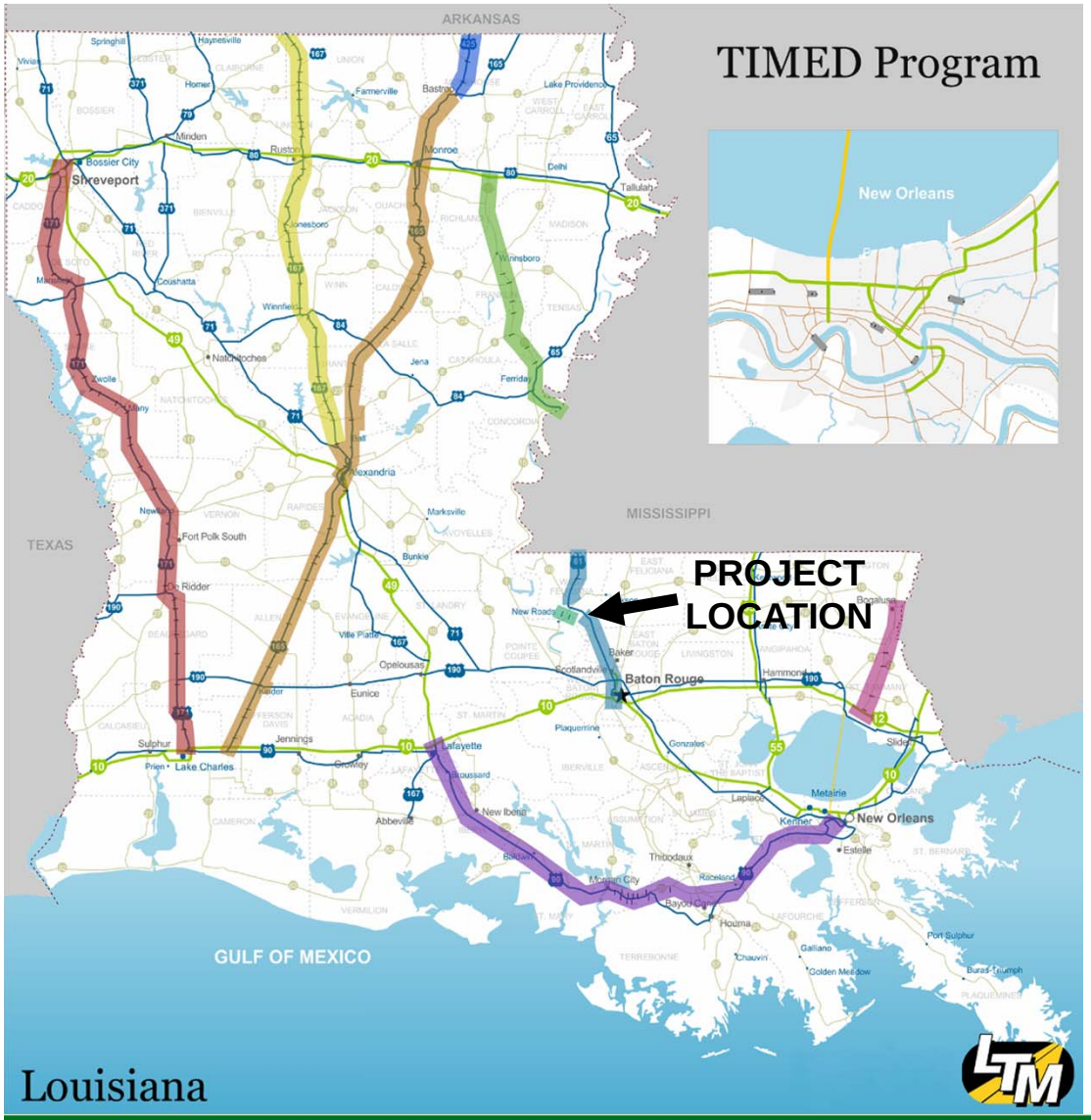
JOHN JAMES AUDUBON BRIDGE



FEHRL US SCAN TOUR
March 30, 2012

Paul Fossier, P.E.
Assistant Bridge Design Administrator
LA DOTD
paul.fossier@la.gov

LOUISIANA BRIDGE INVENTORY
(2011 FHWA NBI Data)

- 13,153 BRIDGES
- 7,854 ON SYSTEM (STATE)
- 5,299 OFF SYSTEM (NON-STATE)
- 157 ARE MOVABLE (Lift, Swing, Bascule, Pontoon) BRIDGES
- 21th in US, NUMBER OF BRIDGES
- 4th in US, BRIDGE AREA (Length x Width)
- 1st in US, MOVABLE BRIDGES

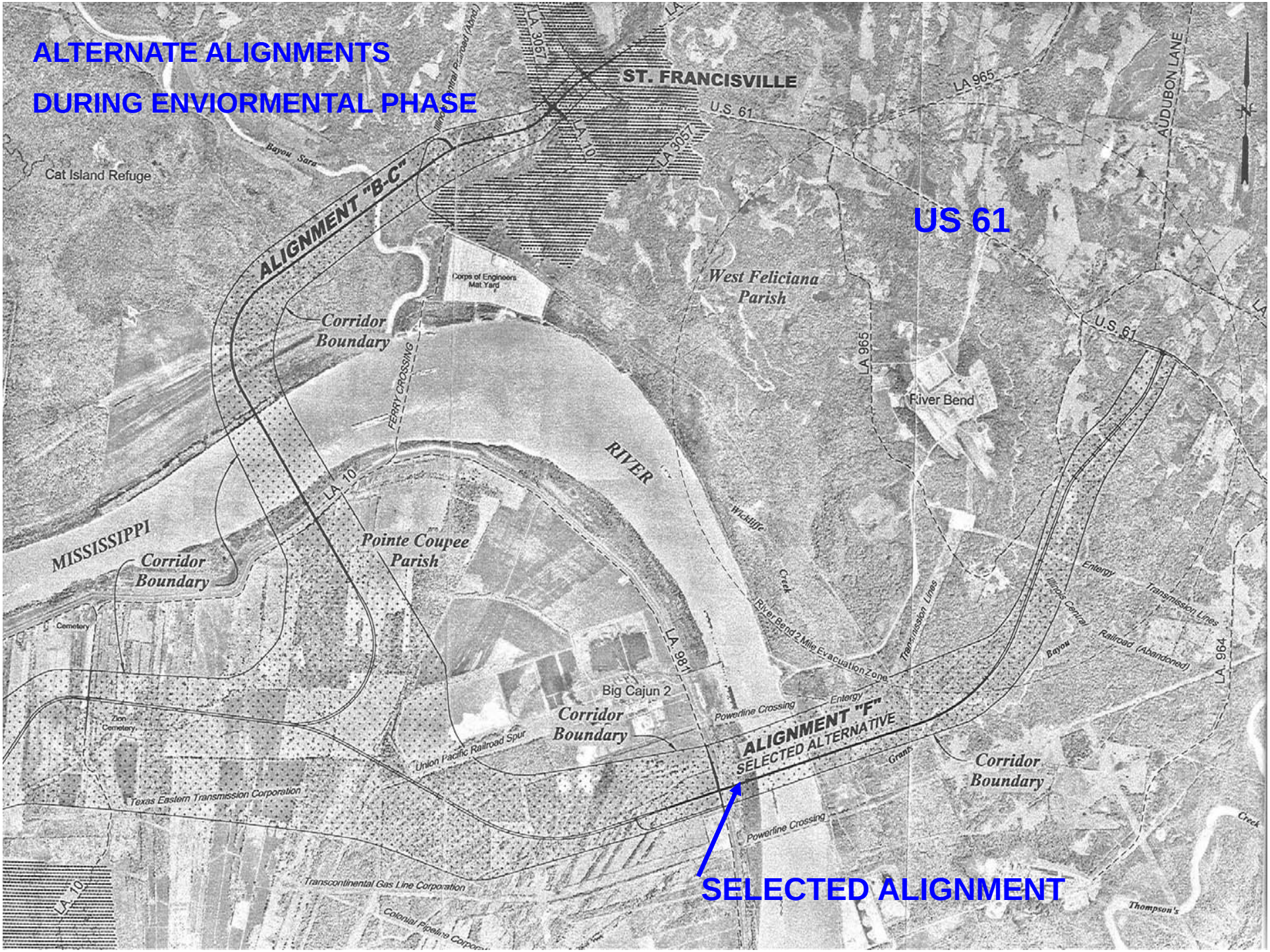
BRIDGE INVENTORY
(2011 FHWA NBI Data)

- **LONGEST CONTINUOUS STRUCTURE**
  - **I-310 TO I-10 TO I-55 STRUCTURE, 38 MILES**

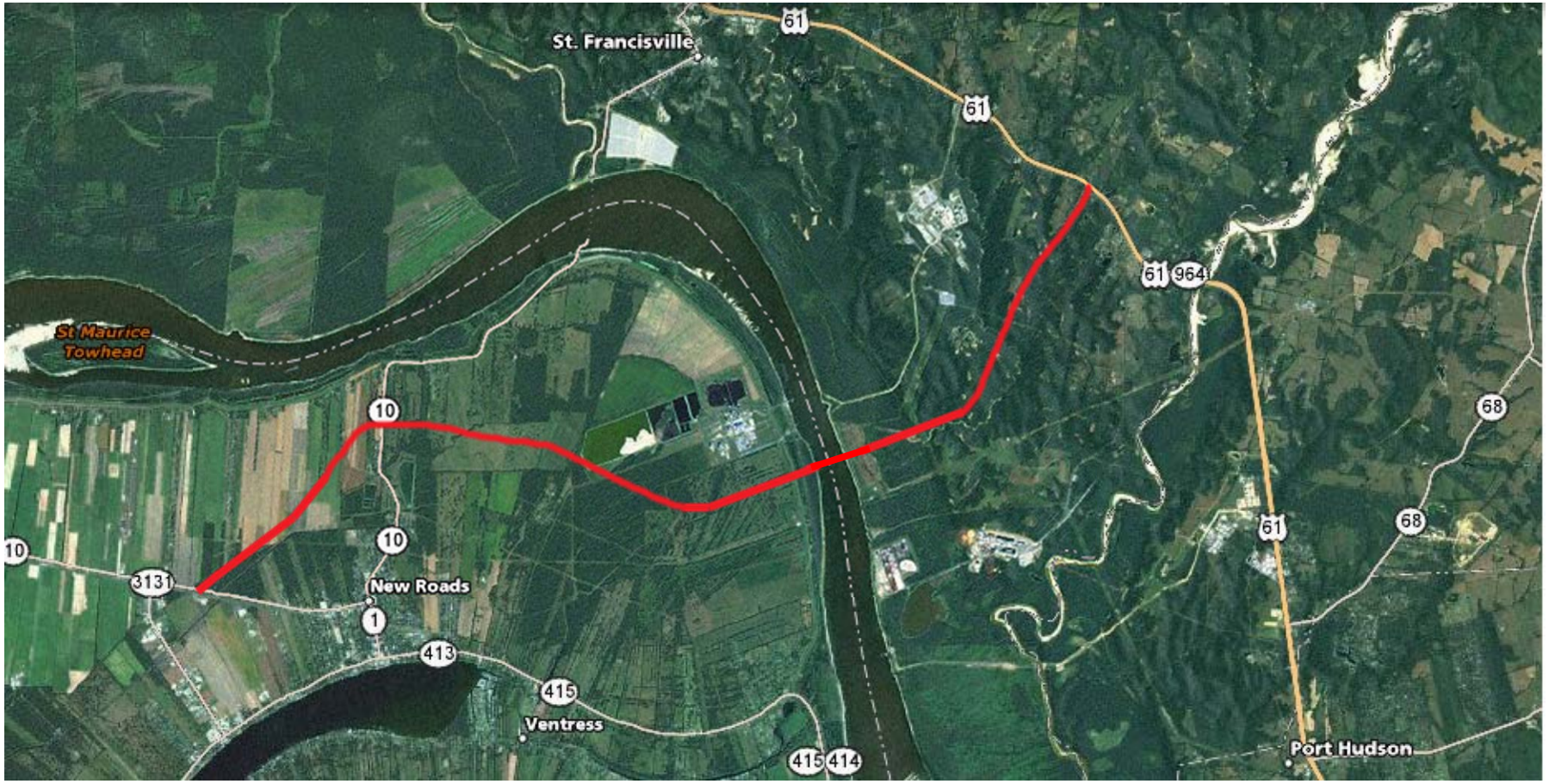
- **12 MISSISSIPPI RIVER CROSSINGS**
  - **11 WITH DEEP CAISSON FOUNDATIONS**
  - **1 WITH LOW WATER FOOTING ON DRILLED SHAFT FOUNDATION**
  - **10 ARE STEEL TRUSS**
  - **2 ARE STAY CABLE**

Why Build this Roadway/ Bridge?

- The bridge will replace an existing ferry between the communities of New Roads and St. Francisville, Louisiana and provide a more reliable crossing.
- The bridge will also serve as the only bridge structure on the Mississippi River between Natchez, Mississippi and Baton Rouge, Louisiana (approximately 90 river miles).
- The project is part of the Zachary Taylor Parkway, a scenic highway across Louisiana from Mississippi to Texas.
- Mandated by Louisiana Legislation, TIMED program.

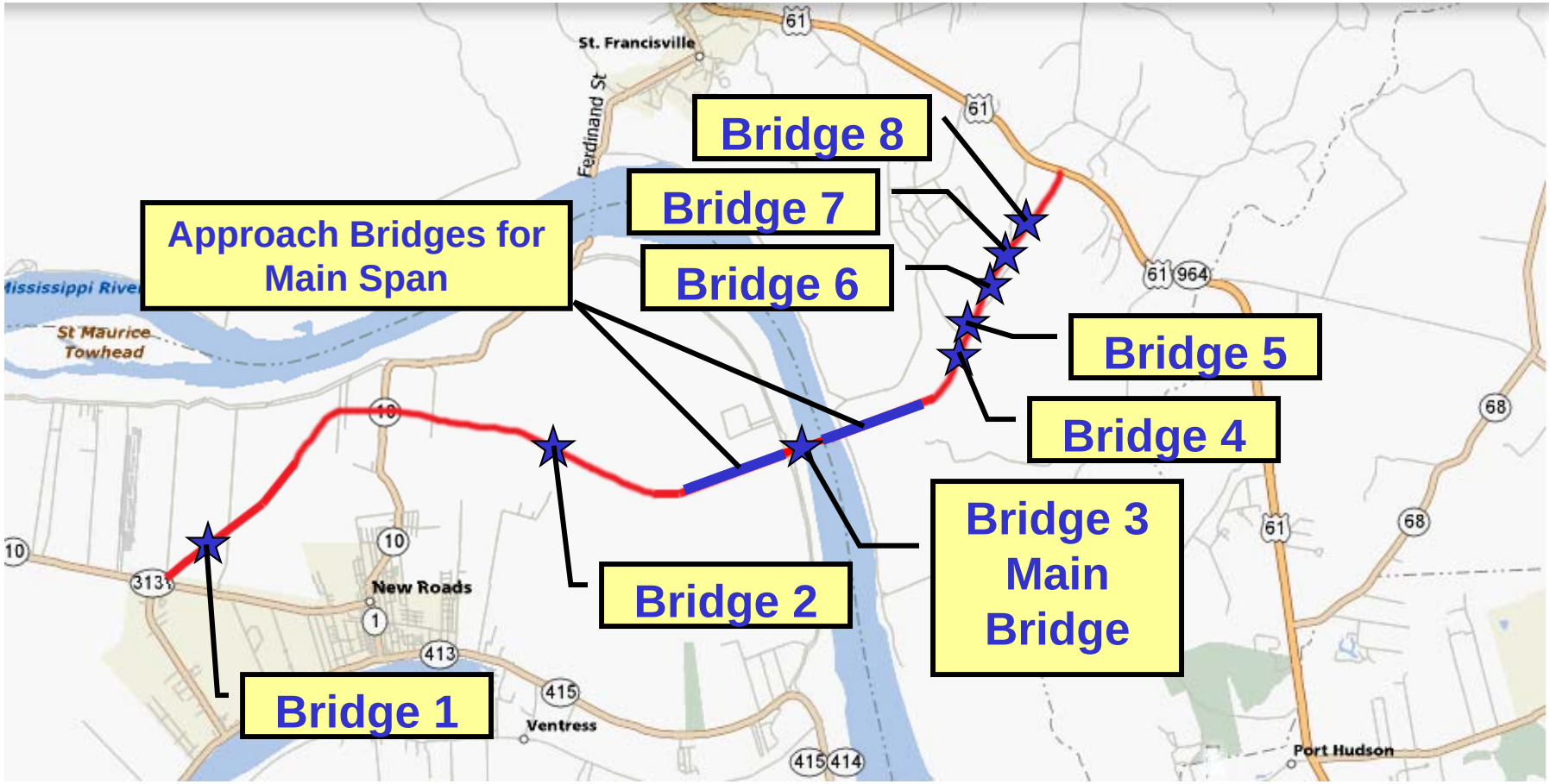

ALTERNATE ALIGNMENTS
DURING ENVIORMENTAL PHASE
US 61
SELECTED ALIGNMENT
ST. FRANCISVILLE
U.S. 61
LA 3057
LA 10
LA 965
AUDUBON LANE
Bayou Sara
Cat Island Refuge
ALIGNMENT "B-C"
Illinois Central Railroad (Abnd.)
Corps of Engineers Mat Yard
Corridor Boundary
West Feliciana Parish
FERRY CROSSING
RIVER
MISSISSIPPI
Pointe Coupee Parish
River Bend
Wickliffe
Creek
River Bend 2 Mile Evacuation Zone
Transmission Lines
Entergy
Illinois Central Railroad (Abandoned)
Bayou
LA 964
LA 981
Big Cajun 2
Powerline Crossing
ALIGNMENT "F"
SELECTED ALTERNATIVE
Union Pacific Railroad Spur
Texas Eastern Transmission Corporation
Transcontinental Gas Line Corporation
Colonial Pipeline Corporation
Cemetery
Zion Cemetery
Thompson's

Project Scope



- **Total Cost $406 Million**
- **Project Length 15.3 miles**
- **Bridge Length: 4.0 miles (main bridge & main bridge approach 4 lanes, other bridges 2 lanes)**
- **Roadway 11.3 miles (2 lane, buy R/W for future 4 lane)**
- **First Design-Build Procurement for LA DOTD**
- **Successful Letting March 2, 2006**
- **Opened to traffic on May 5, 2011, Other misc. work and punch list items not completed till February 2012**

The Bridges


Bridge 8
Bridge 7
Approach Bridges for Main Span
Bridge 6
Bridge 5
Bridge 4
Bridge 3 Main Bridge
Bridge 2
Bridge 1
St. Francisville
Ferdinand St
St Maurice Towhead
New Roads
Ventress
Port Hudson
61
61
61 964
68
68
61
10
10
313
1
413
415
415 414

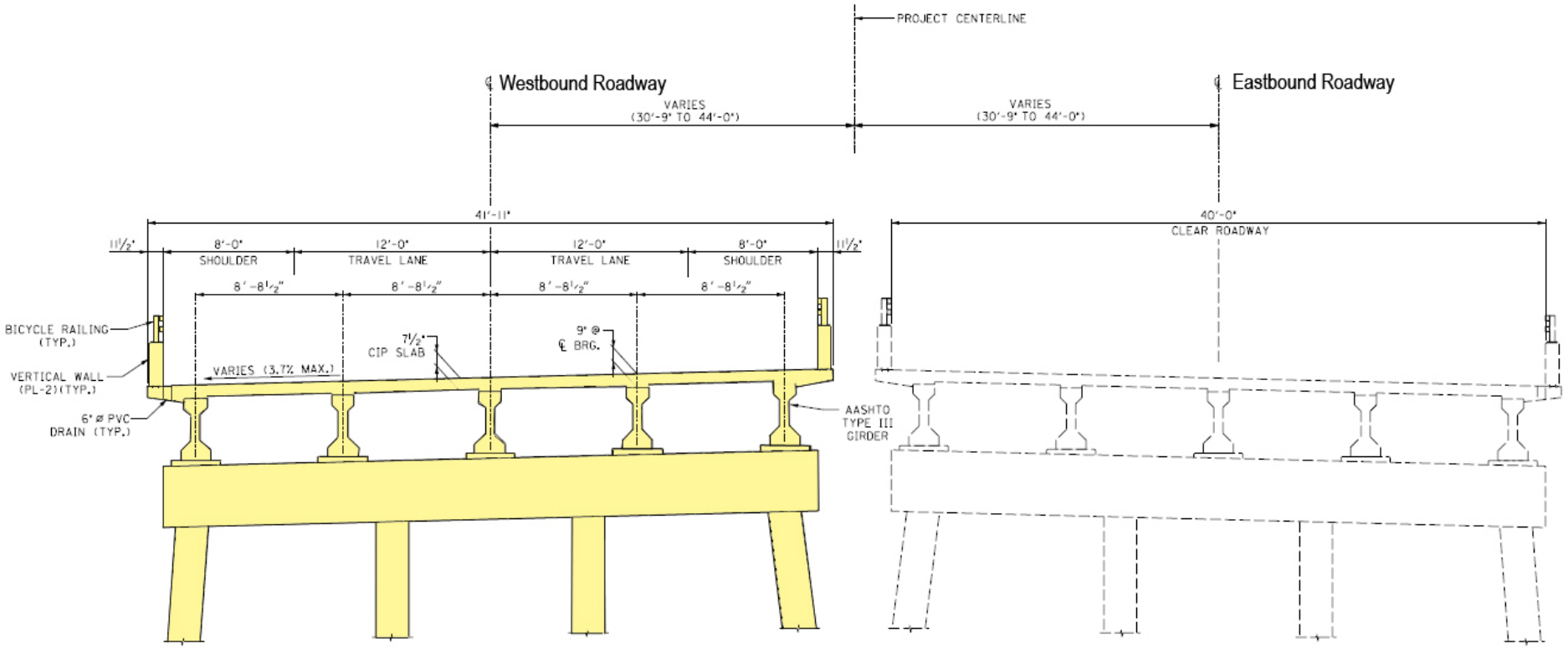
BRIDGE PROJECT FEATURES

- Cable Stayed Superstructure Main Span:
  - 1583 ft. longest stay cable span in North America
  - Galvanized 7 wire prestressed strands (multi levels of protection)
  - Steel edge girders, steel floor beams
  - Precast concrete panels with latex concrete overlay
  - Concrete towers
  - Wind Analysis with Computer Simulation, Wind Tunnel
  - Wind faring plate used on main span
- Main Span River Piers:
  - Unique cofferdam for low water footing
  - Tip grouted 8’ dia. Drilled Shafts in river
  - Construction Techniques- Oscillated and Fully Cased
  - No Auger used, O-Cell load testing to verify shaft capacities

BRIDGE PROJECT FEATURES

- Prestressed Spans – New positive moment detail used for continuity, research project to monitor with instrumentation on skewed spans.
- AASHTO LRFD Design Code, 2004
- AASHTO Standard Design Specifications, Working Stress, Vertical pile capacity
- Contractor must work with risk of Mississippi River varying river stages.
- Temporary work bridges for river access

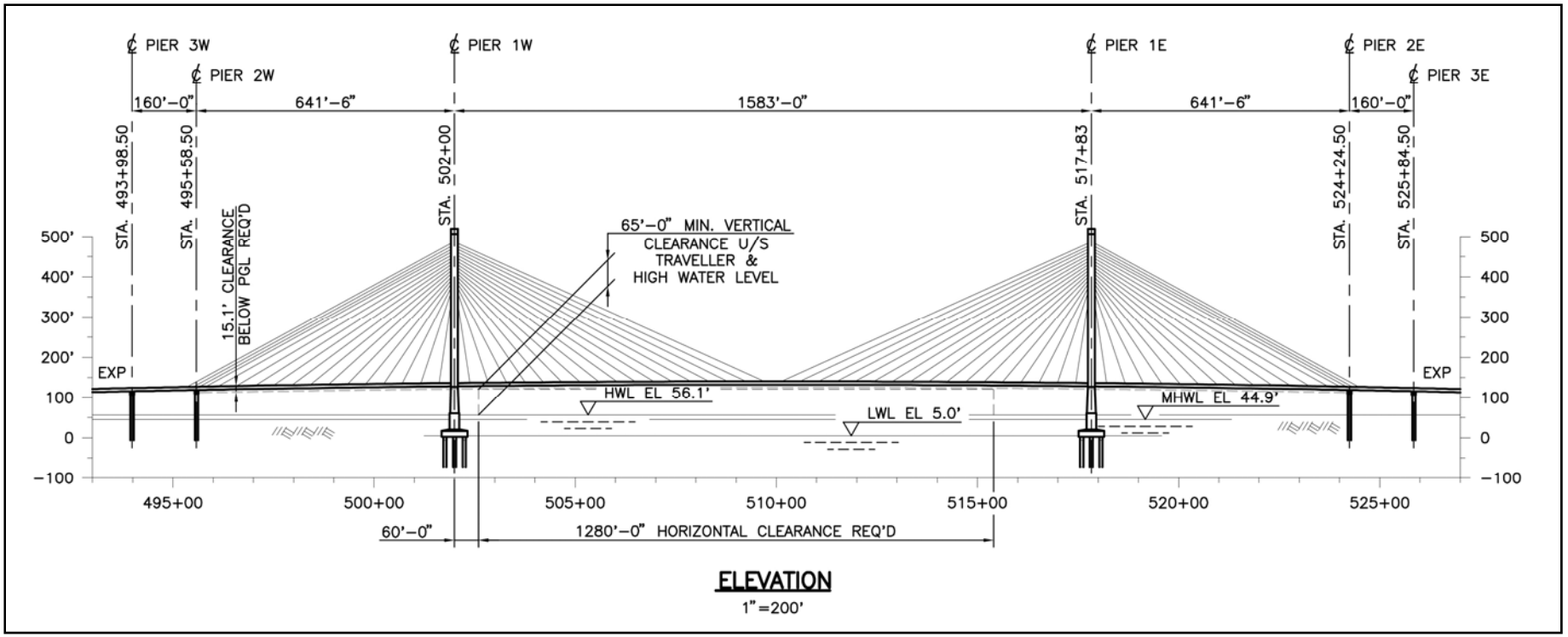
Typical Section – Conventional Bridges



Design Life

Element	Design Life
Cable-Stayed Bridge Structure	100 years
Other Bridge Structures	75 years
Stay Cables	75 years
Stay Cable Vibration Suppression System	25 years
Bearings (Pot)	20 years
Bearings (Elastomeric Pads)	30 years
Expansion Joints (Excluding Finger Joints	10 years
Finger Joints	30 years
Paint System	20 years

Cable-Stayed Unit

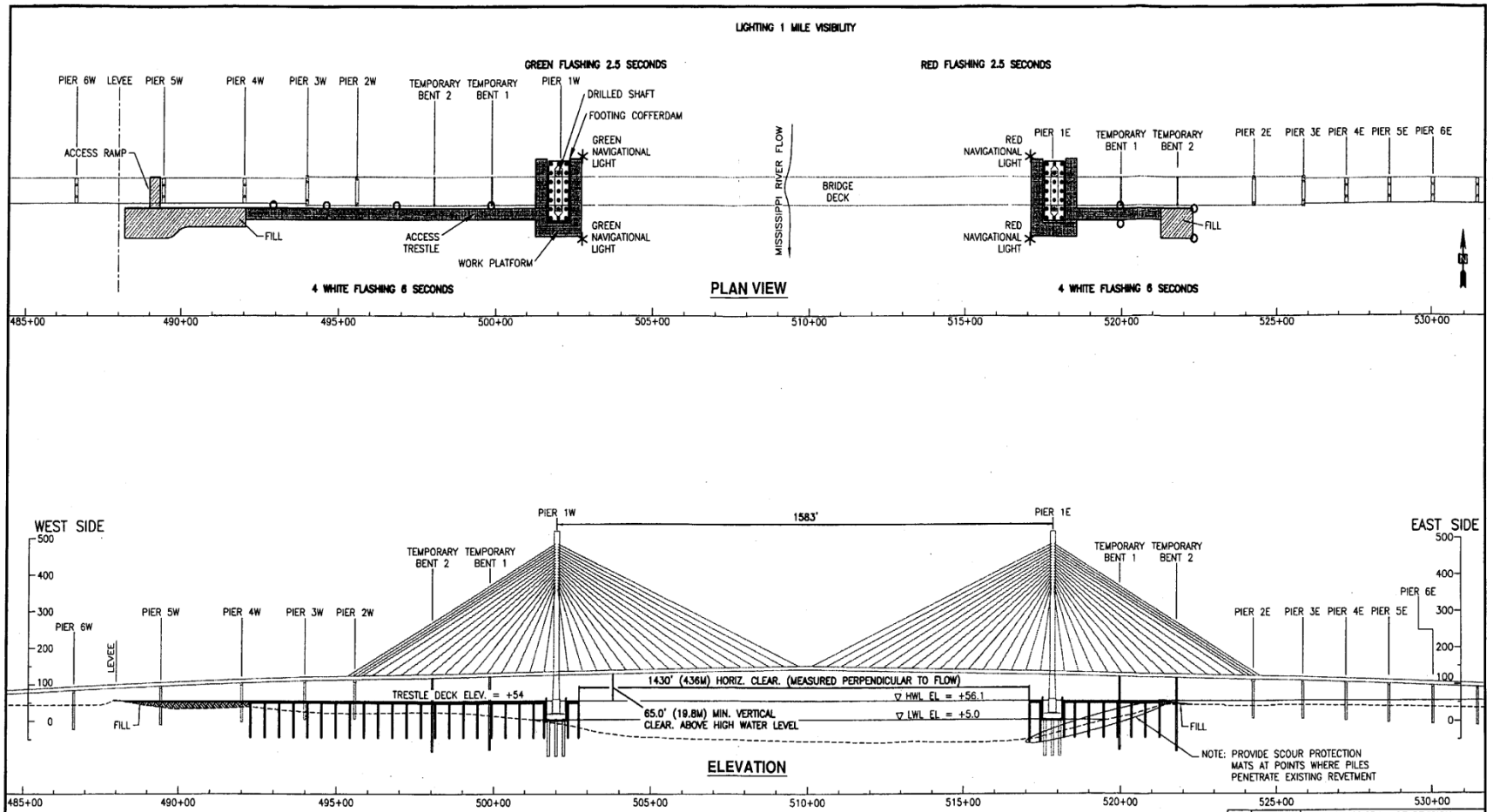


1583 ft main span (1400 ft required)

1463 ft navigational clearance (1280 required)

Aeroelastic Model in Wind Tunnel – RWDI - CANADA

Main span substructure



CONSTRUCTION SEQUENCE

1: CONSTRUCT ACCESS TRESTLE AND FILL. INSTALL NAVIGATIONAL LIGHTING
2: CONSTRUCT DRILLED SHAFTS
3: CONSTRUCT WORK PLATFORM
4: CONSTRUCT FOOTING COFFERDAM
5: CONSTRUCT BRIDGE
6: REMOVE ACCESS TRESTLE (INCLUDING PILES) AND FILL
7: REPAIR EXISTING REVETMENT WHERE PENETRATED BY TRESTLE PILES.

NO.	DATE	DESCRIPTION OF REVISION
2	7/26/06	ADDED NOTES
1	5/18/06	ADDED NOTES

0 200' 400' 800

SCALE: 1" = 300'

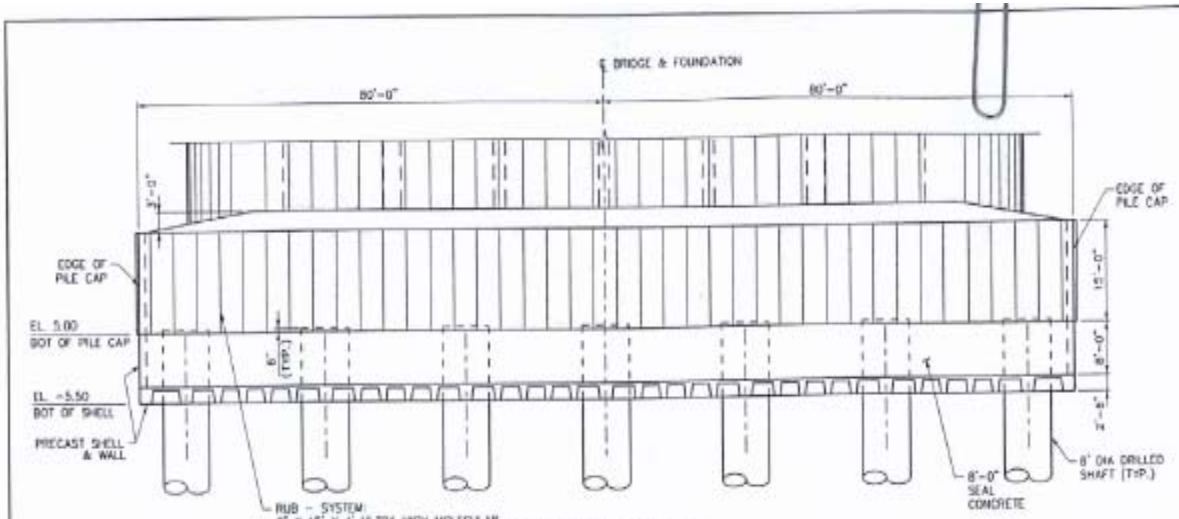
Audubon BRIDGE CONSTRUCTORS
500 WEST MAIN STREET, SUITE 201
NEW ROADS, LA 70760
PHONE: 225-618-0009 FAX: 225-618-0013

DESIGNED BY	NK	DRAWN BY	DJH	CHECKED BY	
DATE	05-10-06	PC JOB NO.	1038	FILE NAME	TLCS-01

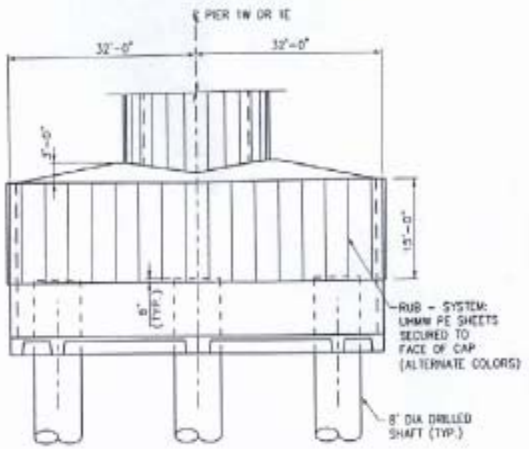
PLAN AND ELEVATION TRESTLE LAYOUT

MISSISSIPPI RIVER BRIDGE
ST. FRANCISVILLE, LA

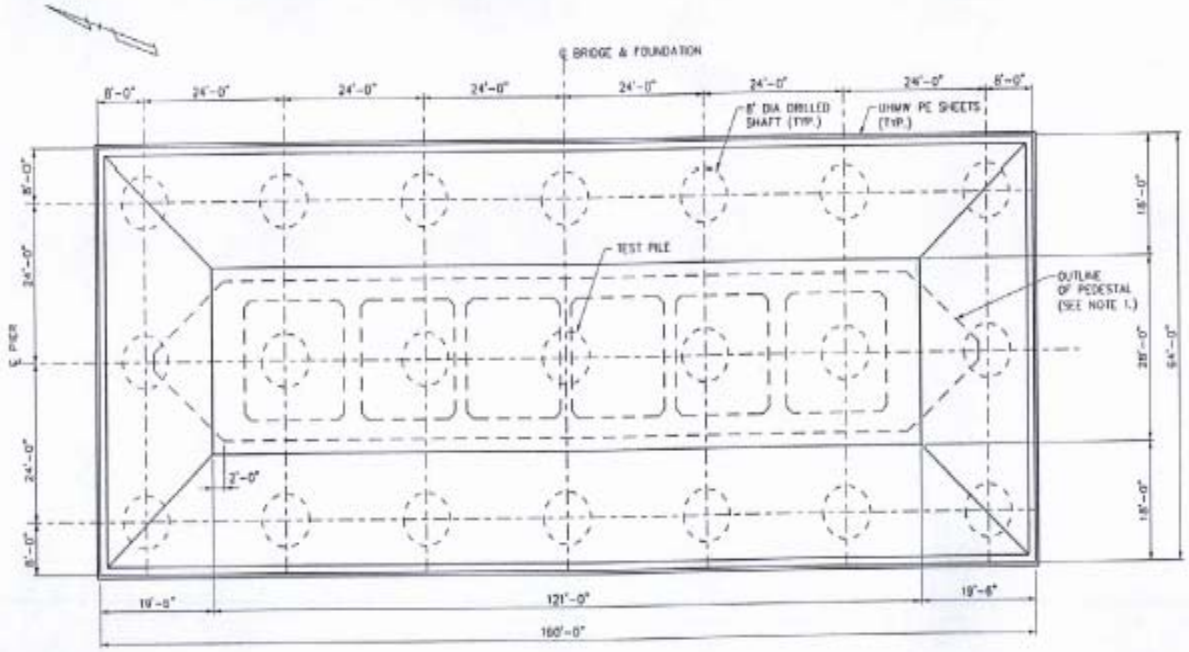
DRAWING NUMBER: TLCS-01



TRANSVERSE ELEVATION
SCALE: 1" = 10'-0"



LONGITUDINAL ELEVATION
SCALE: 1" = 10'



PLAN
SCALE: 1" = 10'-0"

NOTES:

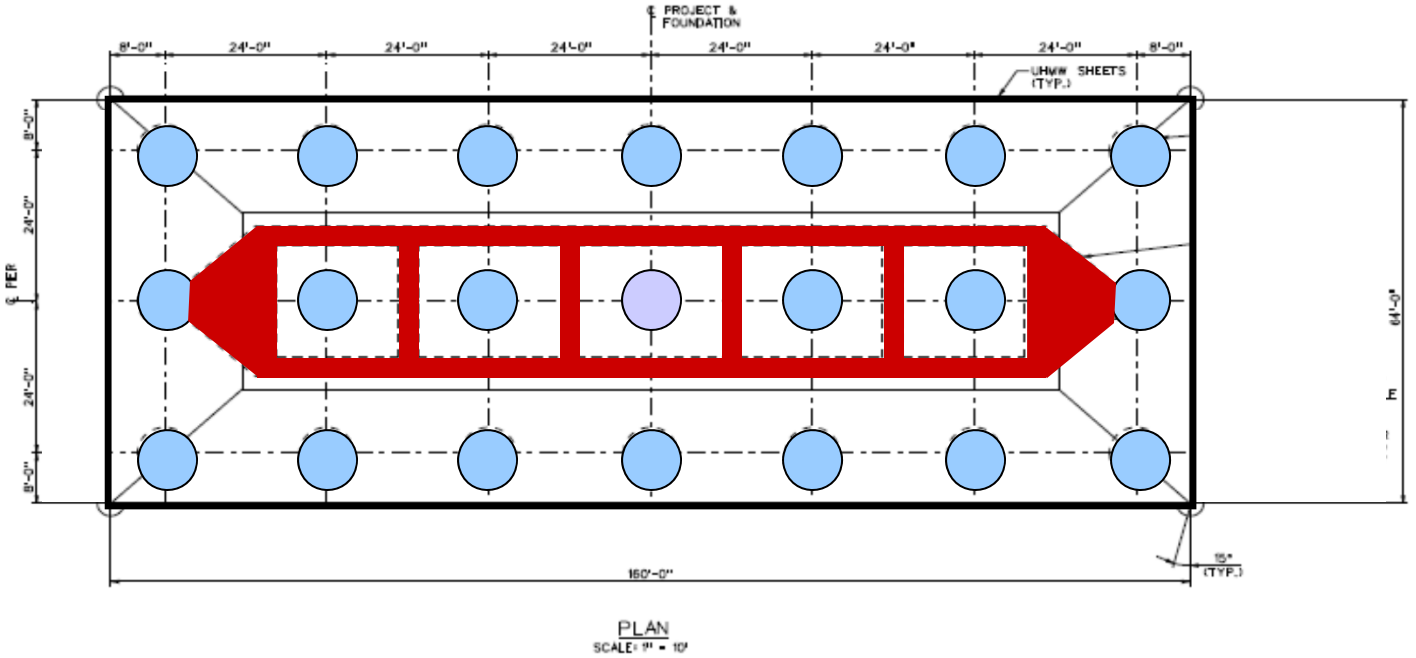
1. FOR PEDESTAL DETAILS, SEE "PEDESTAL LAYOUT" SHEET NO. 33016.
2. FOR DRILLED SHAFT DETAILS, SEE "DRILLED SHAFT DETAILS" SHEETS NO. 33014 AND 33014.1.
3. FOR DETAILS OF UHMW PE SHEETS SEE, "UHMW PANELS" SHEET NO. 33020.3.

2007.01.26 14:48:00 -06'00'

33013-0
B-RC-113-1(2)
PONTE COUPEE/WEST FELICIANA
PILE CAP LAYOUT
BRIDGE 3 (CABLE-STAYED UNIT)
PIERS 1W AND 1E - 1
JOHN JAMES AUDUBON BRIDGE PROJECT
PARSONS
Audubon

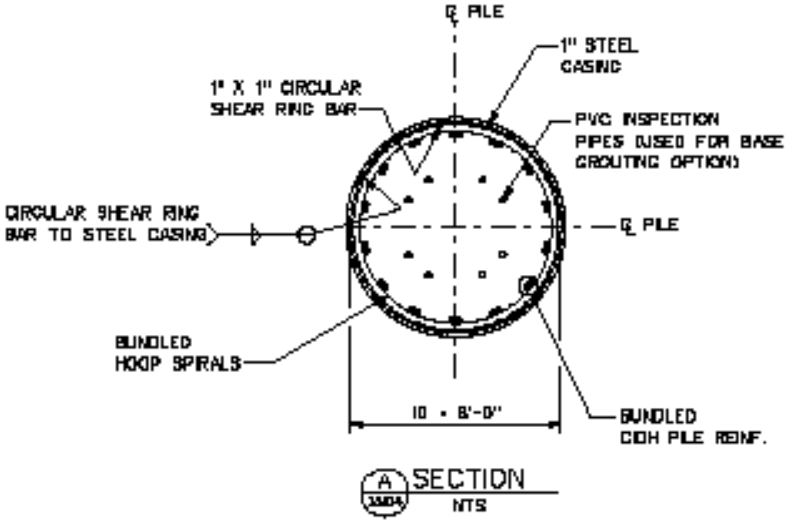
Tower Foundations 1W & 1E

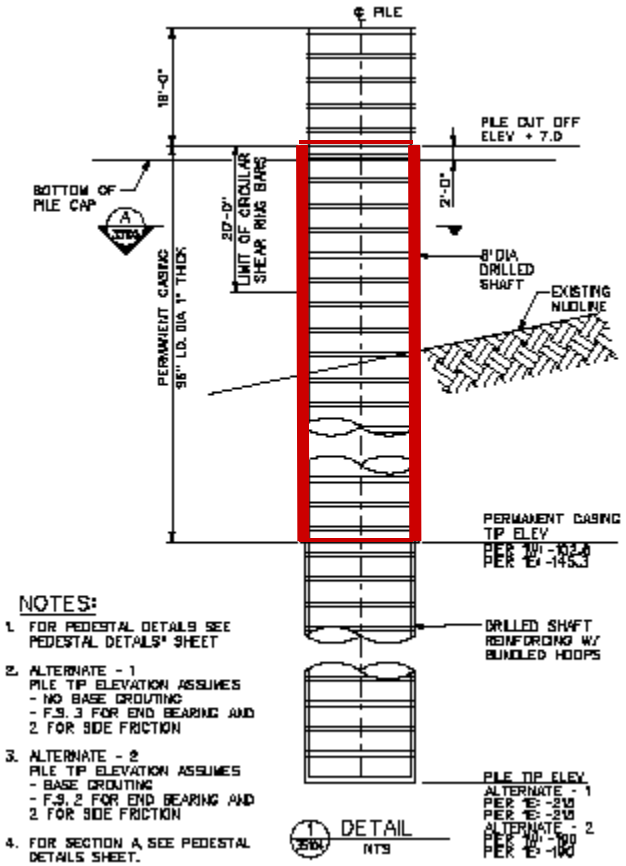
- 160’ x 64’ x 18’ Cap
- 7 by 3 pile group – 1 test pile
- 8’-0” diameter shafts



Tower Shafts

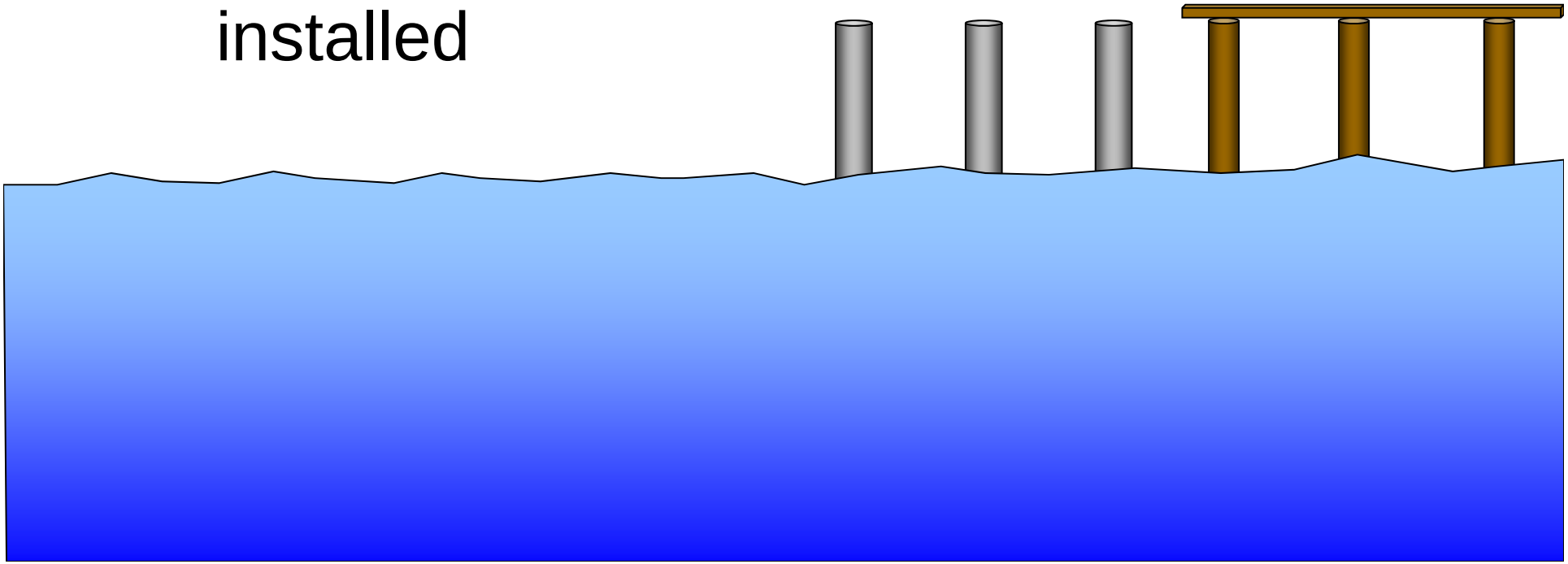
- 96” dia permanent casing
- 90” dia drilled shaft
- Pile tip Elev. -175 to -180
- Tip grouting





Footing Cofferdam Structure

Piles and trestle have been installed



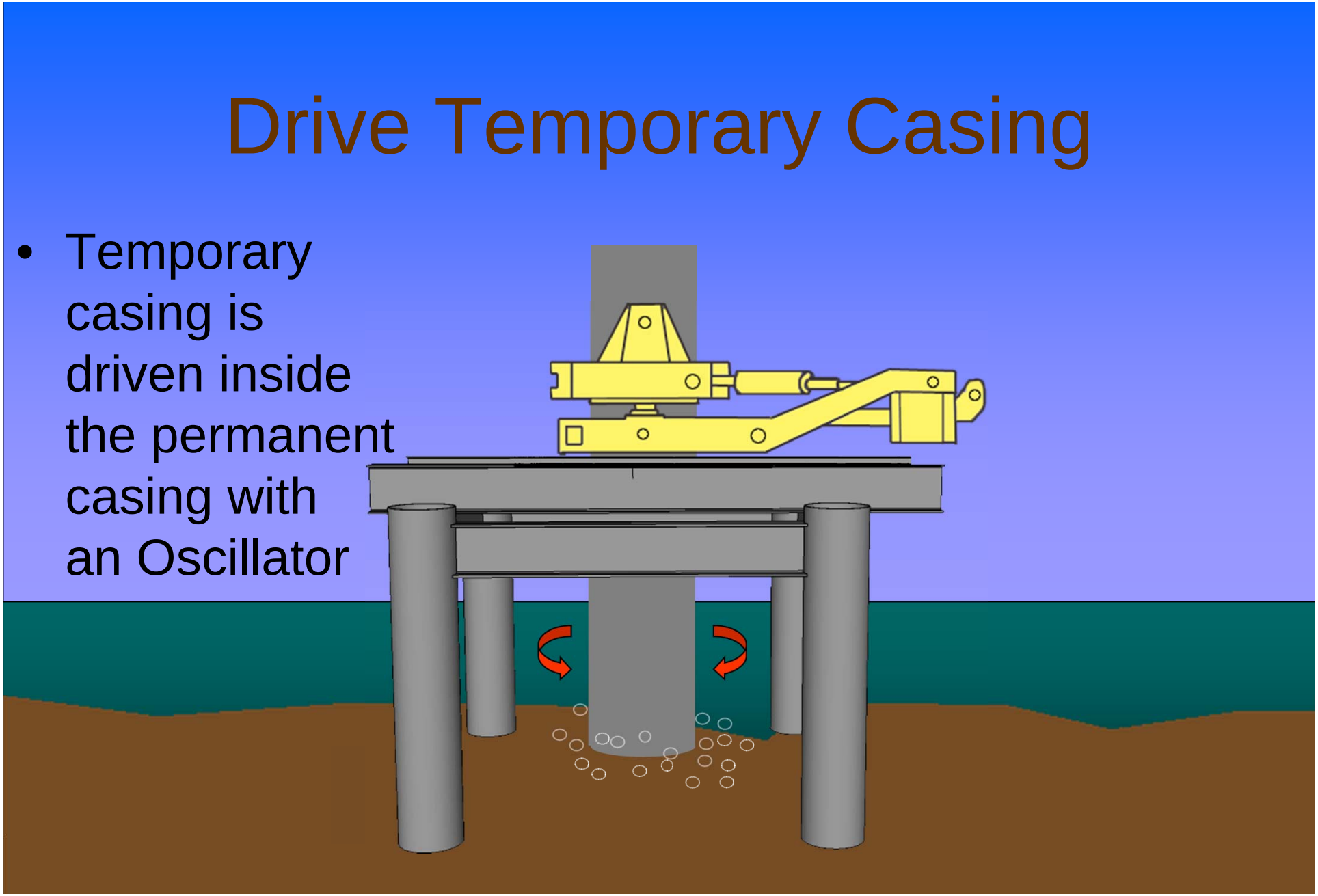
Shaft Template

Drive Permanent Casing

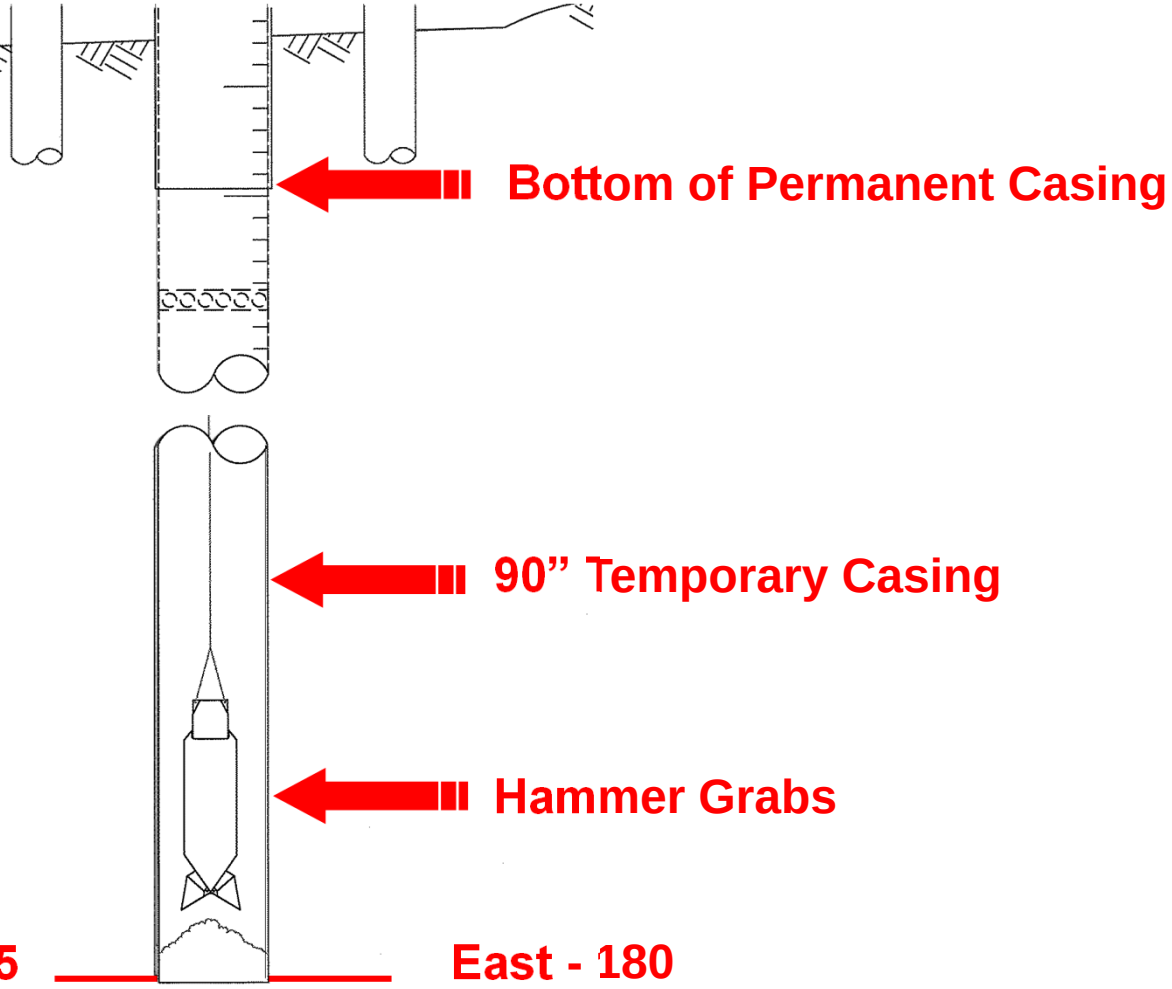
- Vibratory hammer driving the casing into the ground

Drive Temporary Casing

- Temporary casing is driven inside the permanent casing with an Oscillator



Excavate Temporary Casing – Hammer Grab or Air Lifts



Excavation by Air Lifts

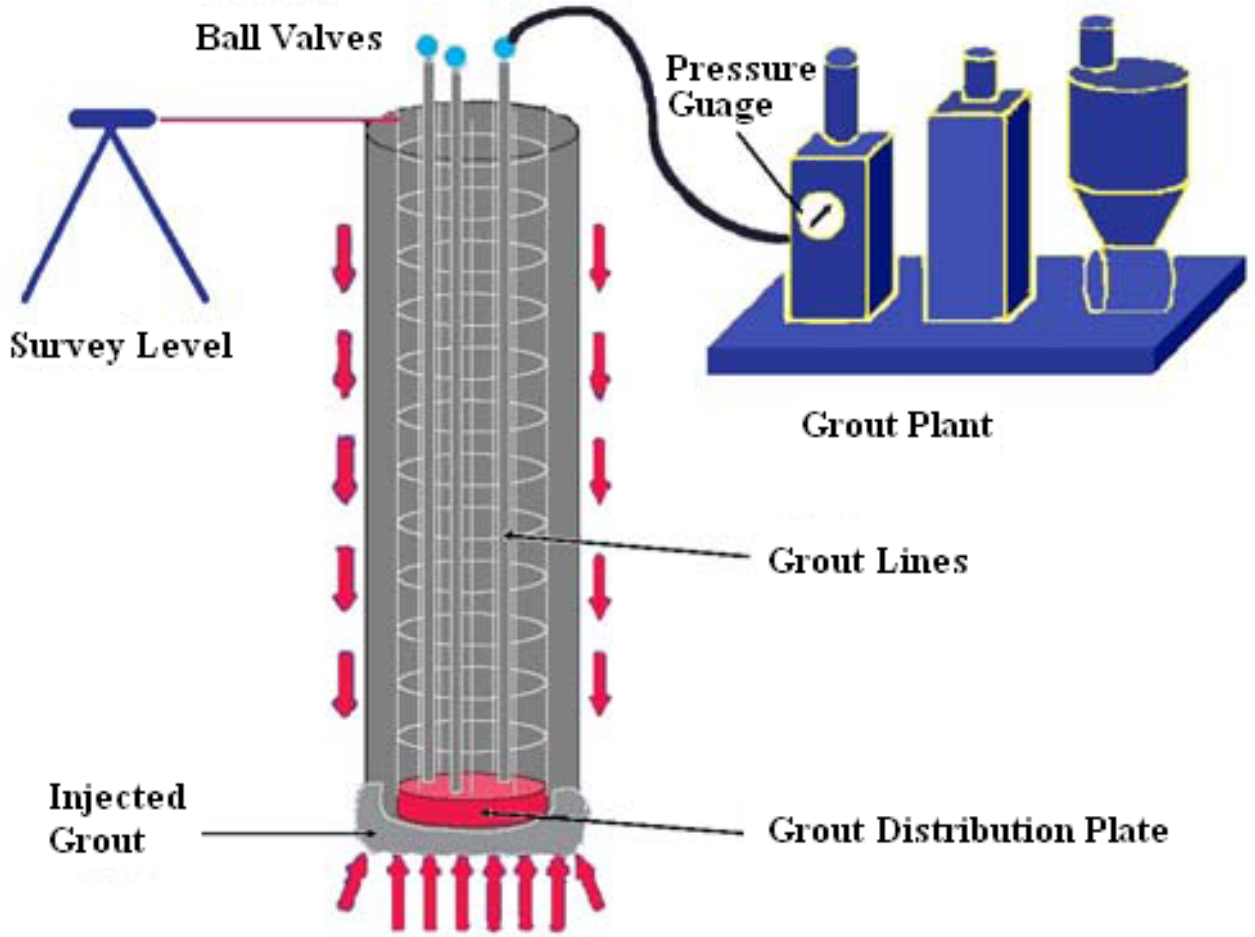

LEFFER
C0354


03/06/2007


HC275

Base grouting verification

- Pressure
- Volume
- Movement of Shaft

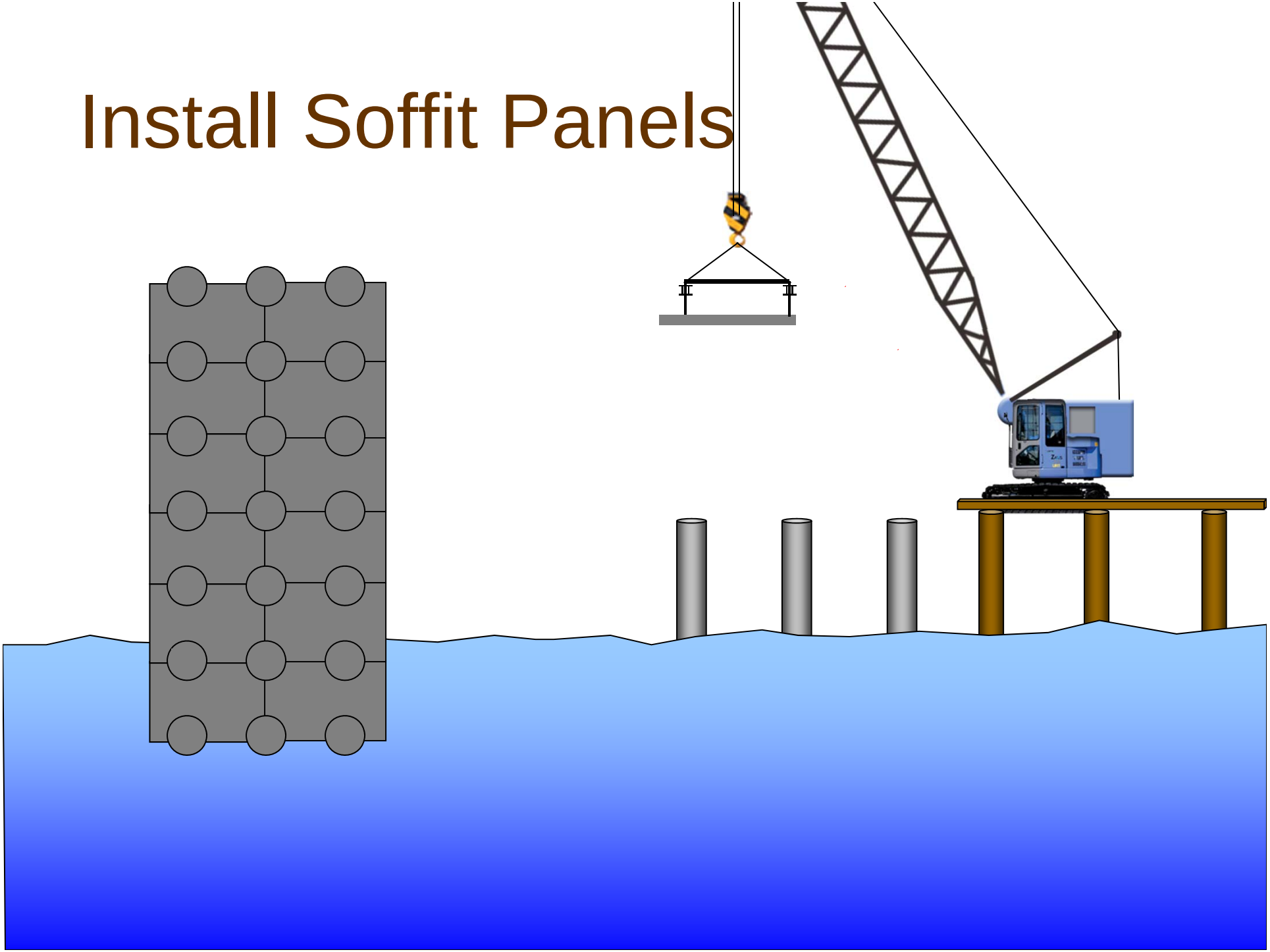



JVC
CHROMA
CONTRAST
VOLUME/SELECT
MENU
PHASE
BRIGHT
INPUT SELECT
POWER
SYSTEM


AFT

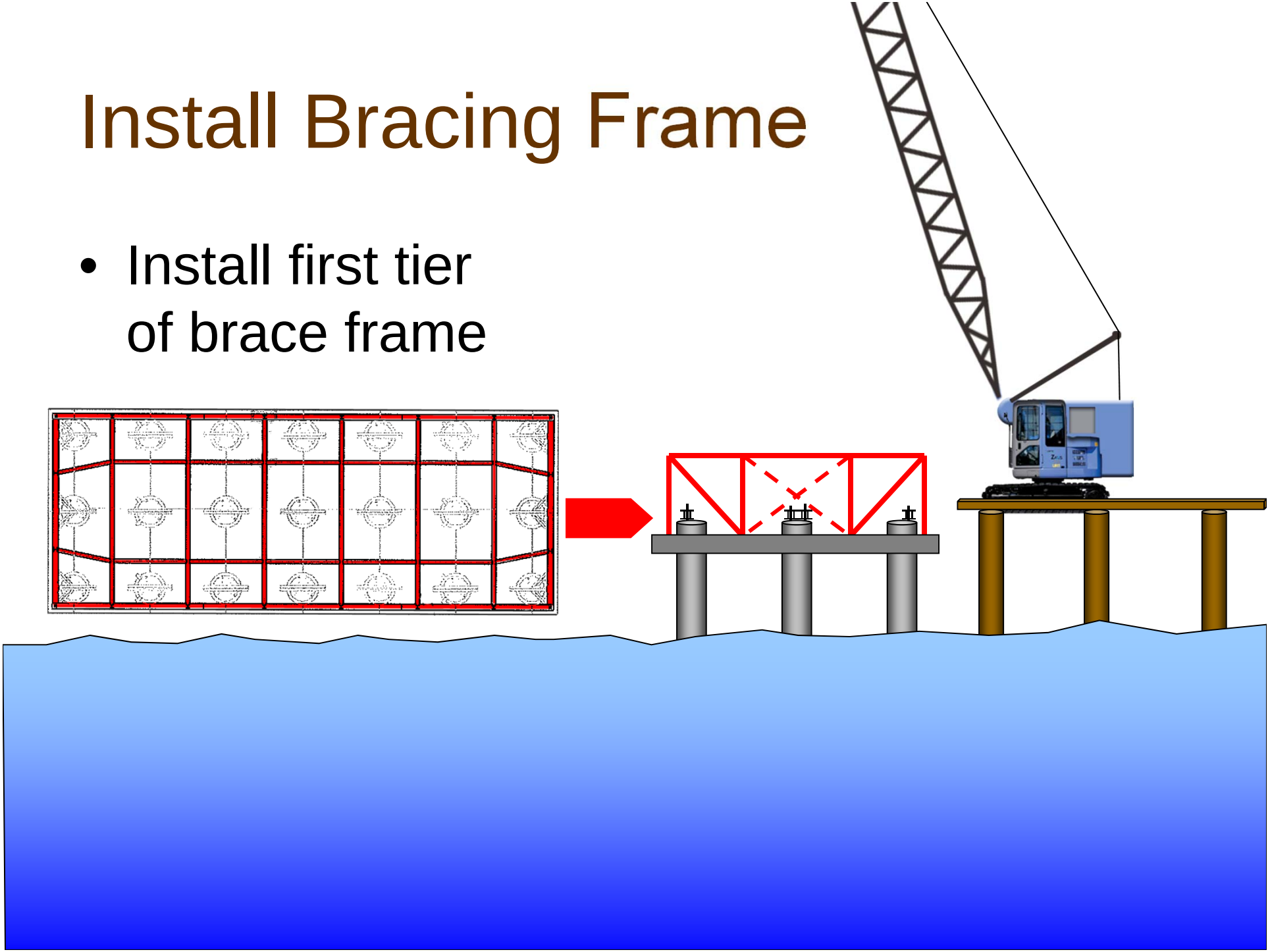

03/28/2007

Install Soffit Panels



Install Bracing Frame

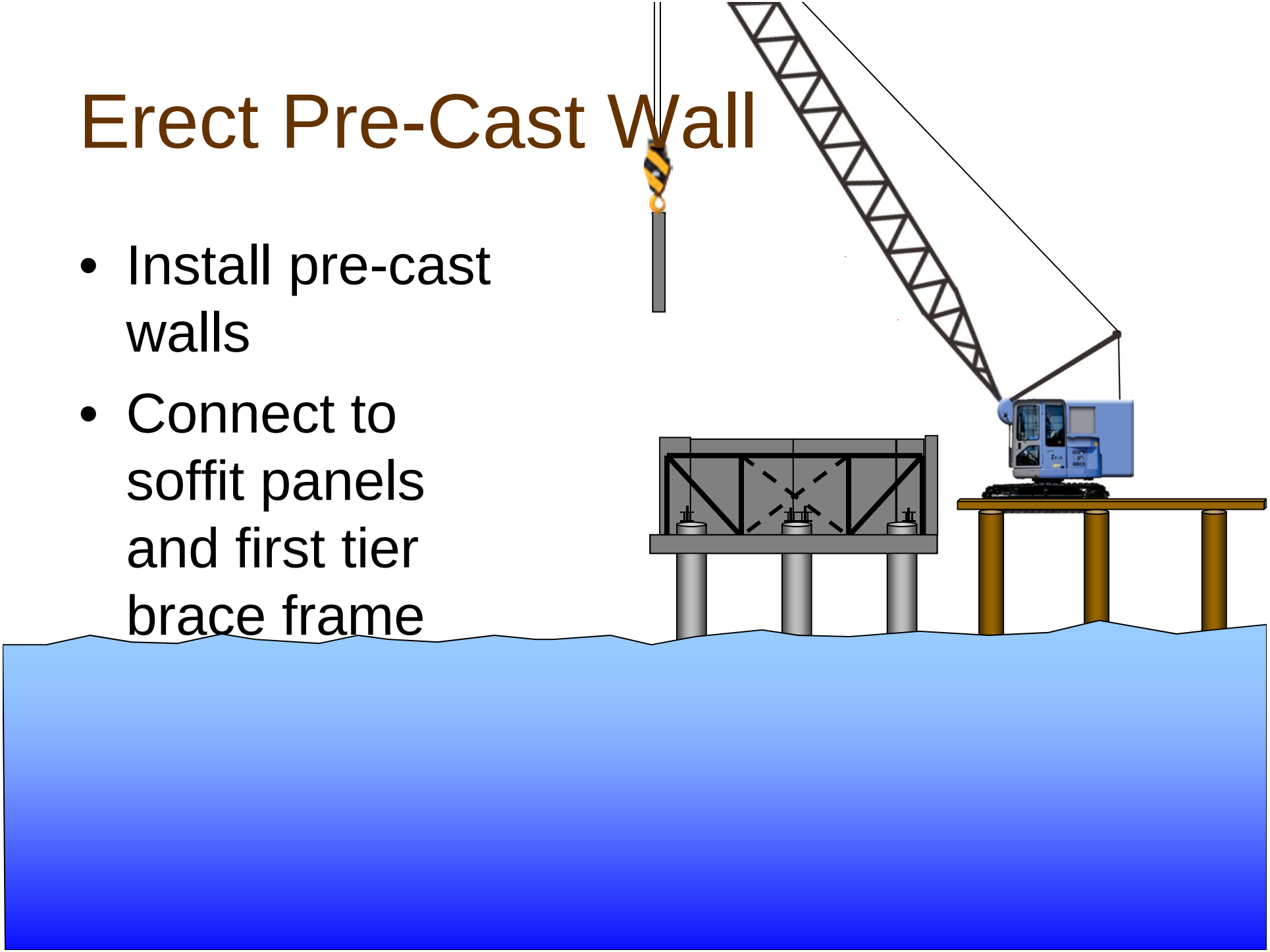
- Install first tier of brace frame




12/10/2008

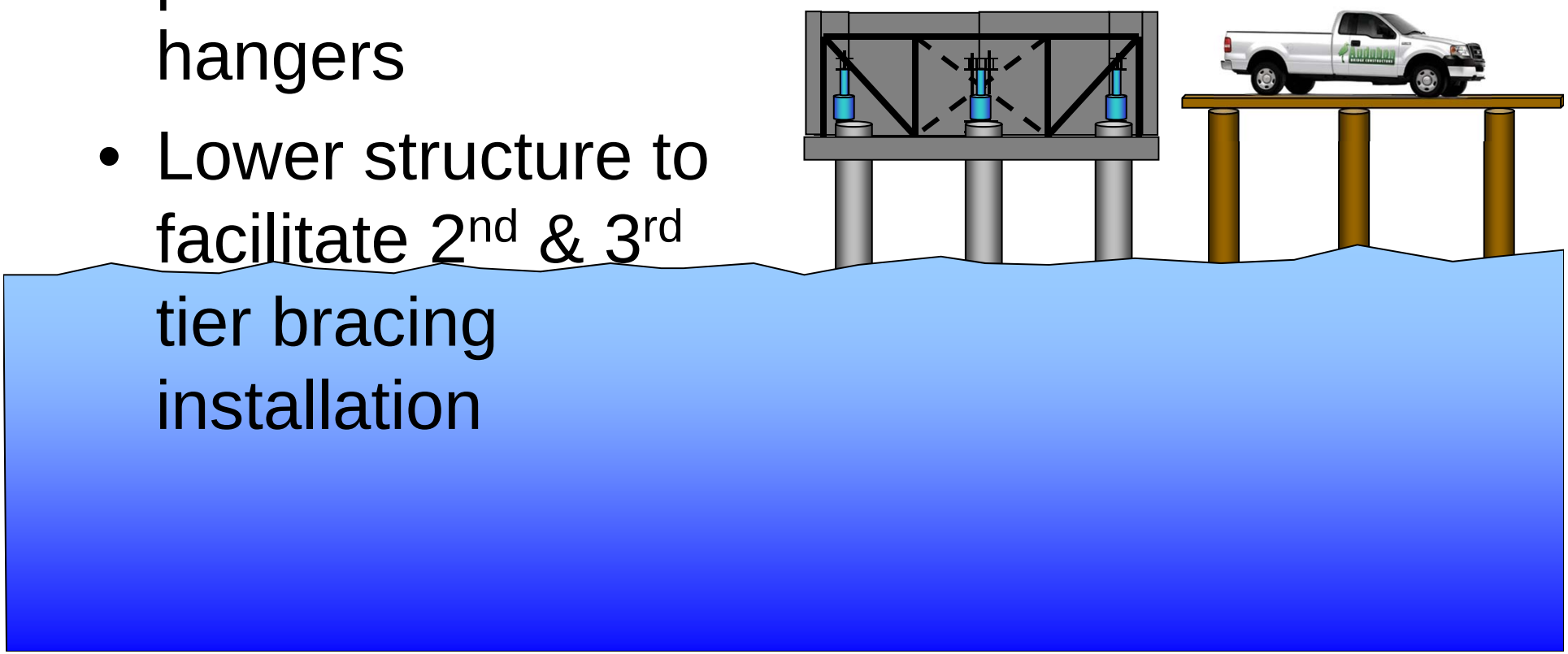
Erect Pre-Cast Wall

- Install pre-cast walls
- Connect to soffit panels and first tier brace frame



Install Jacking System

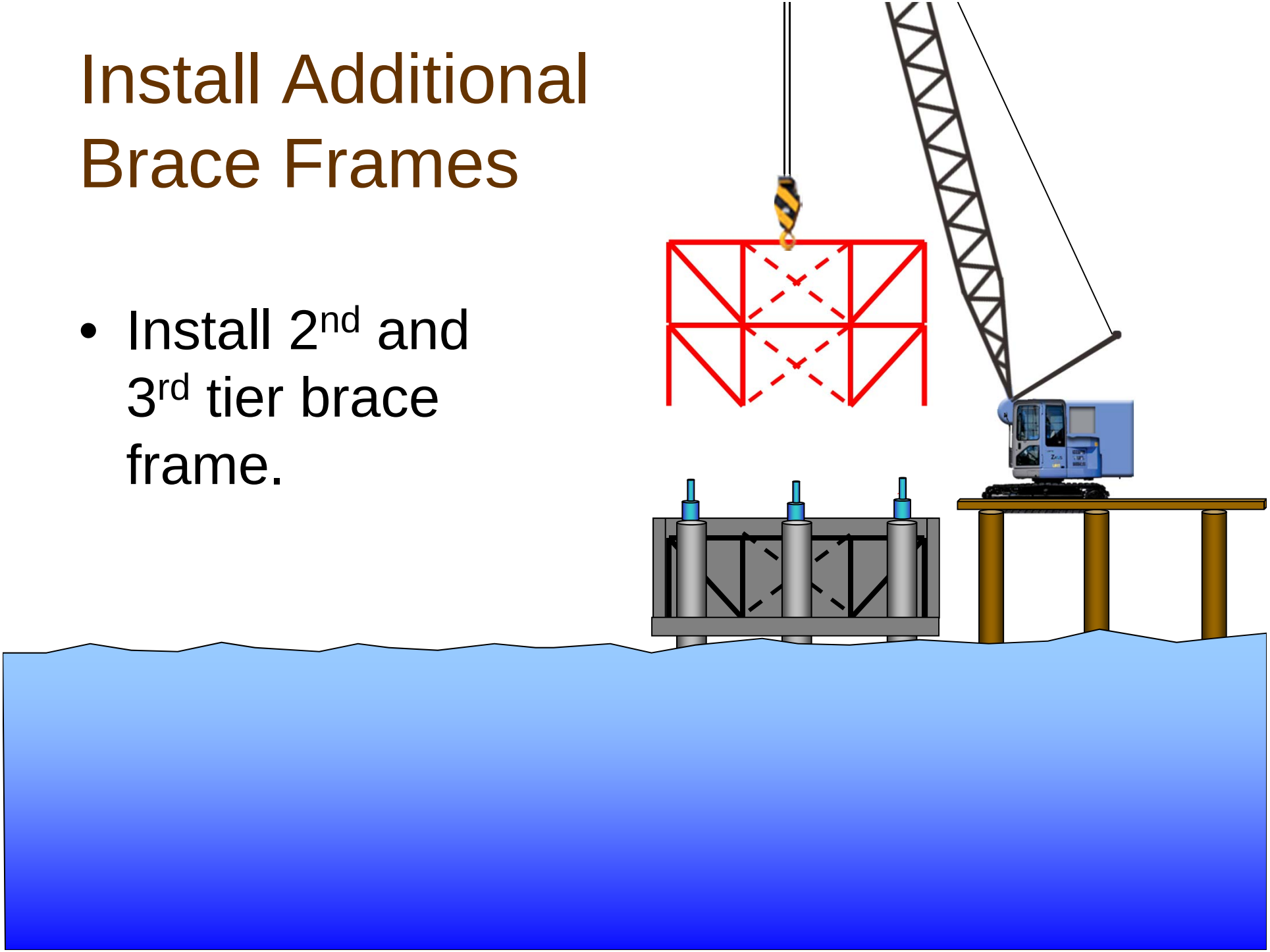
- Install jacking system with permanent hangers
- Lower structure to facilitate 2nd & 3rd tier bracing installation




12/16/2008 12:32

Install Additional Brace Frames

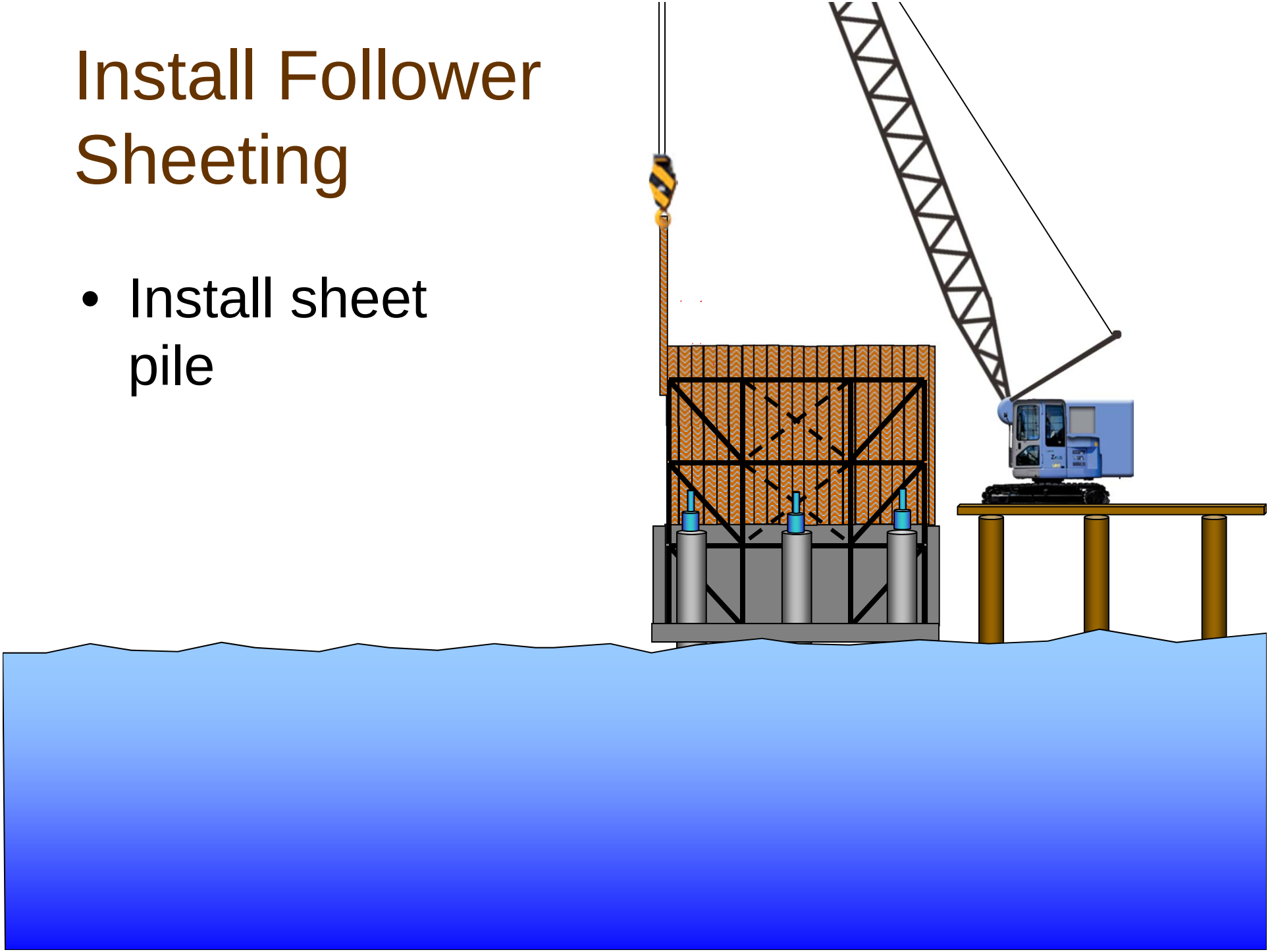
- Install 2nd and 3rd tier brace frame.



Cofferdam Structure with Bracing

Install Follower Sheeting

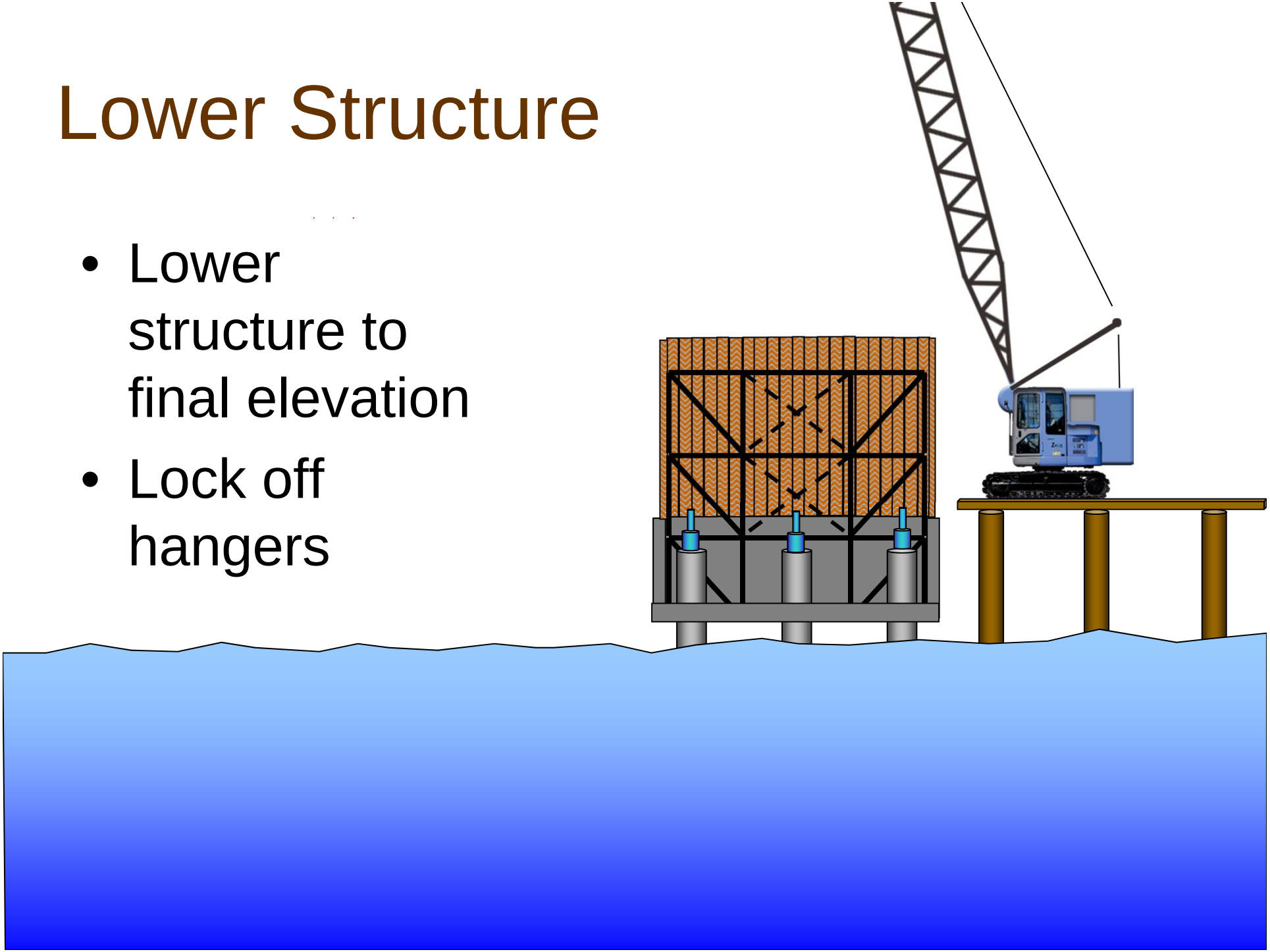
- Install sheet pile




RSC Equipment Rental
02/12/2009 12:54

Lower Structure

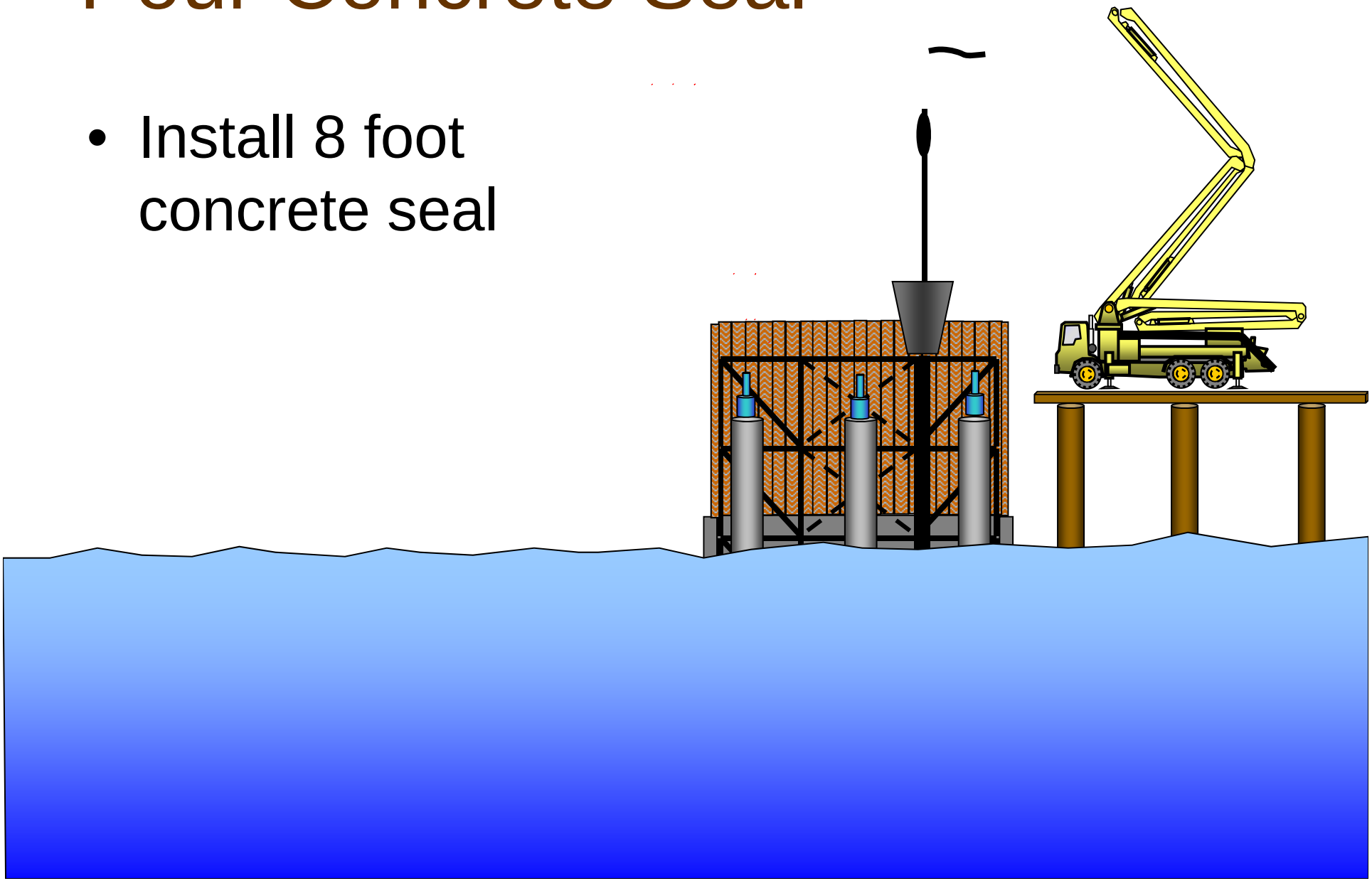
- Lower structure to final elevation
- Lock off hangers




January 11,
2009

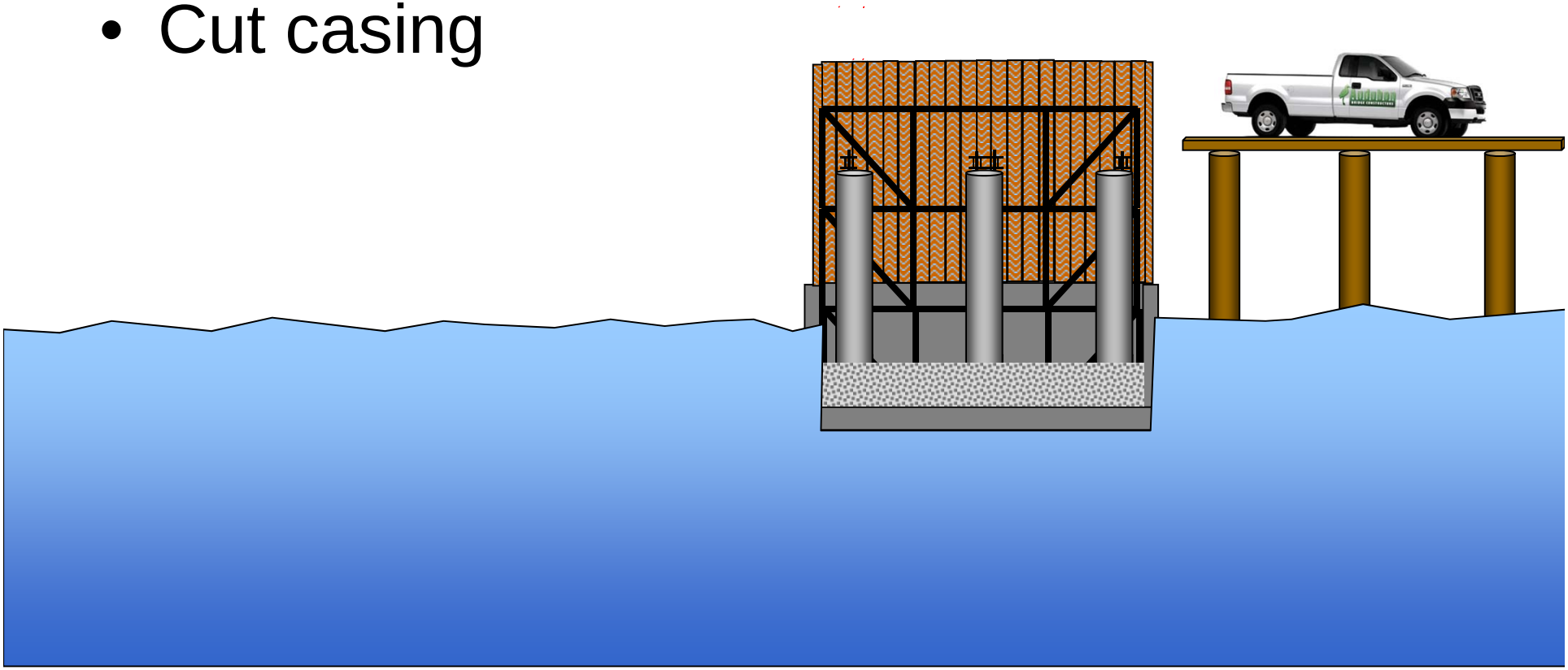
Pour Concrete Seal

- Install 8 foot concrete seal



Remove Hangers and Cut Casing

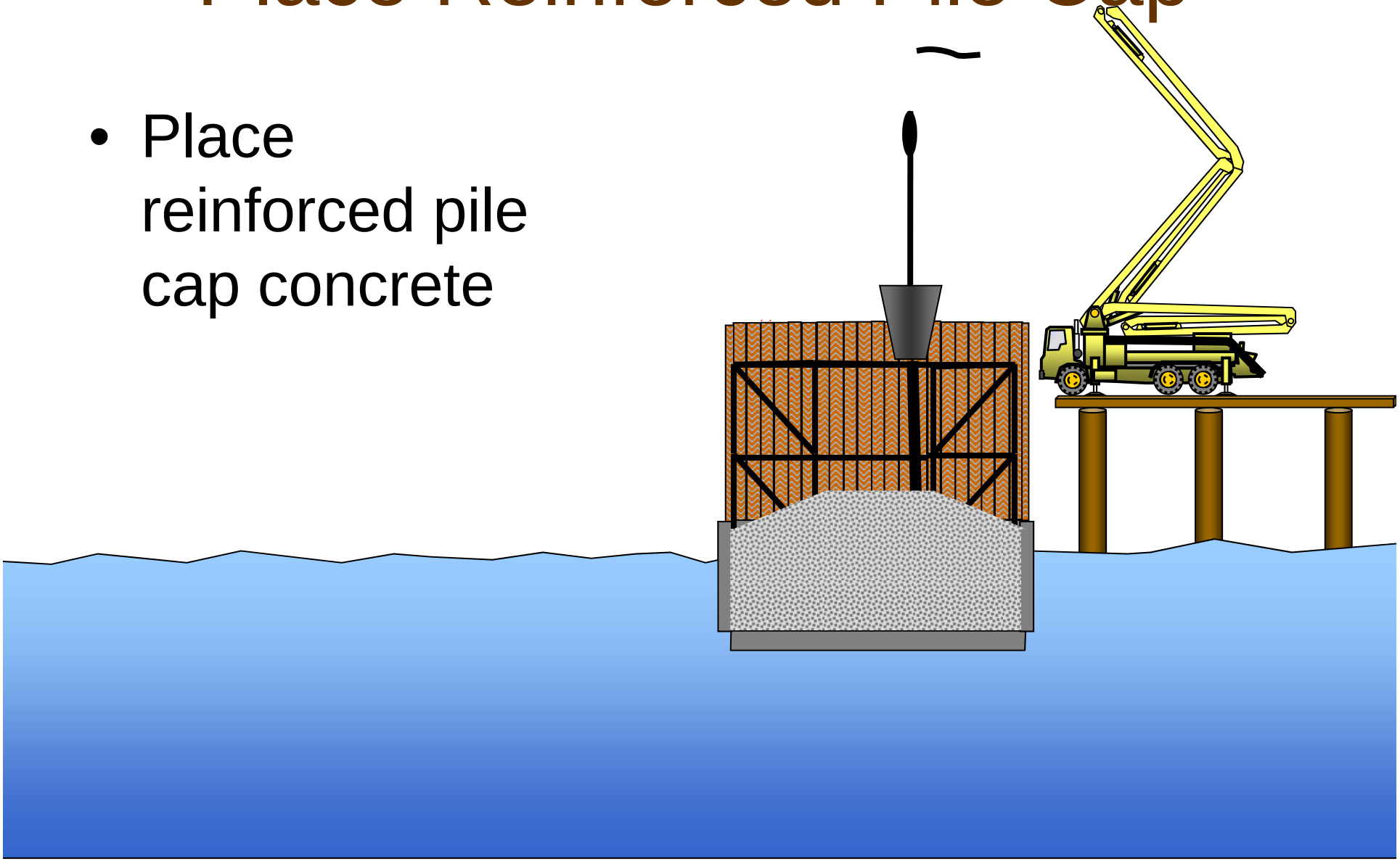
- Remove hangers
- Cut casing




05/27/2009 14:01

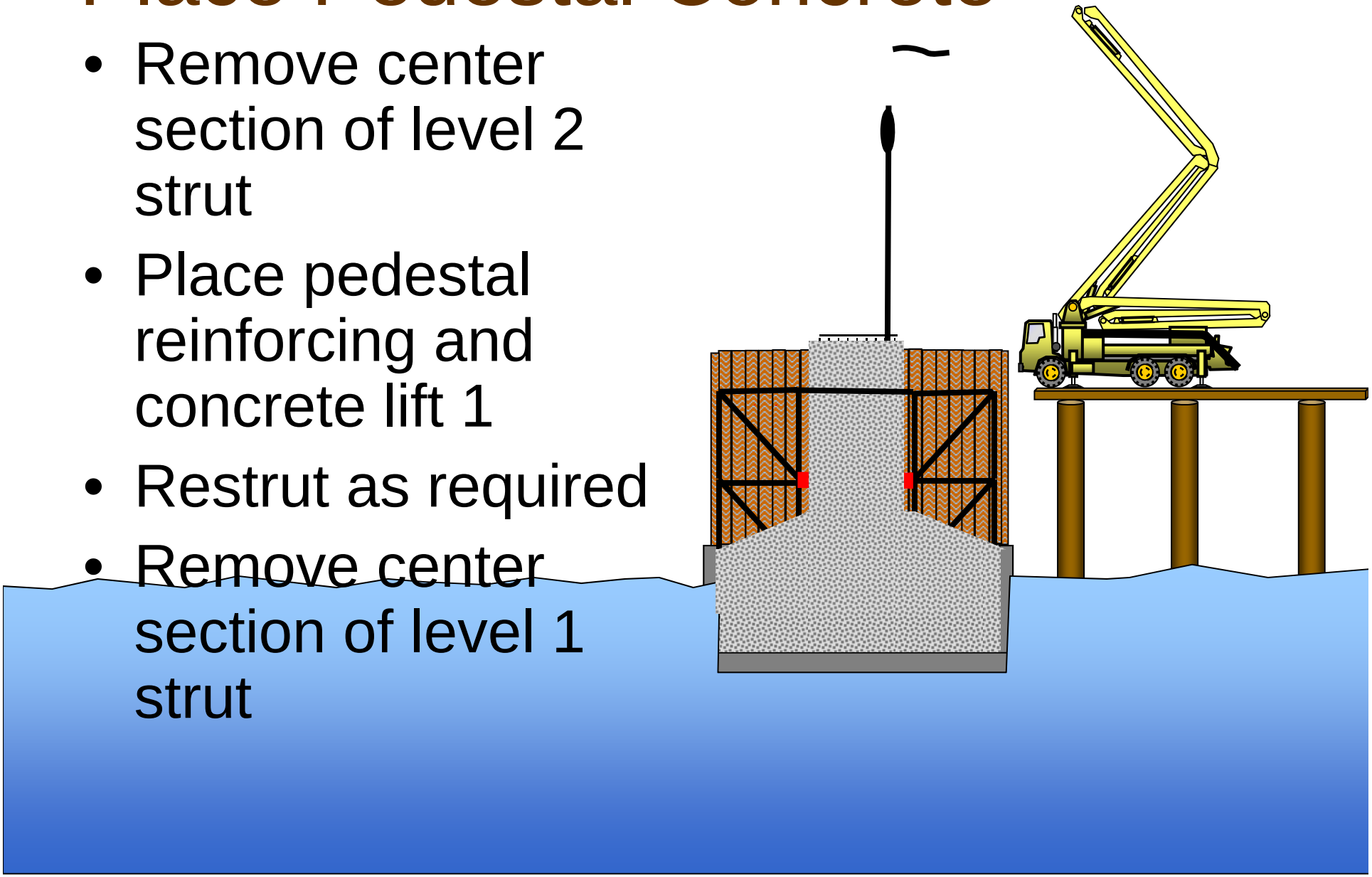
Place Reinforced Pile Cap

- Place reinforced pile cap concrete



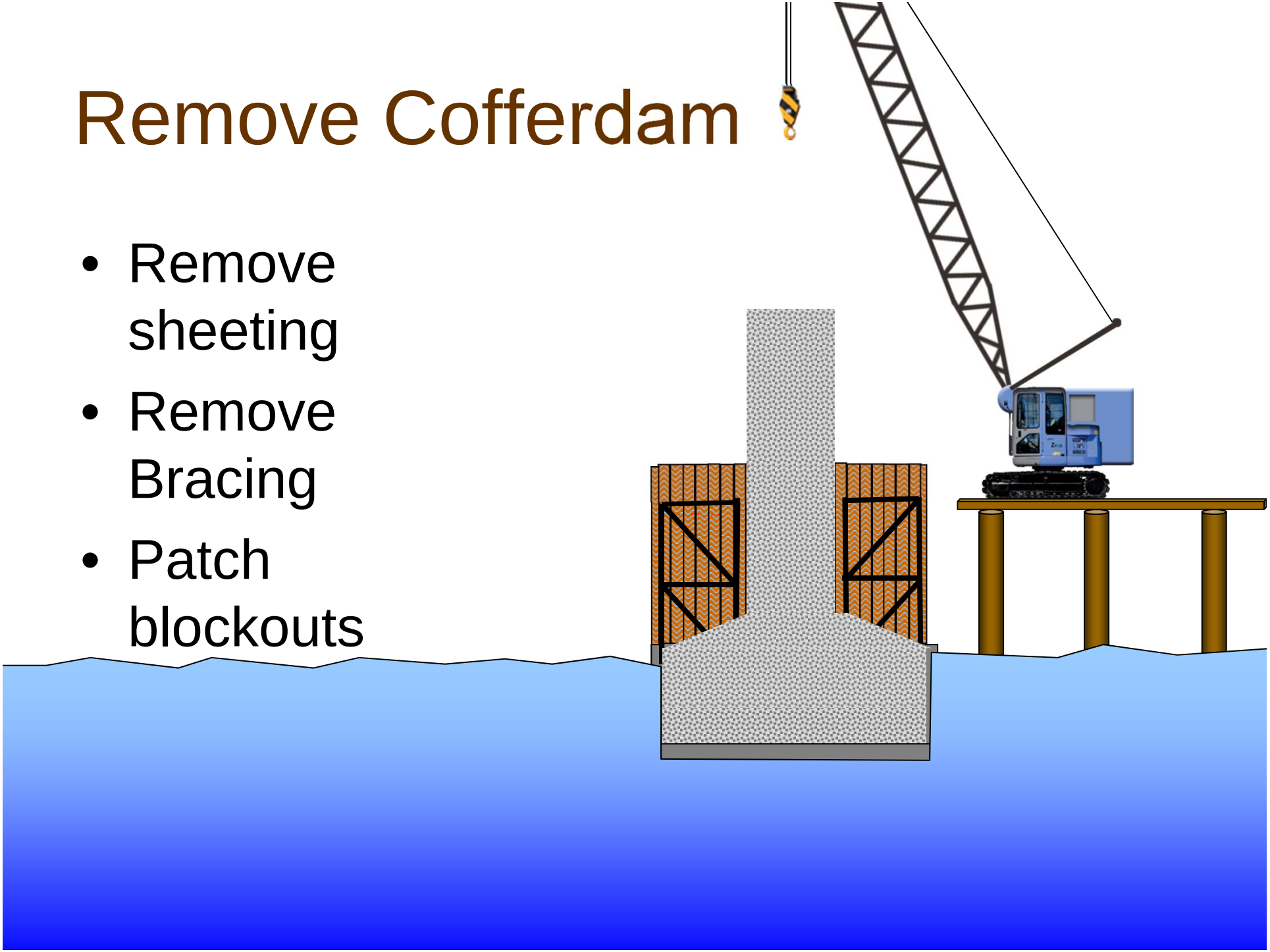
Place Pedestal Concrete

- Remove center section of level 2 strut
- Place pedestal reinforcing and concrete lift 1
- Restrut as required
- Remove center section of level 1 strut



Remove Cofferdam

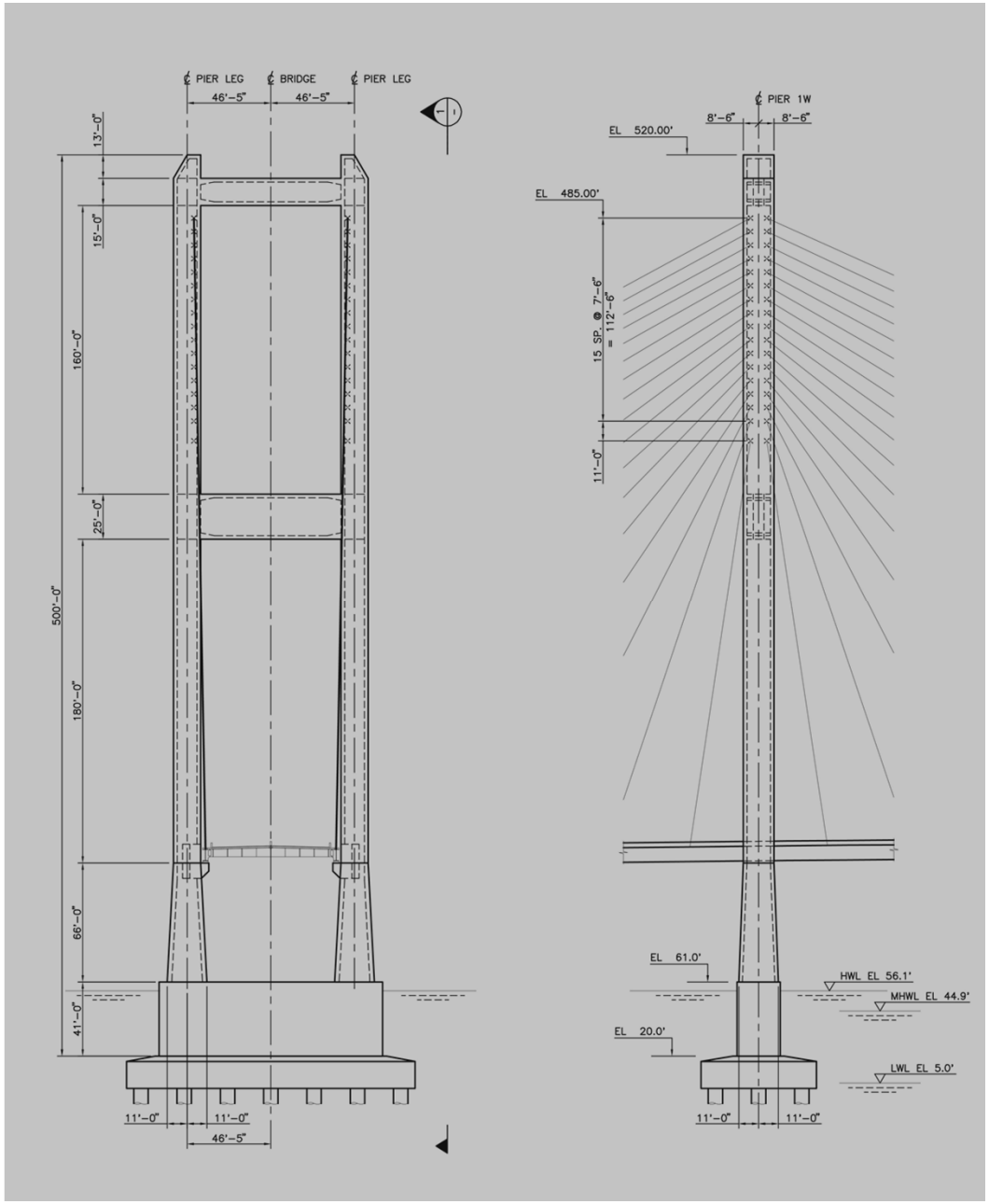
- Remove sheeting
- Remove Bracing
- Patch blockouts



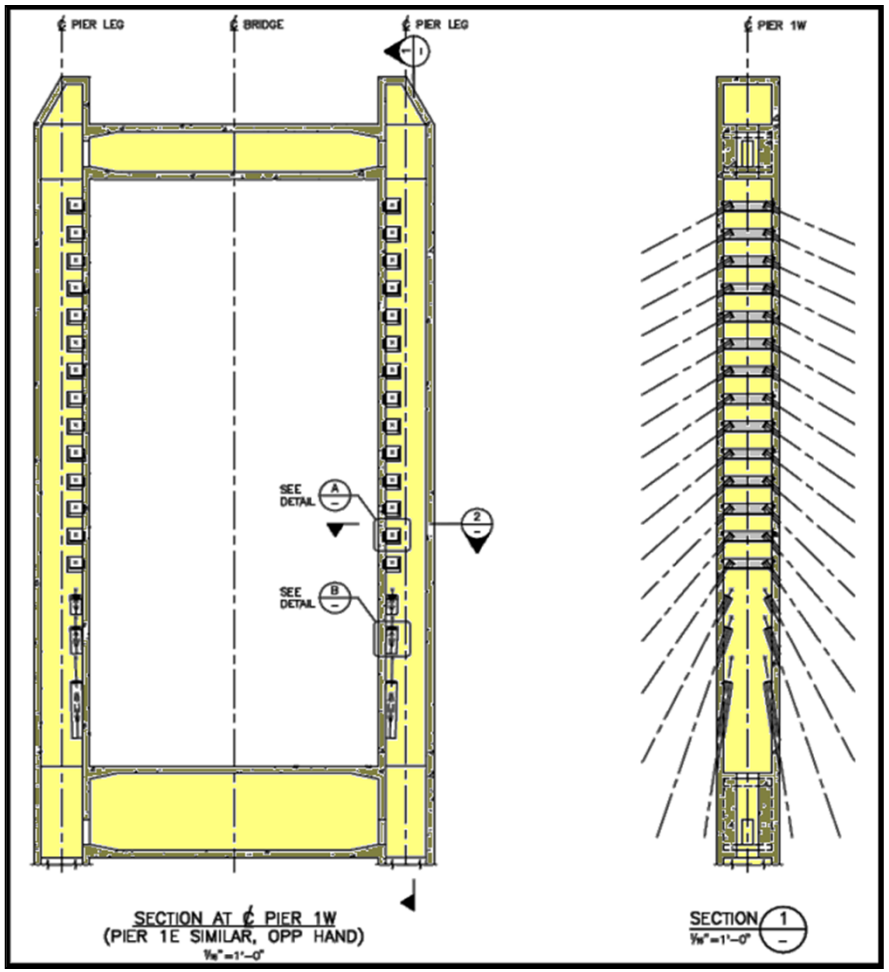

Today

Main Span Towers

- 500’ high
- 136 cable stays
- 2 Crossbeams
- Top of tower is elevation 520’
- Deck Elevation is 130’
- Corbels for deck support
- Maintenance traveler under the deck

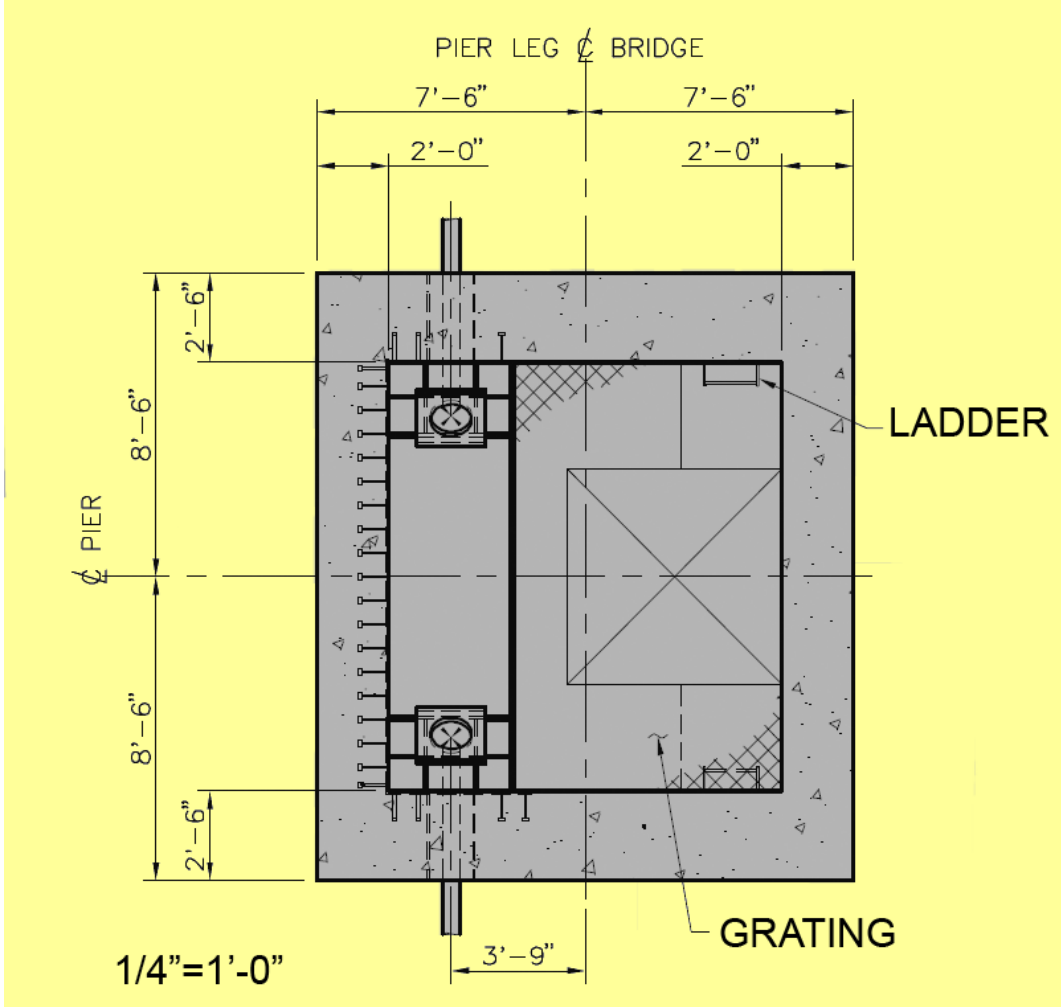


Tower Cable Anchorages



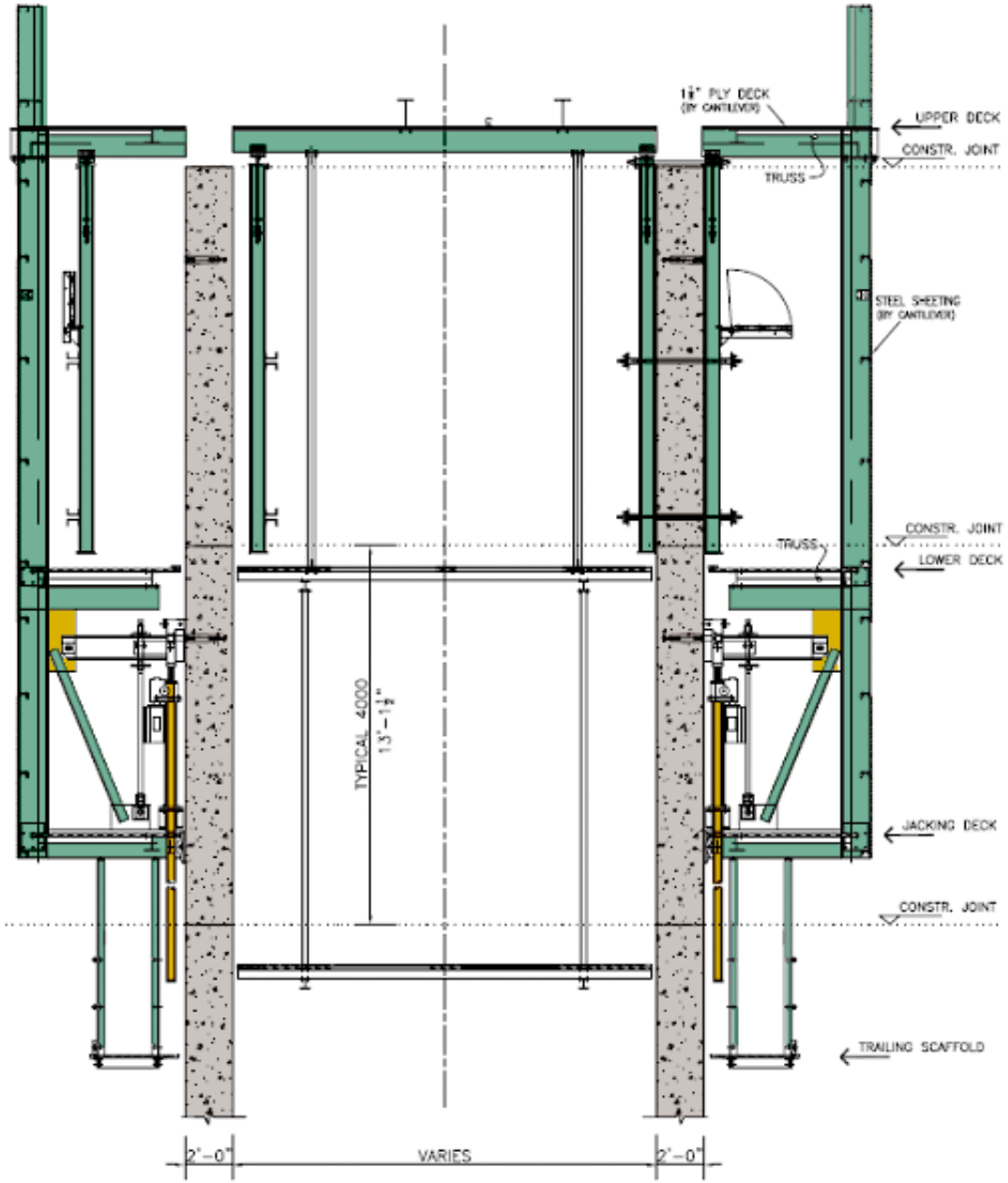
- Steel anchorage trays for upper stays
- Concrete corbels for lower steep cables
- Crossbeams connected clear of anchorage zone

Tower Cross Section



- Anchor box sections for simple jump forming
- Cable anchorage inside tower wall
- Elevator in each leg

Anchor Boxes



Tower Form System

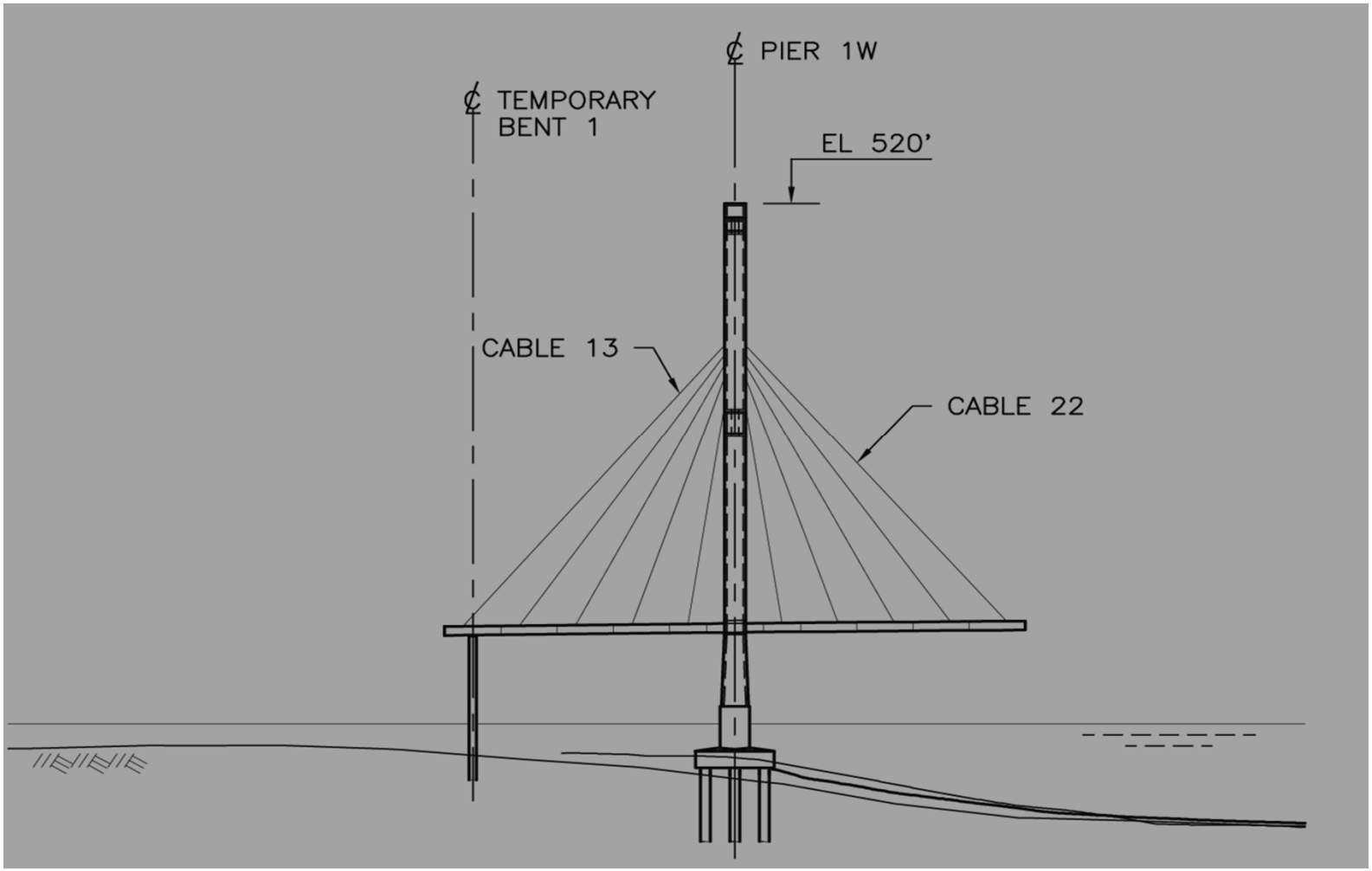
Tower and Cross-Beam Forms

Main span Superstructure

Stage-by-Stage Analysis

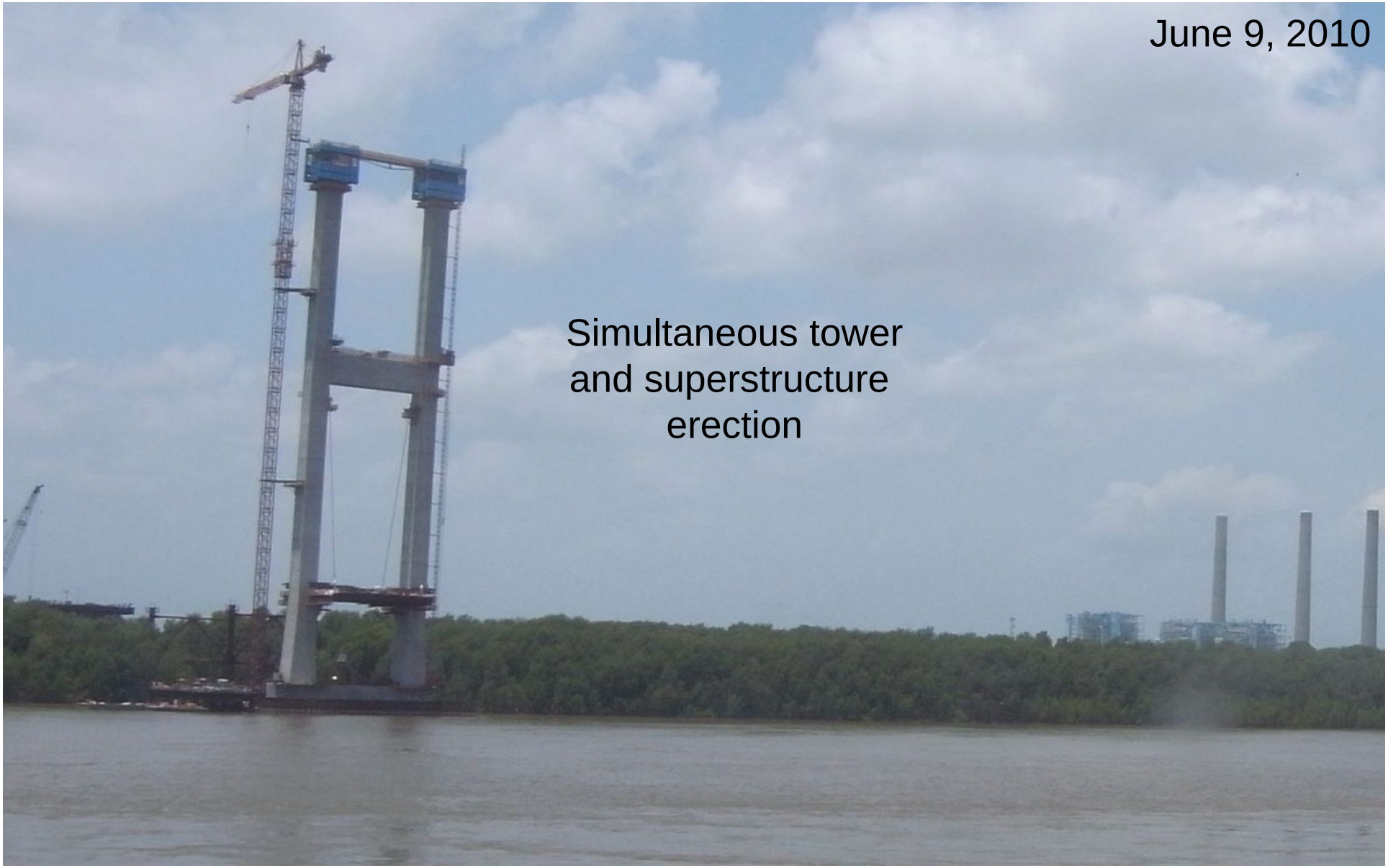
- Structure built one segment at a time
- Precisely captures locked-in effects
- Models time-dependent effects during construction
- Required for tracking bridge geometry during construction
- Performed prior to bridge construction

Bridge Construction

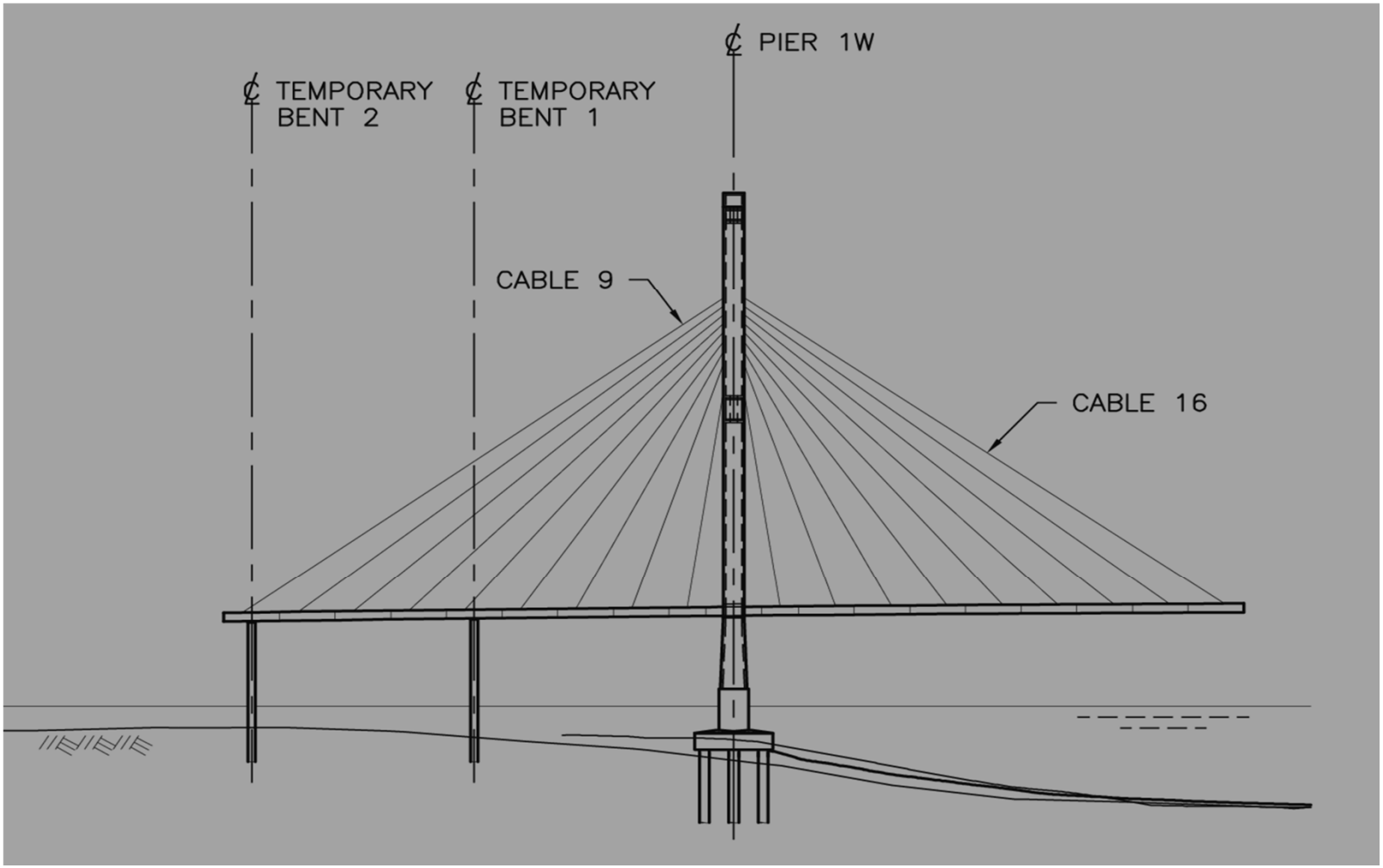



April 4, 2010
Pier Table Erection

Construct pier table

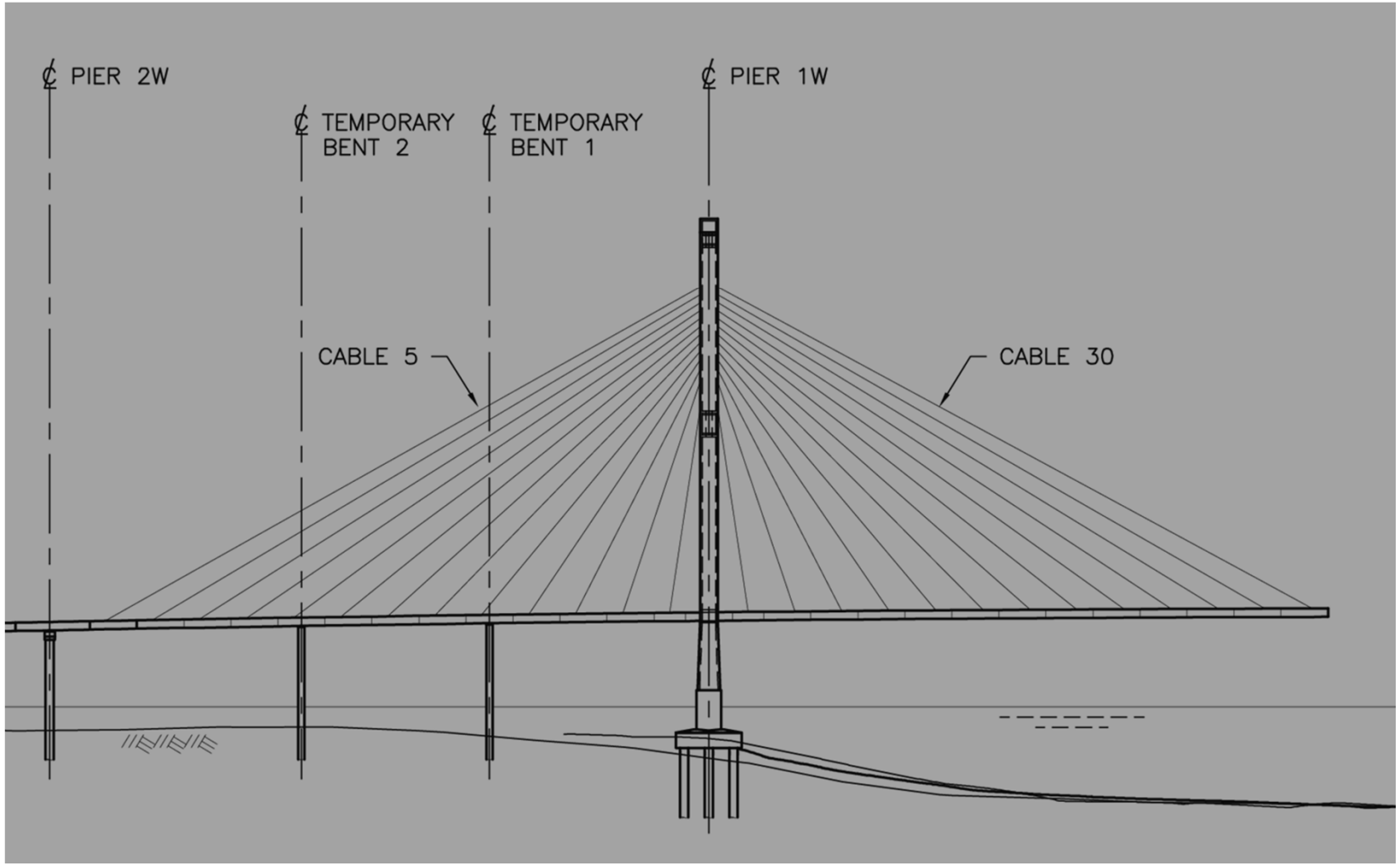

June 9, 2010
Simultaneous tower
and superstructure
erection

Bridge Construction




November 7, 2010
Completion of
Backspan and Transition Span

Bridge Construction

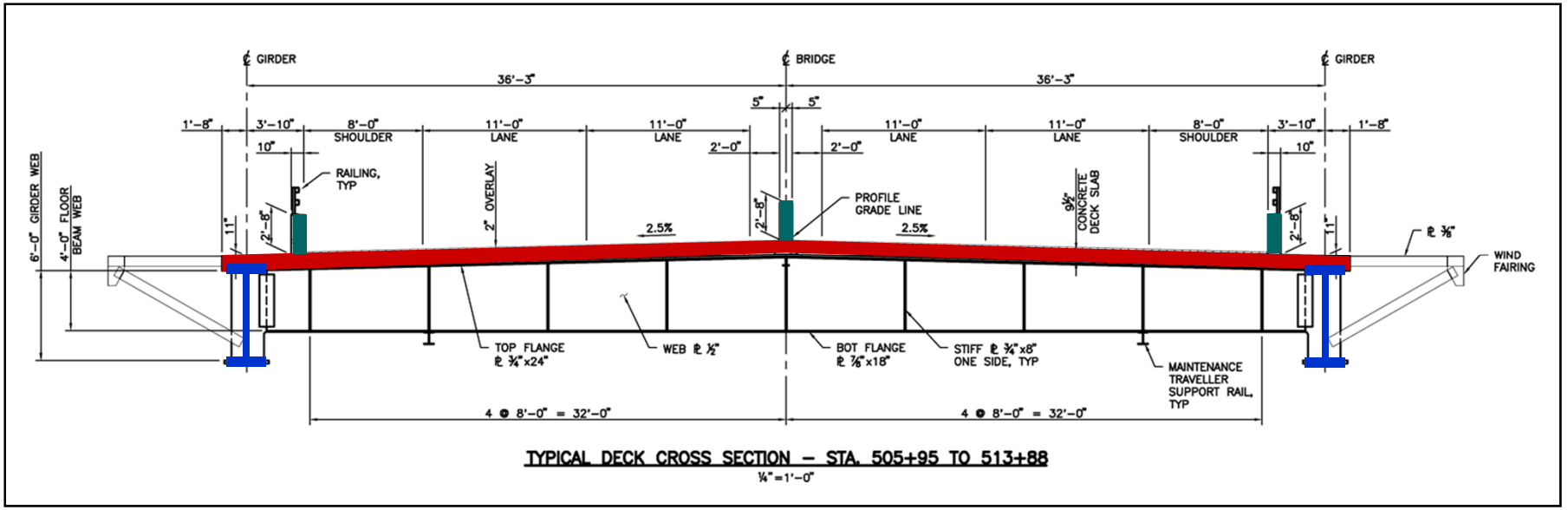



December 12,
2010


12/29/2010

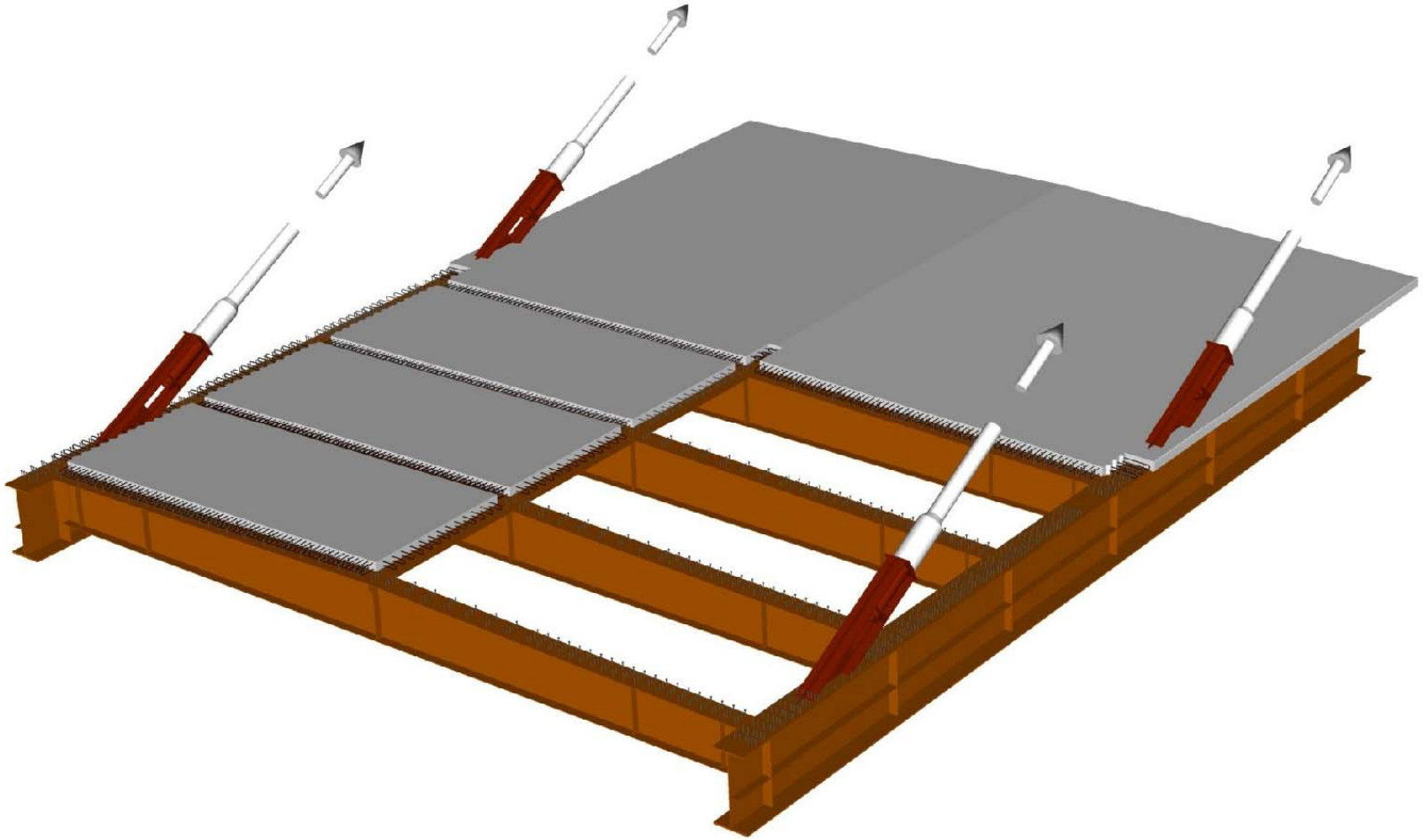

12/29/2010

Composite Deck Cross-Section

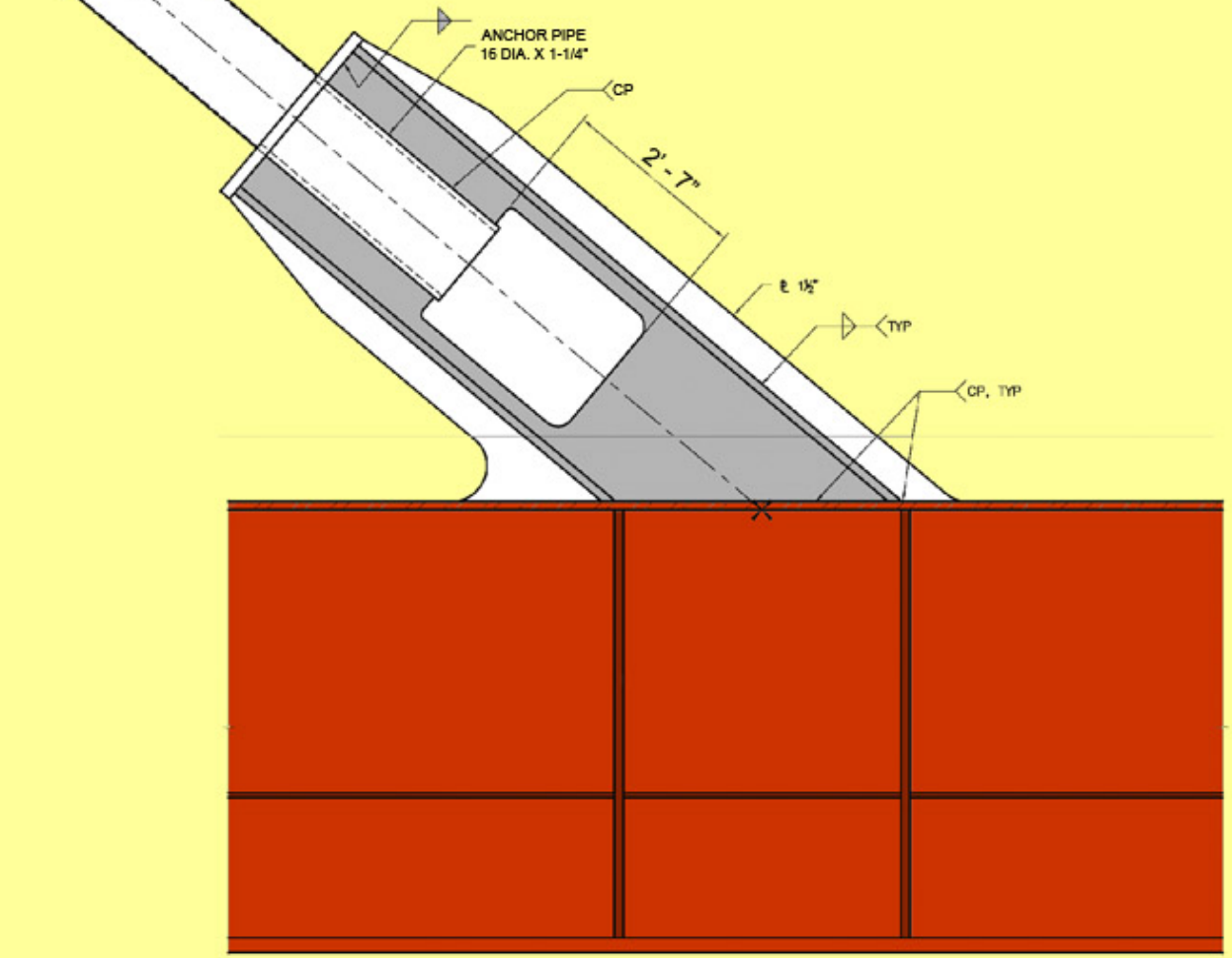


- Economy, simplicity and constructability
- Durability
- Accessibility
- Low maintenance

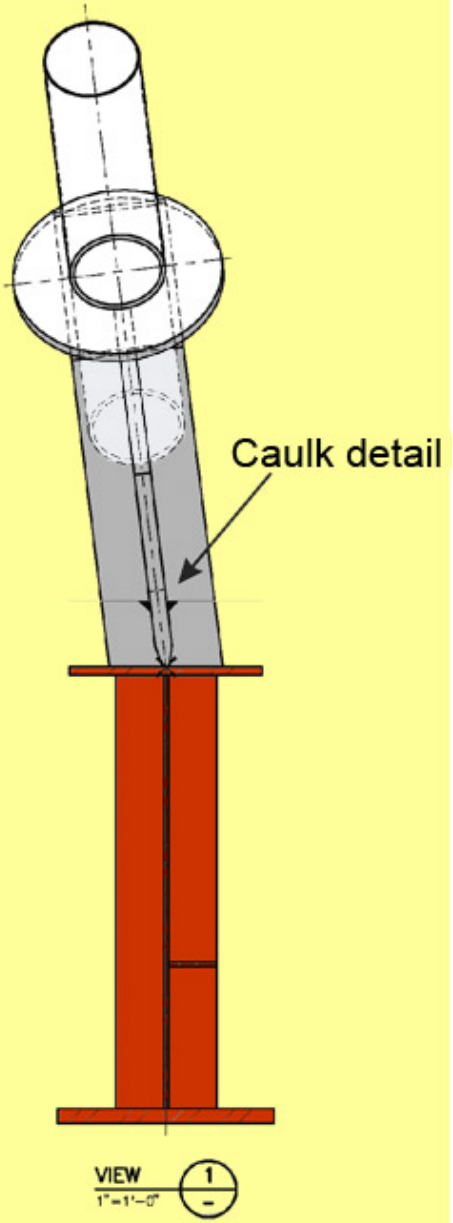
Composite Deck Cross-Section



Deck Anchorage



TYPICAL DECK ANCHORAGE
1"=1'-0"



VIEW 1
1"=1'-0"


12/28/2010


12/09/2010

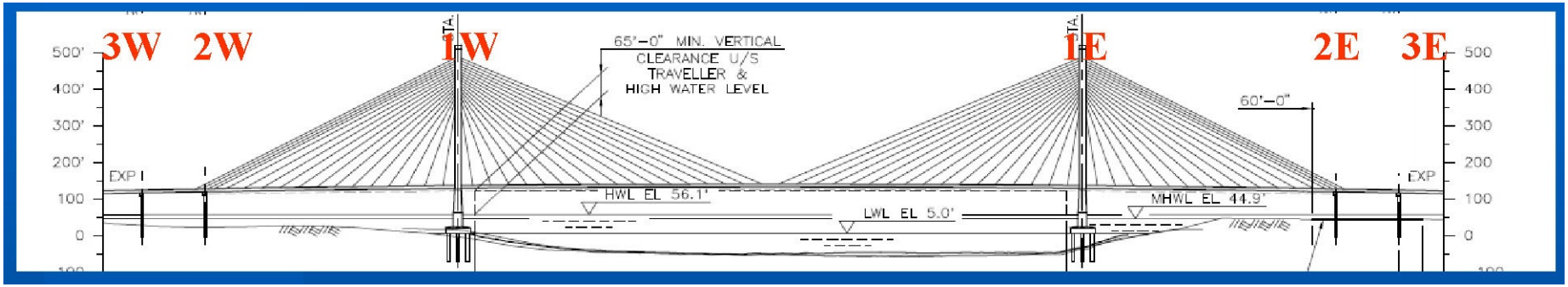
Stay System

- 7-Wire parallel strand
- Monostrand Jacking
- State-of-the-Art Corrosion Protection
  - Galvanizing
  - Grease
  - Strand PE
  - Coextruded HDPE Pipe
- Vibration suppression


05/10/2010 13:39

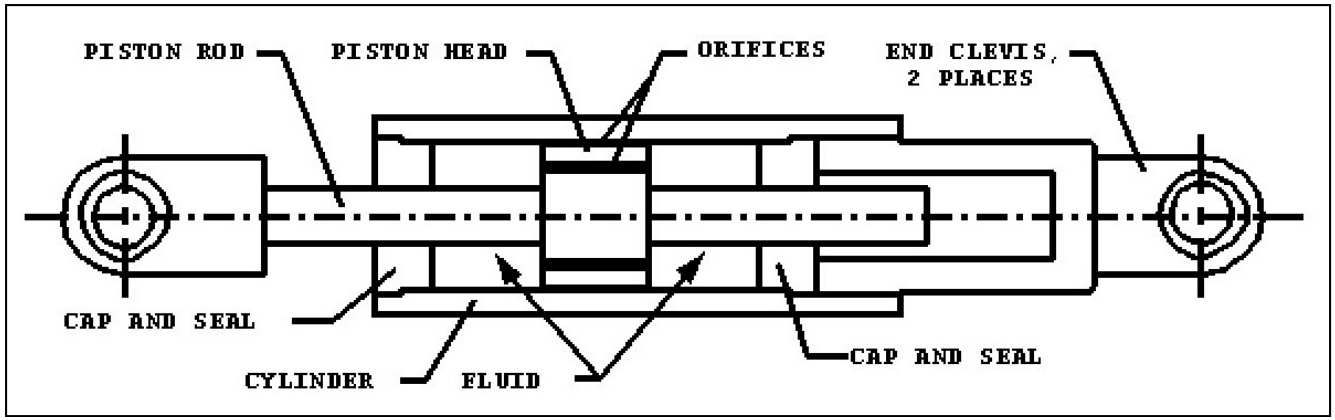

01/04/2008

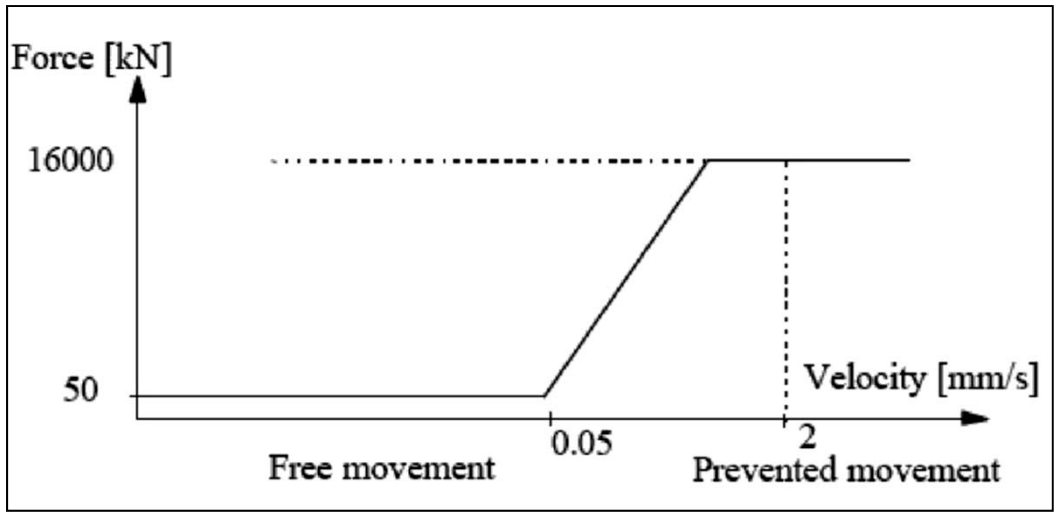
Deck/Tower Articulation



- Longitudinal Fixity
  - Pier 1W & 2W – Fixed Bearing
  - Pier 1E – Lockup Device
  - Pier 2E – Sliding Bearing
- Advantages
  - Maintain flexibility for temperature movements
  - Spread longitudinal shear from wind to both towers

Lock Up Devices





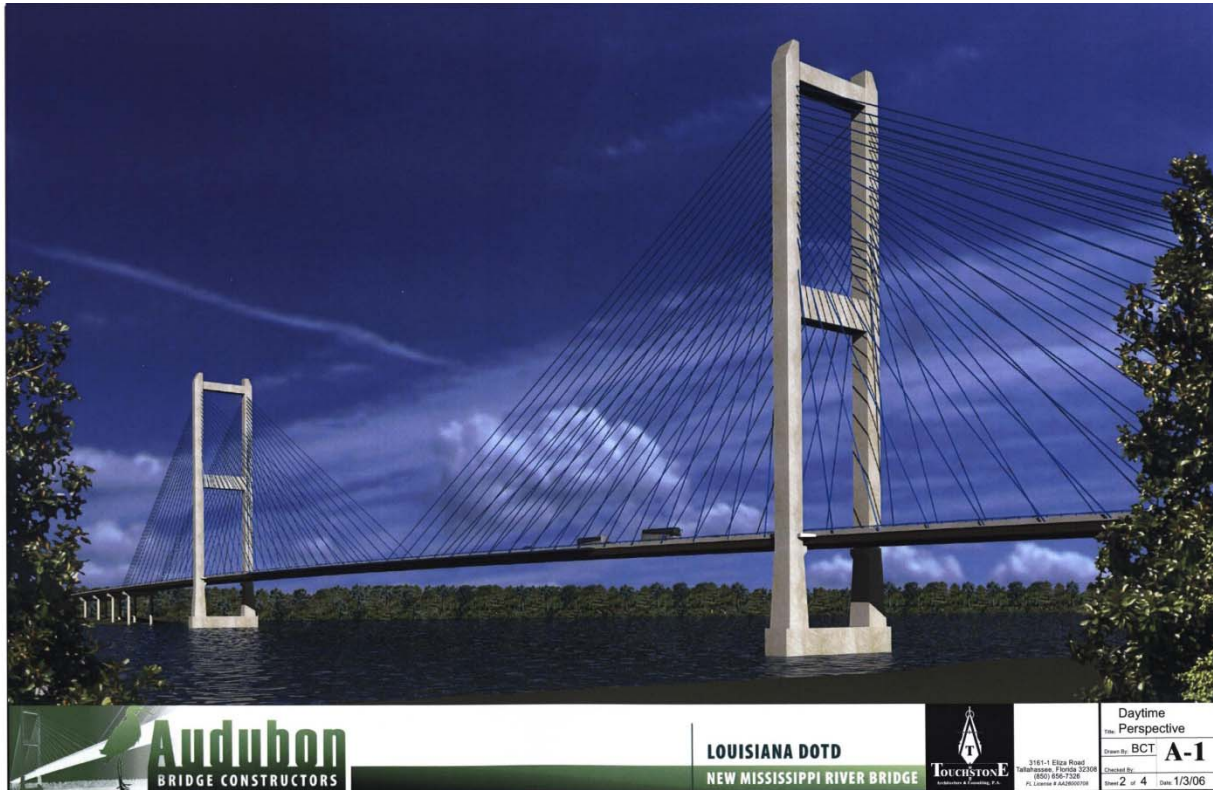

01/05/2011

2” LATEX MODIFIED CONCRETE OVERLAY – RIDING SURFACE

Audubon BRIDGE CONSTRUCTORS

Joint Venture of:

- **Granite Construction**
- **Flatiron Construction**
- **Parsons Transportation Group, Buckland-Taylor**



LTM – LOUISIANA TIMED MANAGERS – PB, GEC, LPA Group