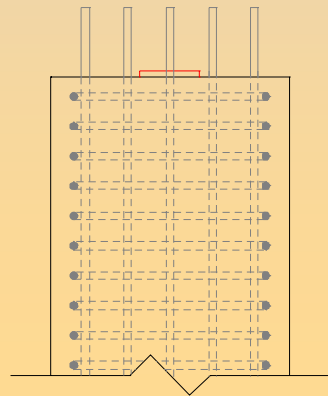
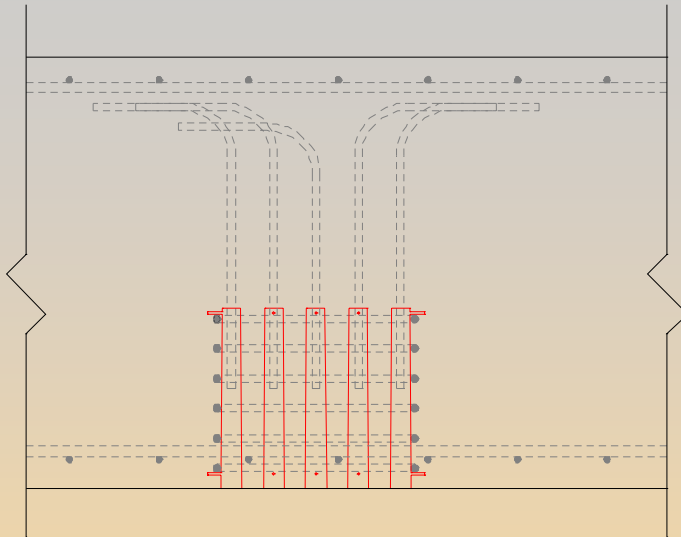


Column to footing connection





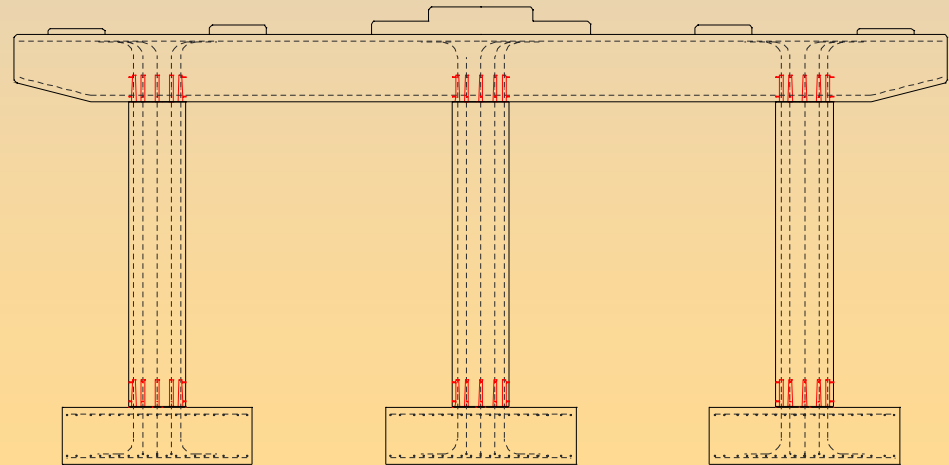
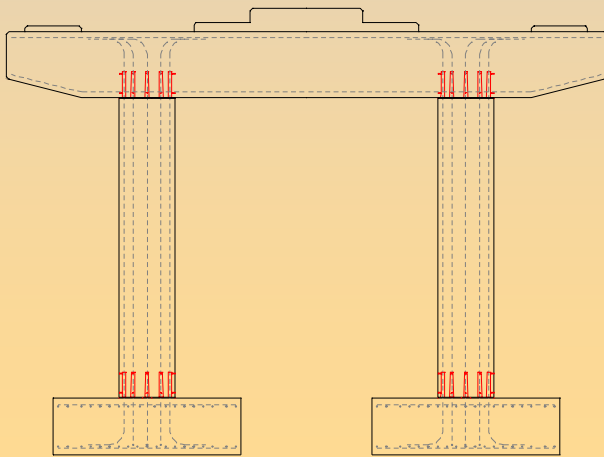
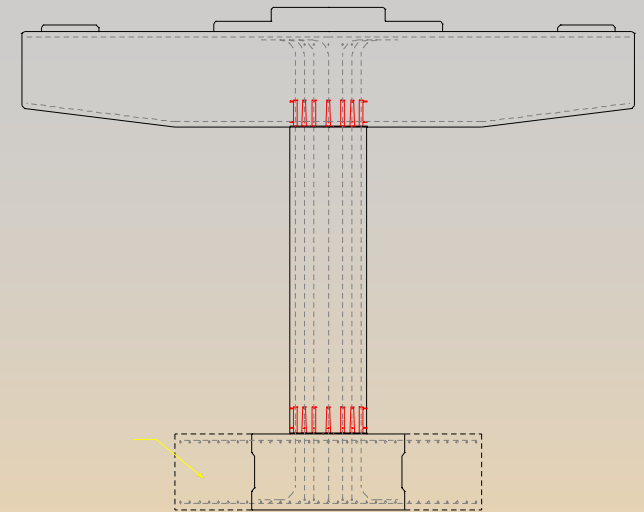
Column to cap connection





Pier Types

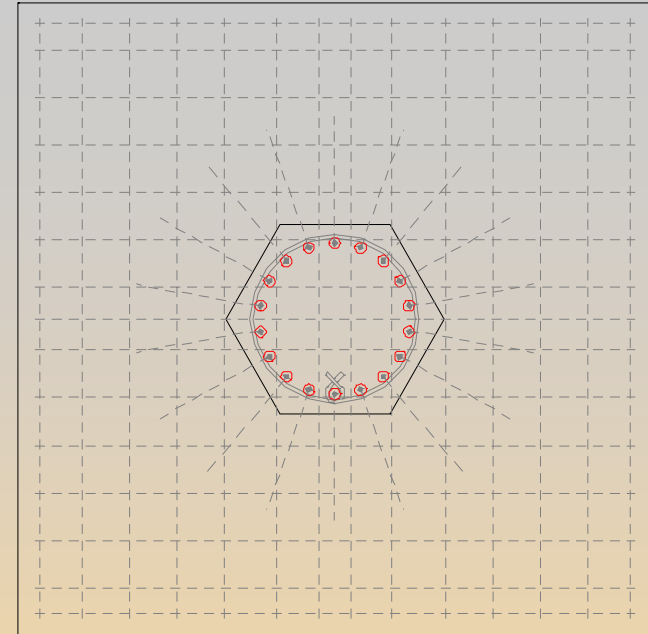
- Single column hammerhead
- Two column bent
- Three column bent



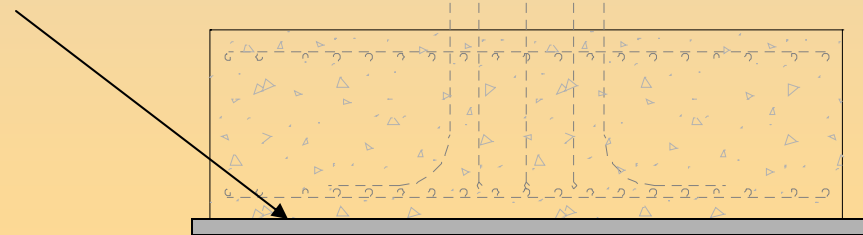


Footings

- Full Precast
 - For smaller footings



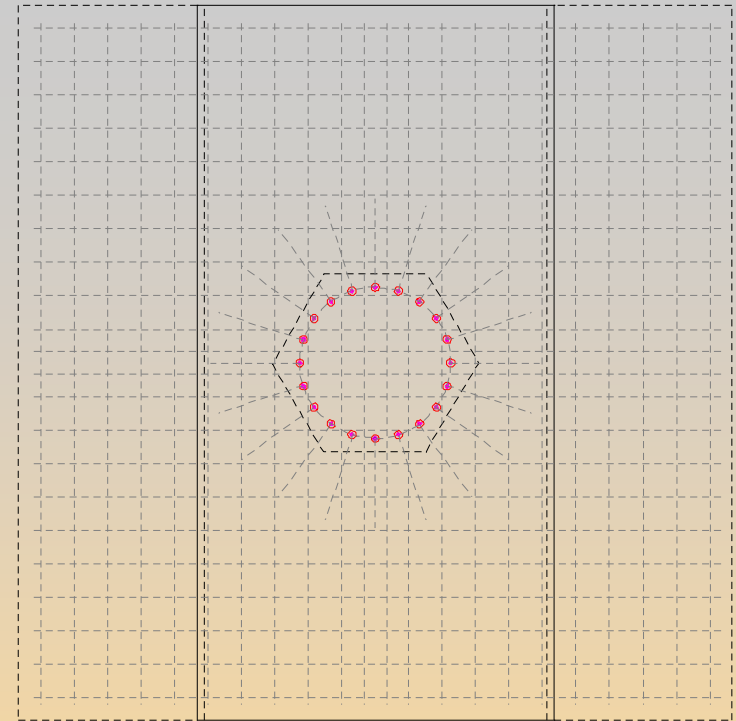
Shim and grout under footing
through ports in footing





Footings

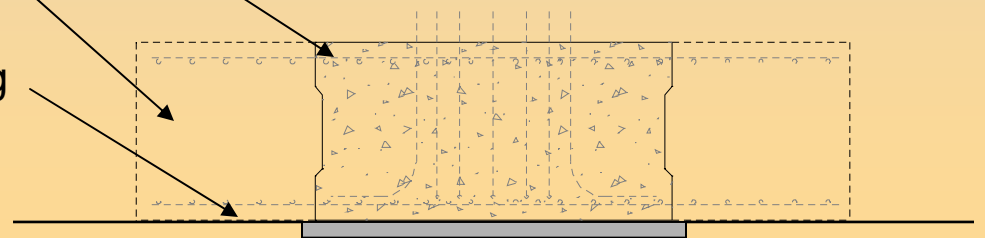
- Partial Precast
 - For larger footings
 - Precast designed to support DL of bridge
 - CIP extensions designed for other loads



Precast Portion

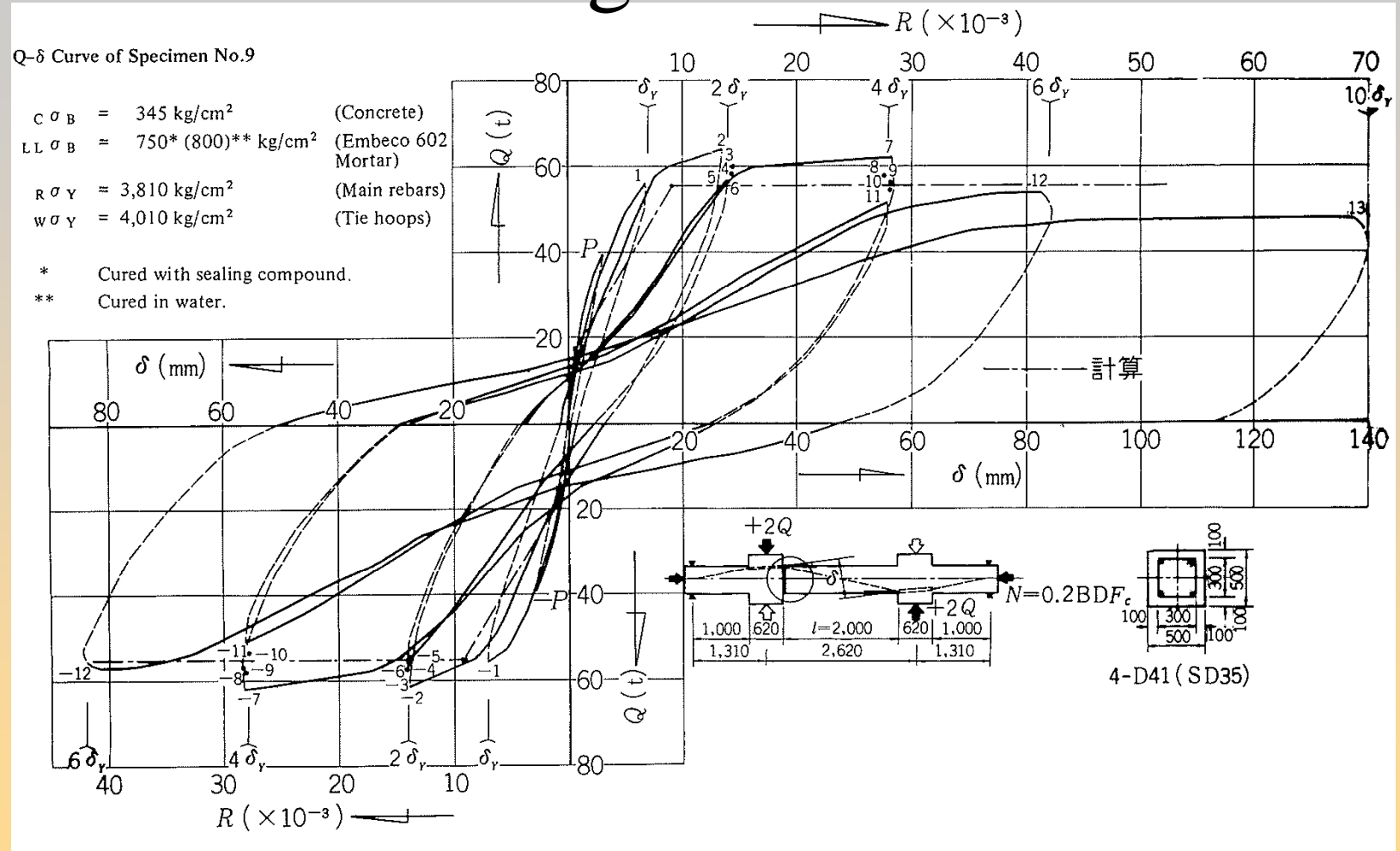
CIP Extension

Shim and grout under footing
through ports in footing





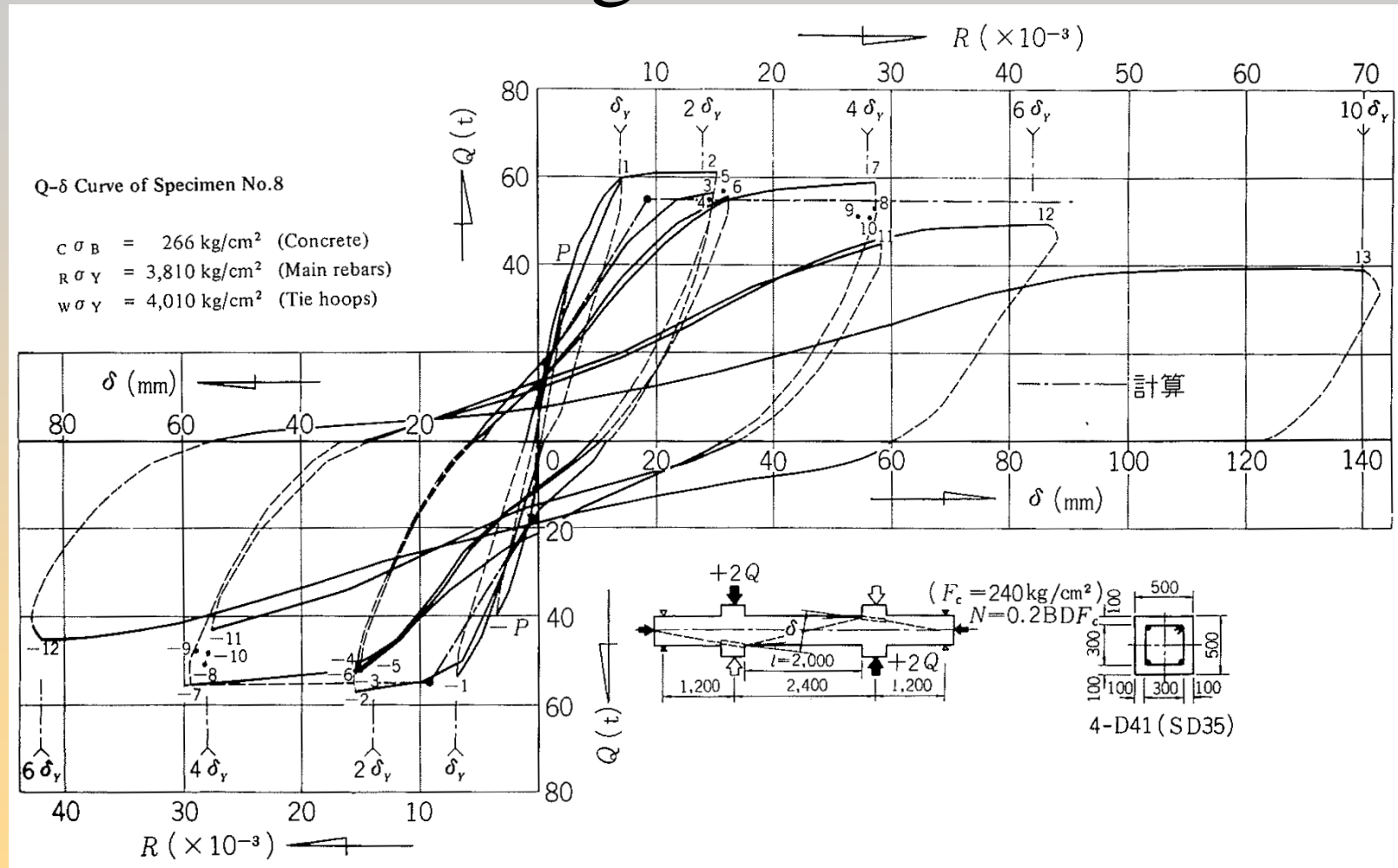
Previous Testing data



Grouted Splice coupler @ end of column

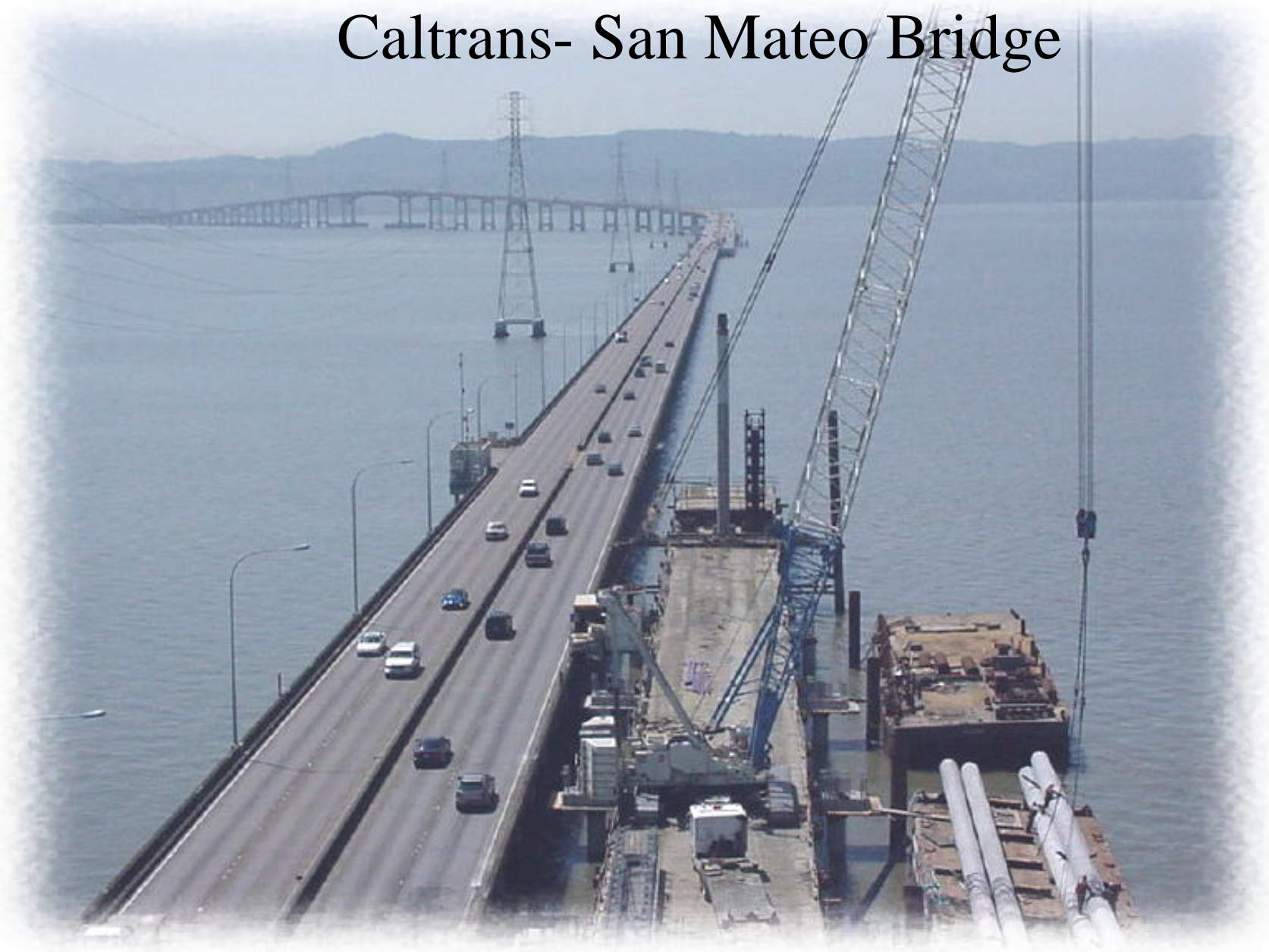


Previous Testing Data



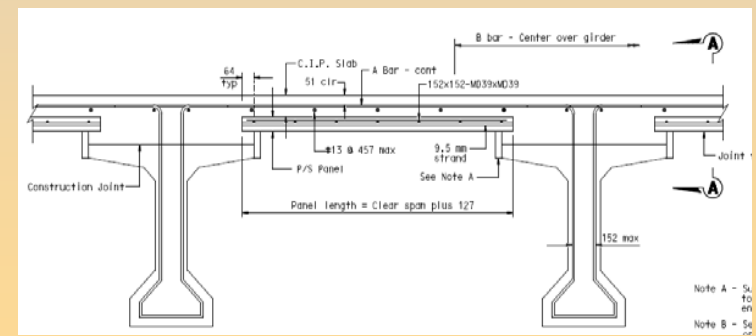
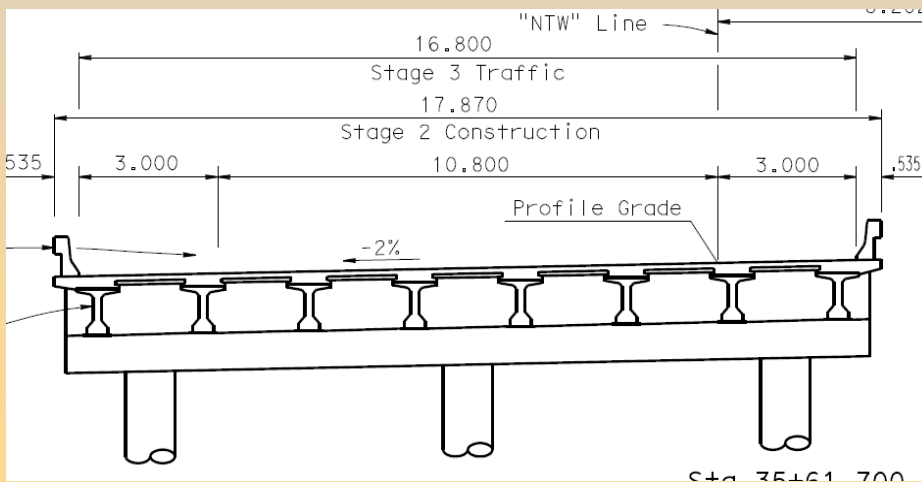
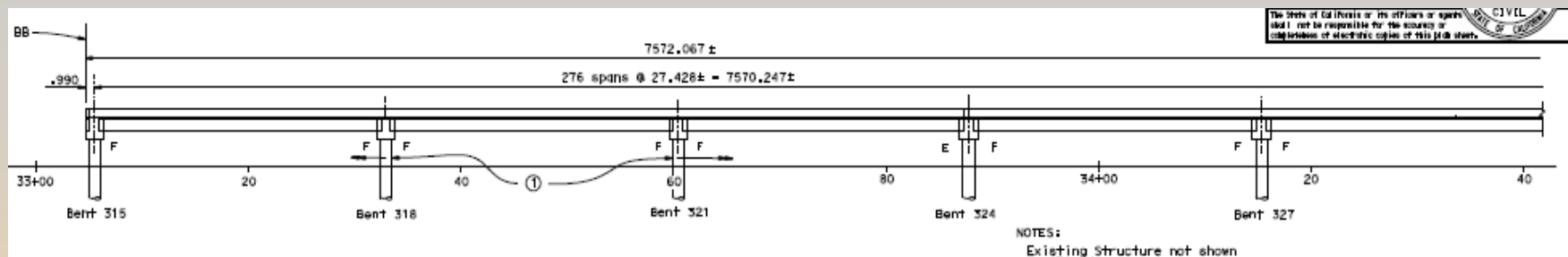
Control Column w/o Grouted Splice Coupler

Caltrans- San Mateo Bridge



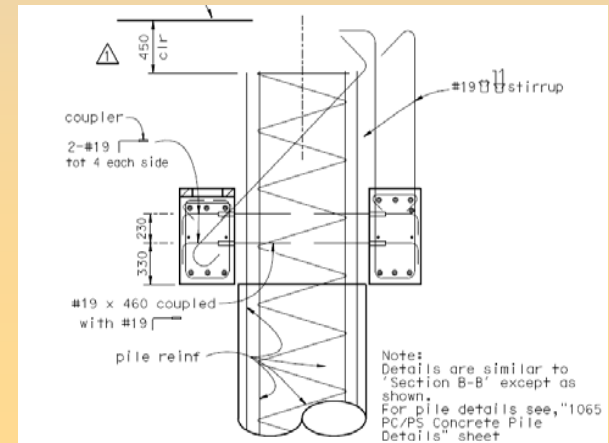
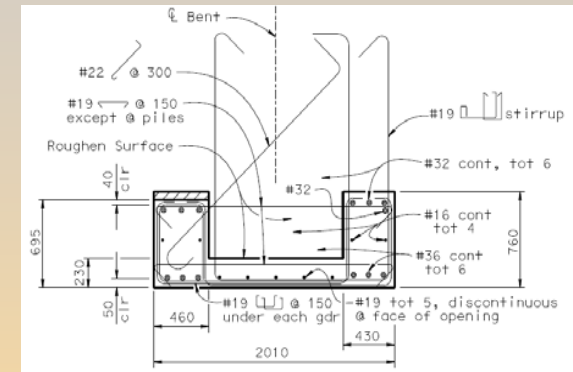
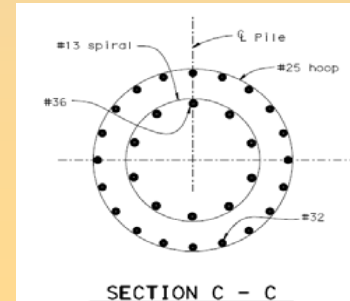
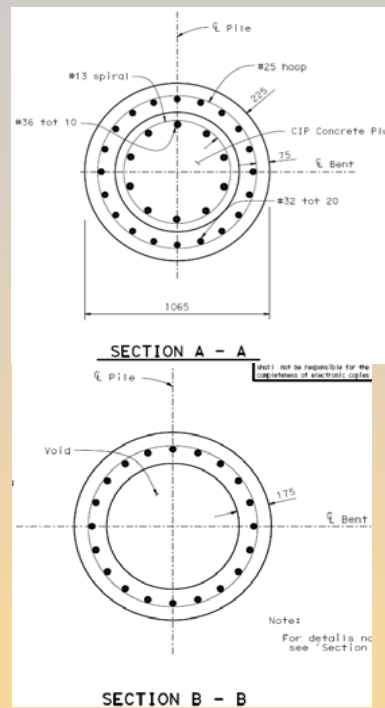
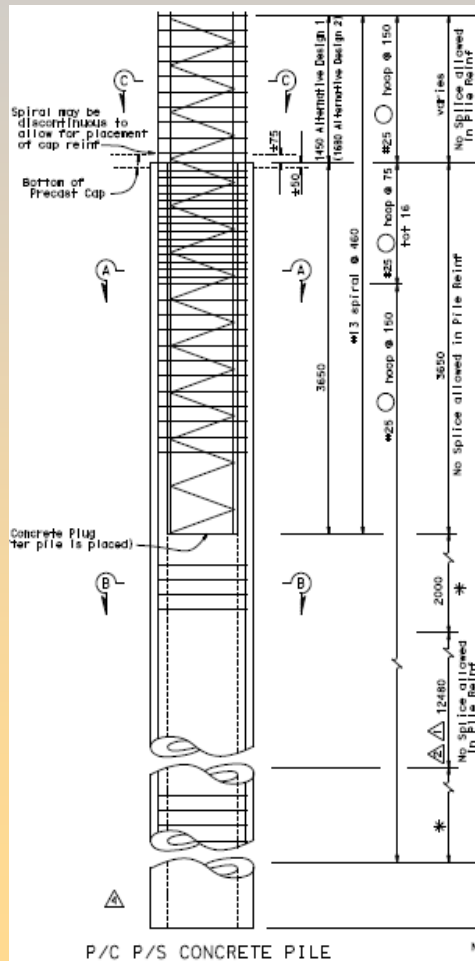
Caltrans- San Mateo Bridge

- Precast Girder
- Precast Bent Cap





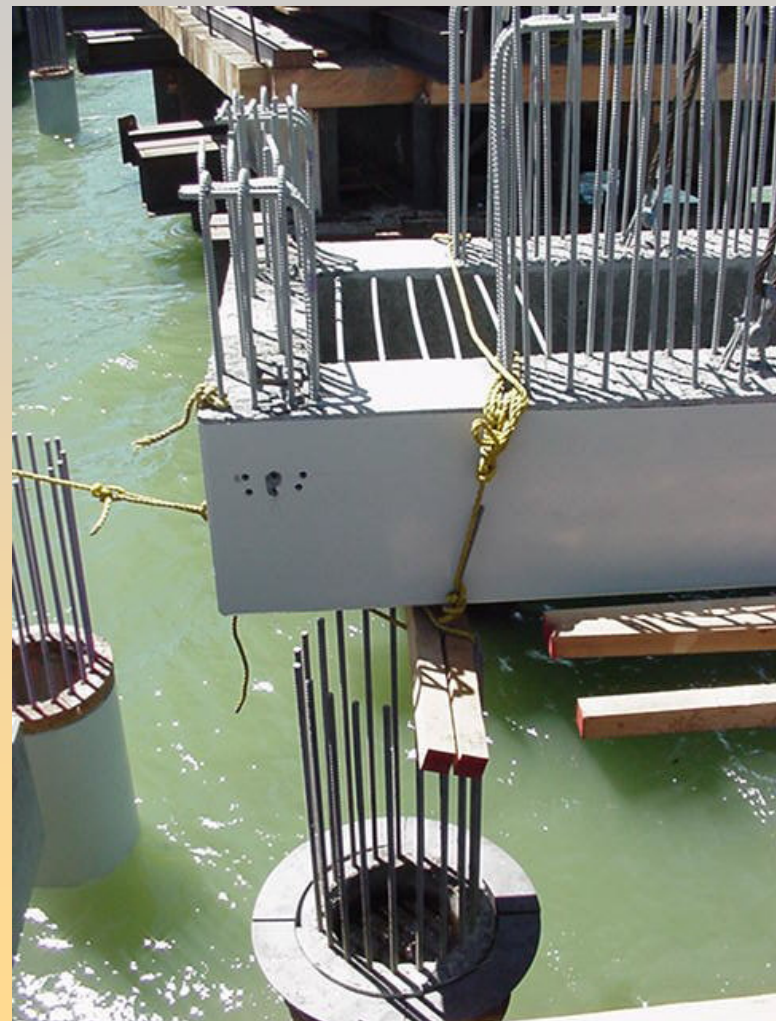
Caltrans- San Mateo Bridge





Caltrans- San Mateo Bridge

Precast Bent Cap





Caltrans- San Mateo Bridge Precast Bent Cap-Column connections



Caltrans- San Mateo Bridge Precast I-Girder placement





Caltrans- San Mateo Bridge



Caltrans- San Mateo Bridge




San Mateo Bridge- Mechanical Couplers



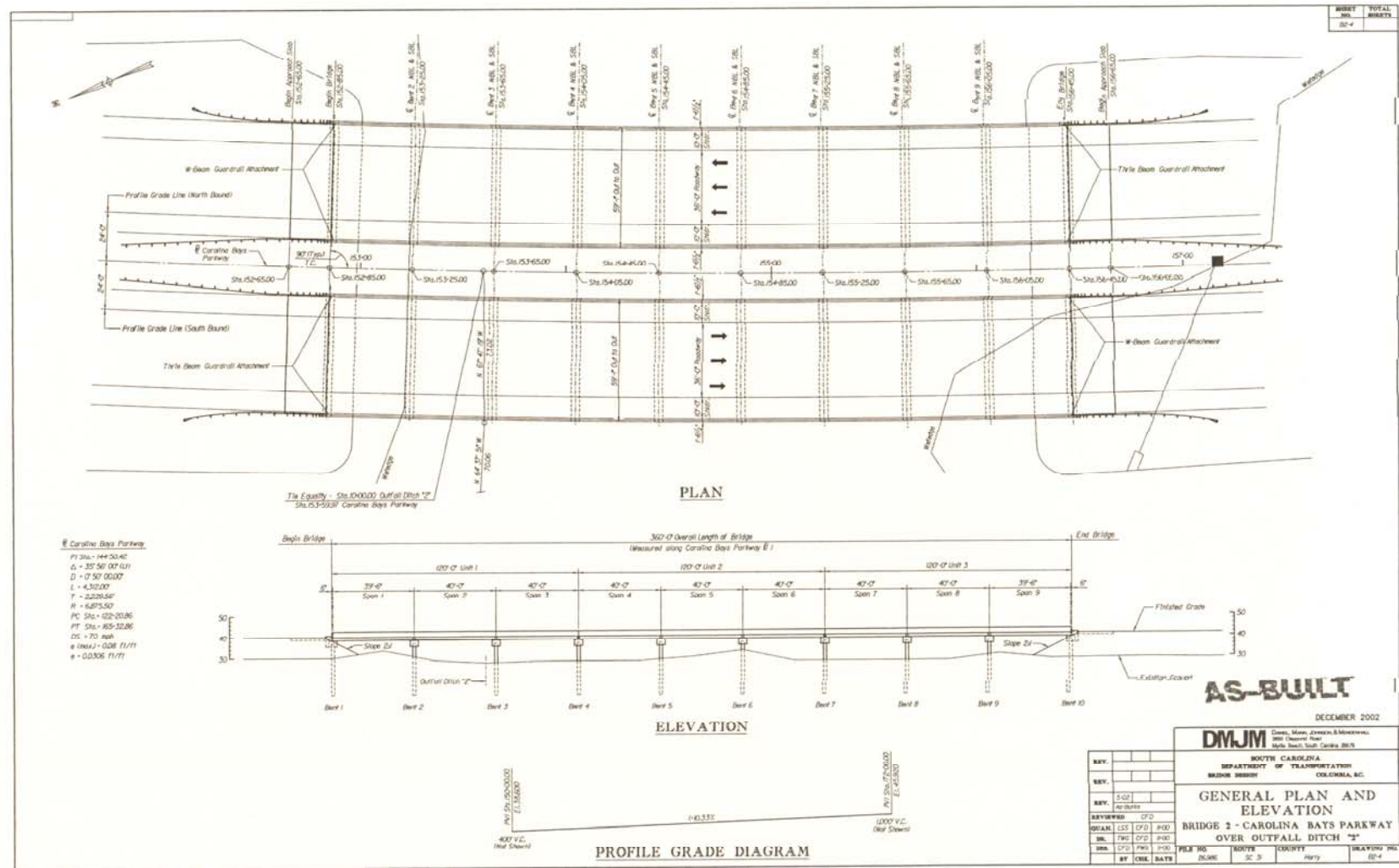


Precast Pile Cap- Carolina Bays Parkway, South Carolina

- 
- SCDOT PCP to Pre-cast Cap Connection detail that was used for several bridges on a Design-Build project. This detail has not been adopted by SCDOT, but it is a candidate for research considerations.
 - The SCDOT detail consists of 18" prestressed concrete piles used as pile extensions instead of reinforced concrete columns.
 - The superstructure used is a flat slab superstructure, very common in our entire SC coastal region.

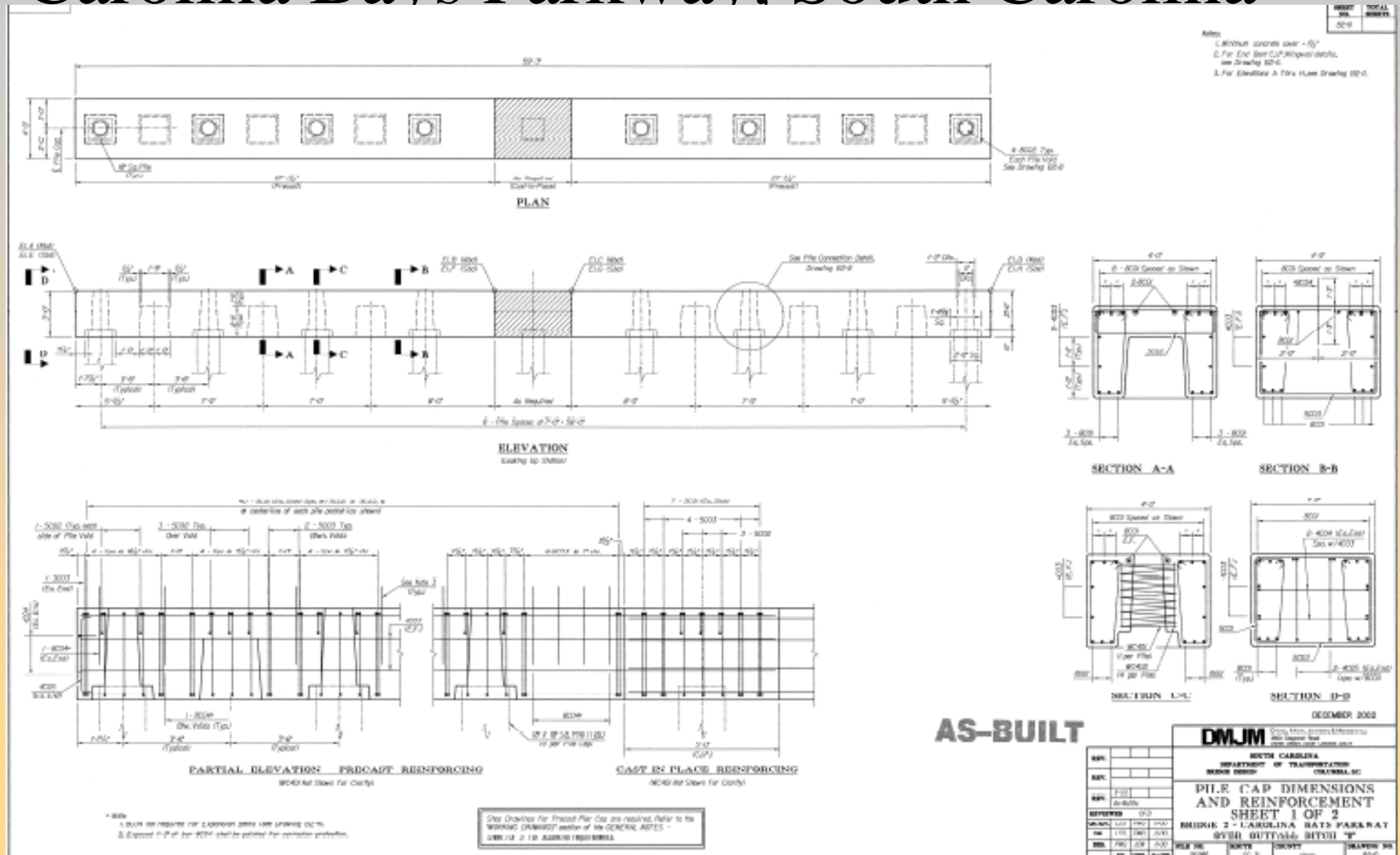
Precast Pile Cap- Carolina Bays Parkway, South Carolina



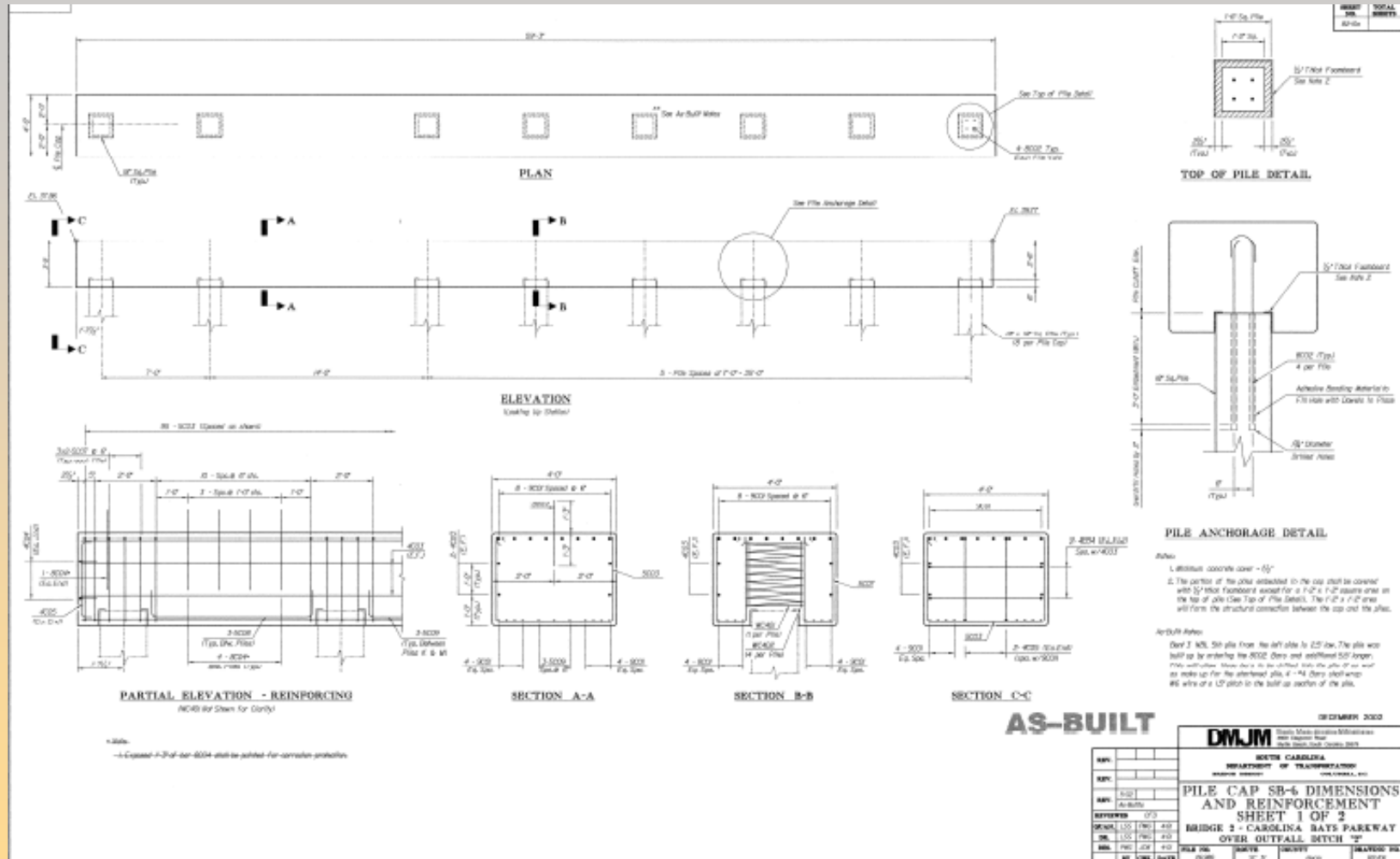




Precast Pile Cap- Carolina Bays Parkway, South Carolina



Precast Pile Cap- Carolina Bays Parkway, South Carolina





Conway Bypass- Precast Bent Cap





Conway Bypass- Precast Bent Cap





Conway Bypass-

Precast Bent Cap





Conway Bypass- Precast Bent Cap





Discussions

- Open Forum
- Agree on Details to be Tested
- Identify Follow-up Action Items