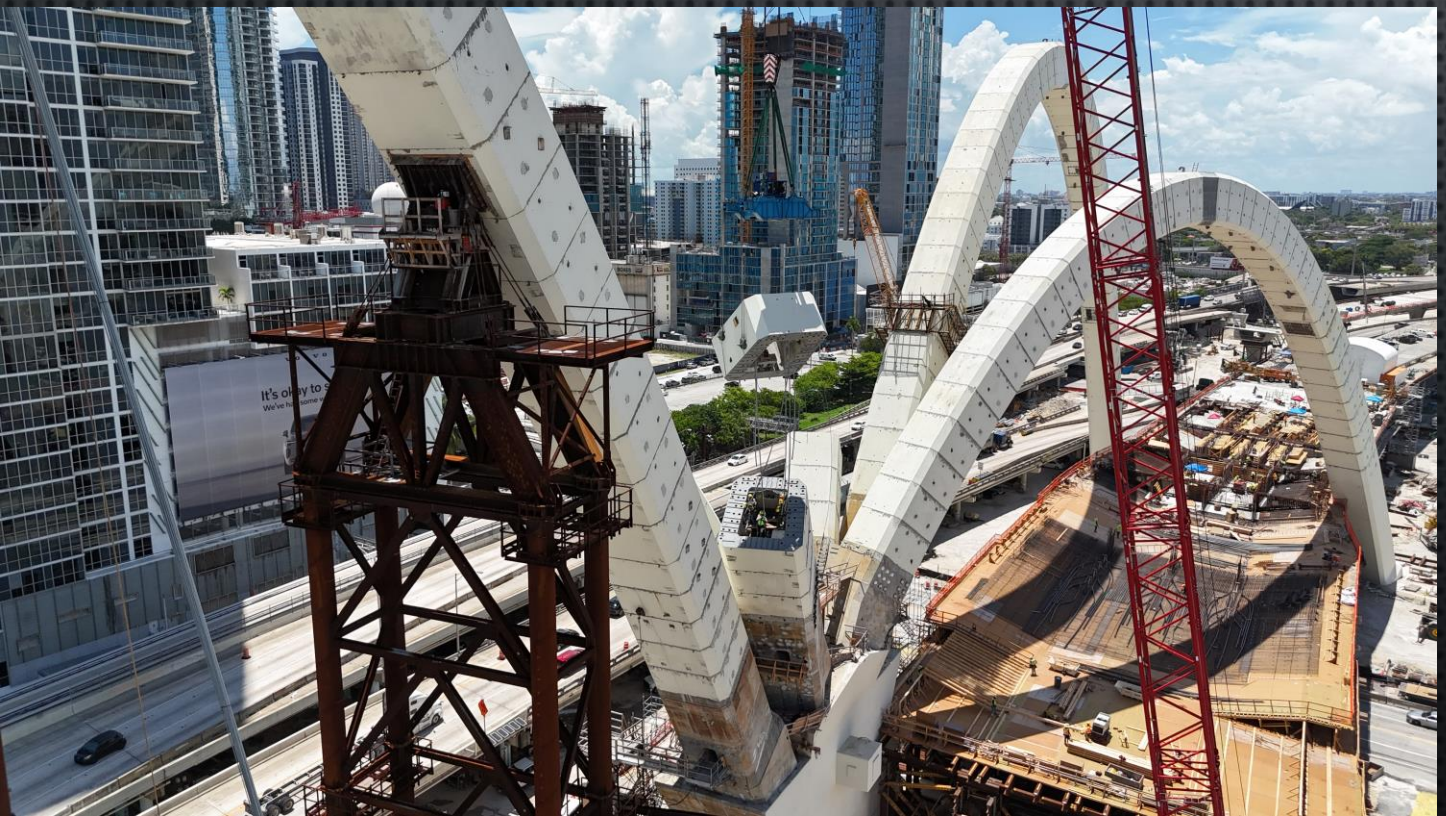
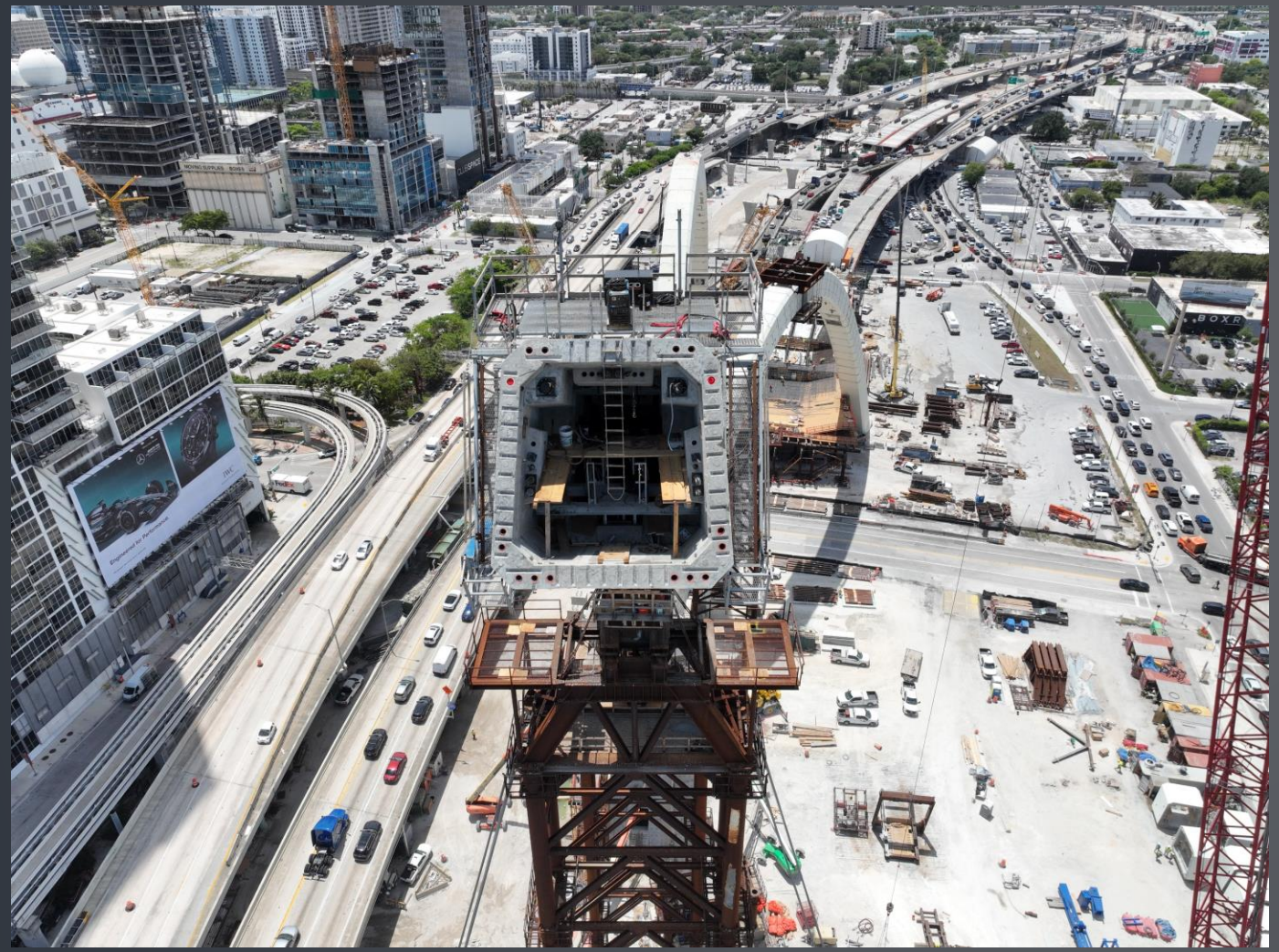


2026 CONSTRUCTION ACADEMY

STRUCTURES SESSION

FDOT

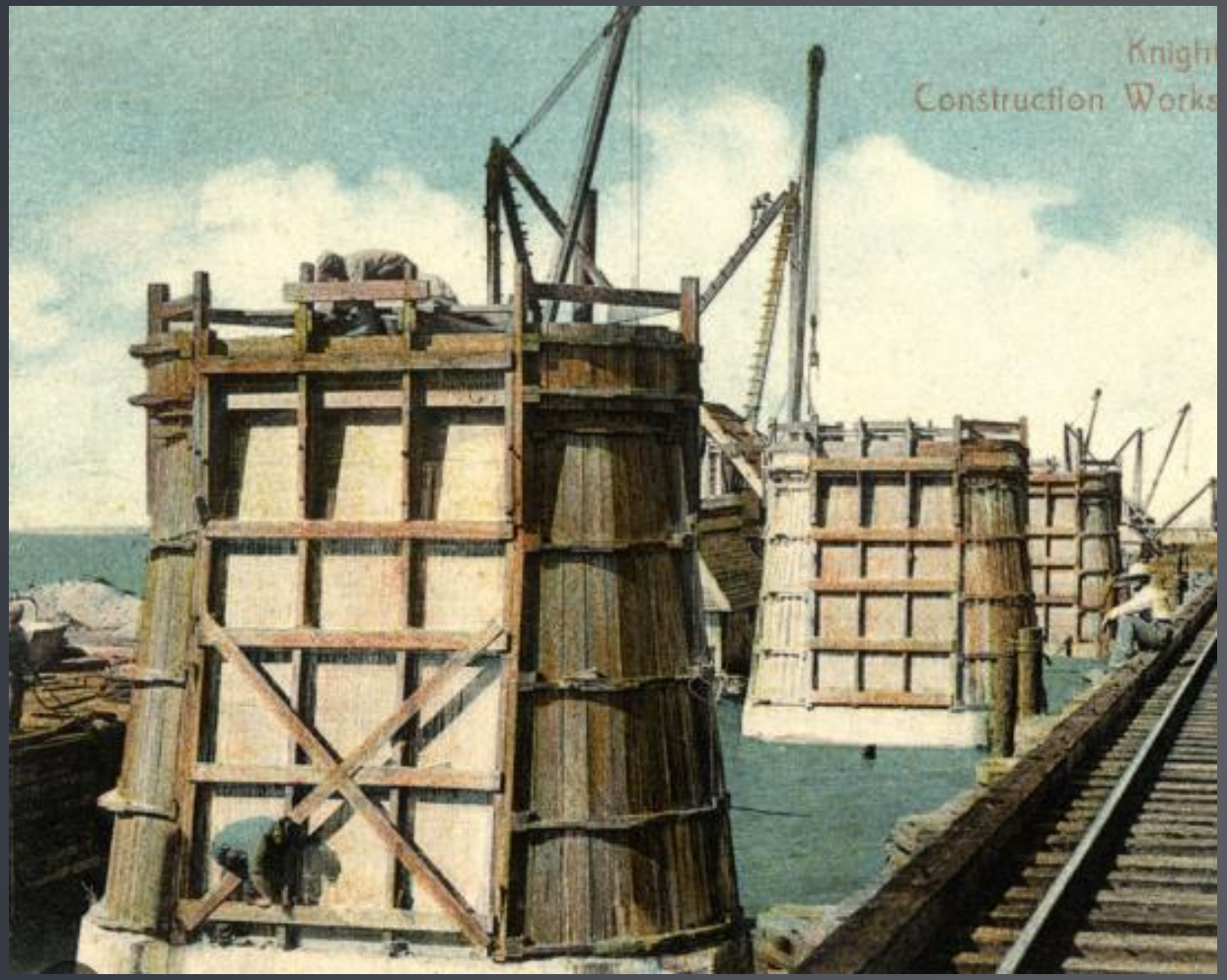


PURPOSE

- Target Audience: FDOT staff & Consultant Project Administrators
- Educate about structures construction
- Review Specifications and CPAM
- Review and Incorporate lessons learned

IMPORTANT TERMS & DOCS

- Construction Project Administration Manual (CPAM)
- Standard Specifications for Road and Bridge Construction (Division 1 and II)
- FDOT Self Study Courses (Structures Inspection and Critical Construction Issues)
- EOR, CEOR, Department Approved Specialty Engineer, Engineer



CPAM SECTIONS

- 8.4 – Shop and Erection Drawing Process
- 8.11 – Contractor Initiated Submittals
- 10.2 – Prestressed/Precast Concrete Components
- 10.3– Concrete Construction
- 10.4 – Coatings & Asbestos Removal, Handling and Disposal and Structural Steel Coating Issues
- 10.6 – Underwater Bridge Construction Inspection
- 10.7 – Post-tensioned Bridges
- 10.9 – Structural Steel & Miscellaneous Metal Components
- 10.10 – Bridge Construction Issues that Must Involve State Construction Office Staff
- 10.11 – General Structures Construction Issues

11. Shop Drawings: A shop drawing is a drawing or set of drawings produced by the contractor, supplier, manufacturer, subcontractor, or fabricator for prefabricated components. Shop drawings also include all working drawings, erection plans, associated trade literature, material cut-sheets, calculations, schedules, erection manuals, geometry control manuals and other manuals and similar documents submitted by the Contractor to define some portion of the project work. The type of work includes both permanent and temporary works as appropriate to the project.

CPAM 8.4 SHOP AND ERECTION DRAWINGS PROCESS

CPAM 8.4 SHOP AND ERECTION DRAWINGS PROCESS

- Nine (9) Item Shop Drawing Tracking Log (number, status, status of EOR review, etc.)
- Schedule of submittals required within 60 days of the start of contract
- At weekly progress meetings Contractor reports latest shop drawing priorities, updates
- EOR QC checkprints required (5-1.4.1.9)

Table 5-1 Submittal and Review Requirements						
Shop Drawing for:	Originated by Specialty Engineer Not Signed and Sealed	Originated by Detailer Not Signed and Sealed	Originated by Specialty Engineer Signed and Sealed	Originated by Contractor s EOR Signed and Sealed	Requires Review, QA/QC Check prints and disposition stamp by Design EOR	Requires Construction IPR and signed and sealed Certification Letter
Steel Fabrication Drawings		Originator			Reviewer	
Steel Erection Plan			Originator		Reviewer	
Geometry Control Manual				Originator	Reviewer	
Segmental Erection Manual				Originator	Reviewer	Reviewer[5]

SPECS 5-1.4.2 SHOP DRAWINGS SUBMITTAL AND REVIEW REQUIREMENTS

CPAM 8.11 CONTRACTOR INITIATED SUBMITTALS

- Categories of Submittal:
  - Request for information (RFI)
  - Request for Correction (RFC)
  - Request for Modification (RFM)
  - Nonconformance Report (NCR; aka RFC)
  - Engineering Analysis Report (EAR)
- Process/procedure covered in CPAM
- 17-item tracking log for each submittal

The expected response time for RFMs and RFCs will be the same as specified for shop drawings in Section 5-1 of the Standard Specifications (45 days), or as specified in the Request for Proposal for Design-Build projects. (Copy paste from CPAM) 5.1.4.6 below

CPAM 8.11.8 has timelines for response time, can range from 2 to 15 days depending on priority level and escalation matrix in CPAM

Despite its apparent simplicity, RFIs frequently pose challenges, often leading to delays, conflicts, and legal implications

Some common abuses of construction RFIs include submitting excessive RFIs for minor issues, using RFIs to shift blame or responsibility, and generating RFIs without proper research or documentation. These abuses can lead to project delays, confusion, and unnecessary disputes.

submittal does not deviate from the Plans, clearly state so in the submittal.

Schedule the submission of shop drawings to allow for a 45 calendar day review period for all submittals associated with a category 2 bridge; tolling components identified in the current FDOT General Tolling Requirements (GTR) Part 3; and the tolling-related signing, DMS and ITS infrastructure. Schedule the submission of shop drawings to allow for a 25 calendar day review period for all other items. The review period commences upon the Engineer's receipt of the valid submittal or valid re-submittal and terminates upon the transmittal of the submittal back to the Contractor. A valid submittal includes all the minimum requirements outlined in 5-1.4.4.

Nonconformance/Noncompliance Report (NCR): A Request for Correction (see the definition of Request for Correction) that requires the Contractor's submitted documents to include official Department ***Form No. 675-010-10, Nonconforming Structural Steel and Miscellaneous Metal Component Data Sheet,*** *or* ***Form No. 700-030-10,***

Noncomplying Prestressed/Precast Concrete Component Data sheet, when the correction involves a structural steel or miscellaneous metal product including mechanical and electrical components or a prestressed/precast product.

450-12 Noncomplying Prestressed Products.

450-12.1 General: When a precast prestressed concrete product does not comply with the requirements of this Section or is damaged, use the following provisions for evaluating and dispositioning of deficiencies. However, when precast prestressed concrete products have been installed, the disposition of concrete cracks shall be in accordance with Section 400. Apply these provisions in all cases that clearly fall under the circumstances described in Section 400. Consider situations not covered by these specific circumstances on their individual merits. Consider and apply the following where practical.

Make all major repairs that require a repair proposal under the observation and the satisfaction of the QC Manager or designee.

450-12.2 Identification of Defects: The QC Manager, or QC inspectors under direction of the QC Manager, will examine all deficiencies within the time limit specified in 450-2.3 and 450-2.4, to determine the applicable provisions and requirements of this Article and which course of action is appropriate.

1. If the QC Manager or designee determines that a deficiency is a cosmetic or minor defect, as stated 450-12.3, appropriate repairs may be executed in accordance with 450-13.

2. If the deficiency is major as defined in this Section, and is repairable for acceptance, submit a completed Noncomplying Prestressed/Precast Concrete Component Data Sheet (Form No. 700-030-10) to the Engineer within 30 days of the defect identification.

Submit an Engineering Analysis Scope in accordance with 6-4 for approval, to address the deficiency. A previously approved Engineering Analysis Report (EAR) may not be applied to a current major repair without the approval from the original engineer who signed and sealed the previously approved EAR.

Make major repairs under the observation of and to the satisfaction of the QC Manager. The Engineer reserves the right to witness the repairs.

EAR

A Specialty Engineer, who is an independent consultant, or the Contractor's Engineer of Record as stated within each individual Section shall perform any such analysis within 45 calendar days of the Engineer's approval of the Engineering Analysis Scope, complete and submit the EAR. The EAR must be signed and sealed by the Specialty Engineer or the Contractor's Engineer of Record that performed the engineering analysis. Allow for a 45 calendar day review period for all EARs associated with a category 2 bridge; tolling components identified in the current FDOT General Tolling Requirements (GTR) Part 3; and the tolling-related signing, DMS and ITS infrastructure. Allow for a 25 calendar day review period for all other items. The Engineer will determine the final disposition of the material after review of the EAR. No additional monetary compensation or time extension will be granted for the impact of any such analysis or review.

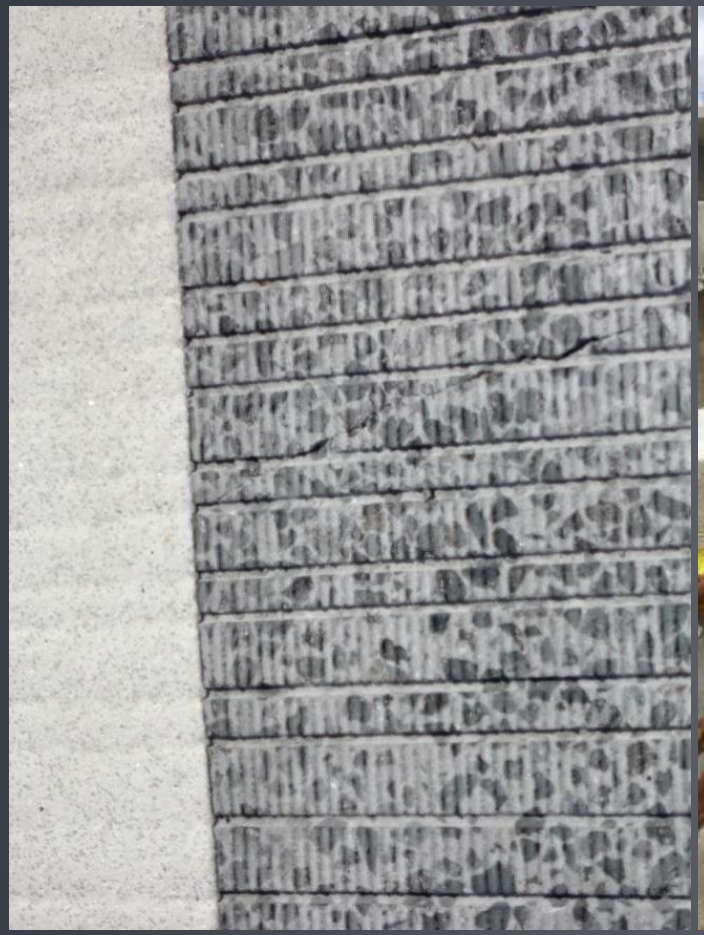
400-21 Disposition of Cracked Concrete.

400-21.3 Classification of Cracks: The Engineer will classify cracks as either nonstructural or structural. In general, nonstructural cracks are cracks 1/2 inch or less deep from the surface of the concrete; however, the Engineer may determine that a crack greater than 1/2 inch deep is nonstructural. In general, structural cracks are cracks that extend deeper than 1/2 inch. As an exception, all cracks in concrete bridge decks that are supported by beams or girders will be classified as nonstructural and repair will be in accordance with 400-21.5.1. However, if the Engineer determines that repair under 400-21.5.1 is unacceptable, repair in accordance with 400-21.5.2.

400-21.5.2 Structural Cracks: Submit an Engineering Analysis Scope in accordance with 6-4, signed and sealed by the Contractor's Engineer of Record, to determine the strength and durability of the proposed repair. Upon approval of the EAR and final determination of the Engineer, repair or remove and replace the cracked concrete in accordance with the approved EAR.

CPAM 10.3 Concrete Construction

- Spec. 400-21, Disposition of Cracked Concrete: the number of cracks, average crack width, length of cracks taken into account
- CPAM Section 10.3.5, Mass Concrete Control Plan (MCCP)
- CPAM Section 10.7, Crack and Joint Inspection of Post-Tensioned Bridges



CPAM 10.3 CONCRETE CONSTRUCTION

CPAM 10.3 CONCRETE CONSTRUCTION

- 10.3.6: Crack inspection 3X: 1) after casting, 2) all dead loads, 3) all live loads
- Early discovery allows crack monitoring and correction of other components to prevent more cracks
- Crack Maps denoting length, width, depth, location
- Disposition of Cracks:
  - Structural or
  - Non-structural—Engineer makes the determination!

CPAM 10.4 PAINT & ASBESTOS REMOVAL, HANDLING & DISPOSAL AND STRUCTURAL STEEL COATING ISSUES

- Hazardous but also potentially hazardous waste:
  - Asbestos Containing Material (ACM)
  - Lead
- Coating Concerns:
  - Surface preparation
  - Bolts, caulking gaps and seams—stripe coating
  - Faying surfaces
  - Testing for chloride, sulfate and nitrate concentrations
  - Containment
- Discuss concerns at pre-operations meetings

CPAM 10.4 PAINT & ASBESTOS REMOVAL, HANDLING & DISPOSAL AND STRUCTURAL STEEL COATING ISSUES

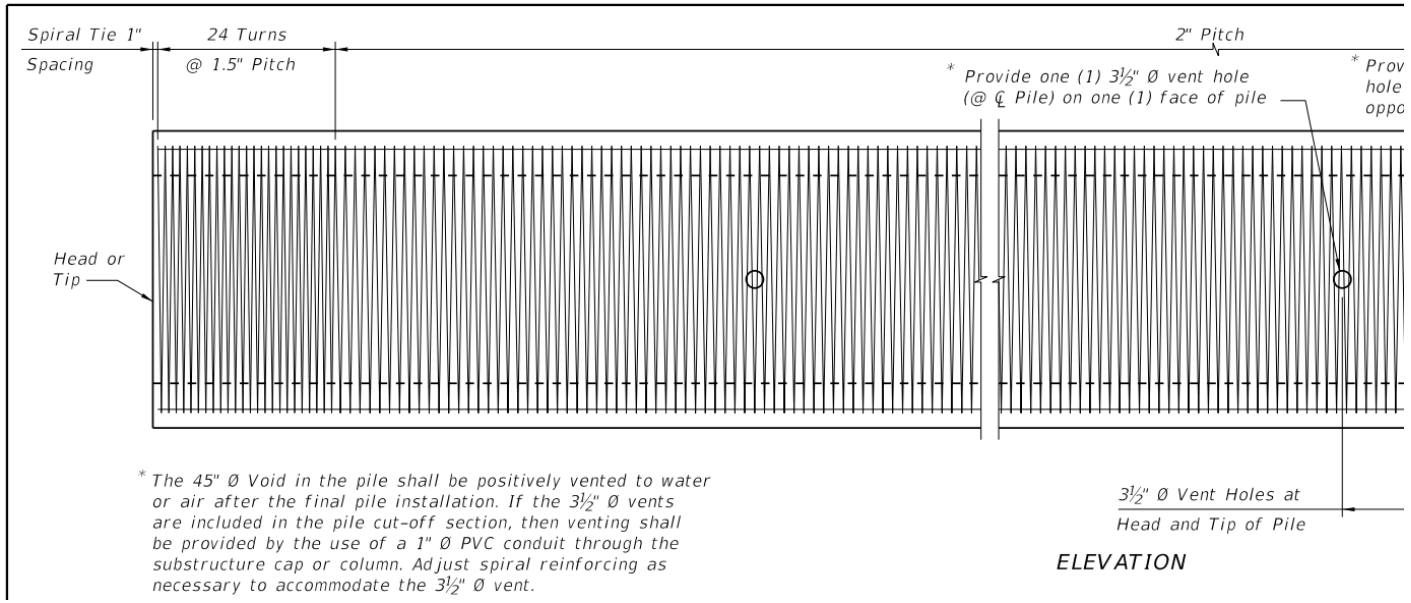
- **Blast media for paint removal/surface prep**
- **Ferrous (top)**
- **Steel grit (below)**

CPAM 10.4 PAINT & ASBESTOS REMOVAL, HANDLING & DISPOSAL AND STRUCTURAL STEEL COATING ISSUES

CONTAINMENT

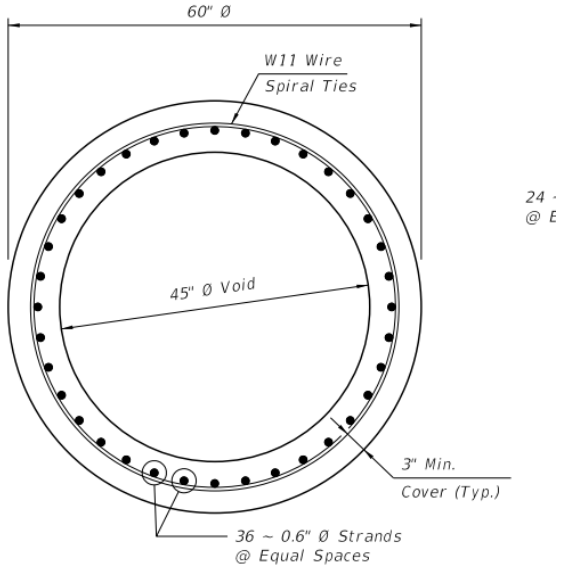
CPAM 10.6 UNDERWATER BRIDGE CONSTRUCTION INSPECTION

- Initial inspection of voided concrete/cylinder piles
- Other pile types, Engineer makes decision
- Final underwater inspections for all projects by:
  - FDOT prequalified Consulting Firm (Maintenance)
  - FDOT Structures Maintenance



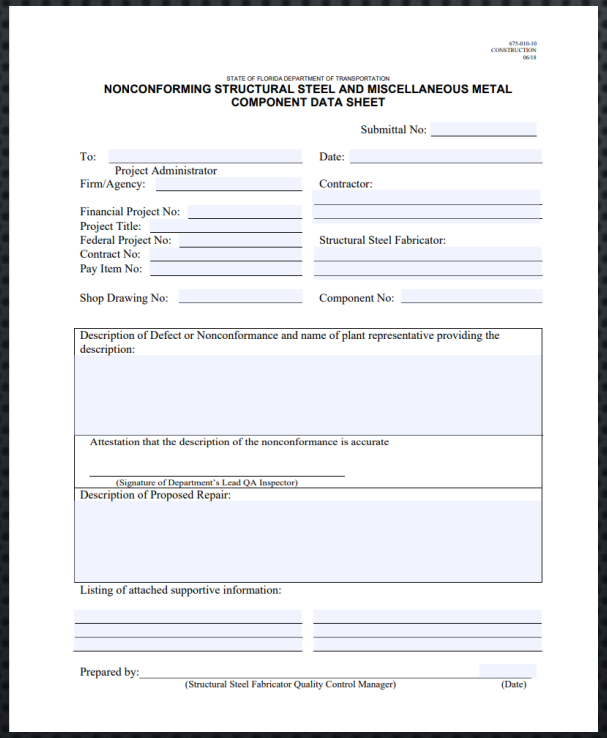
* The 45" Ø Void in the pile shall be positively vented to water or air after the final pile installation. If the 3½" Ø vents are included in the pile cut-off section, then venting shall be provided by the use of a 1" Ø PVC conduit through the substructure cap or column. Adjust spiral reinforcing as necessary to accommodate the 3½" Ø vent.

ELEVATION



SECTION A-A

CPAM 10.9 Structural Steel and Miscellaneous Metal Components



675-010-10
CONSTRUCTION
06/18

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

NONCONFORMING STRUCTURAL STEEL AND MISCELLANEOUS METAL COMPONENT DATA SHEET

Submittal No: _____

To: _____ Date: _____
Project Administrator
Firm/Agency: _____ Contractor: _____

Financial Project No: _____
Project Title: _____
Federal Project No: _____ Structural Steel Fabricator: _____
Contract No: _____
Pay Item No: _____

Shop Drawing No: _____ Component No: _____

Description of Defect or Nonconformance and name of plant representative providing the description:

Attestation that the description of the nonconformance is accurate

_____
(Signature of Department's Lead QA Inspector)

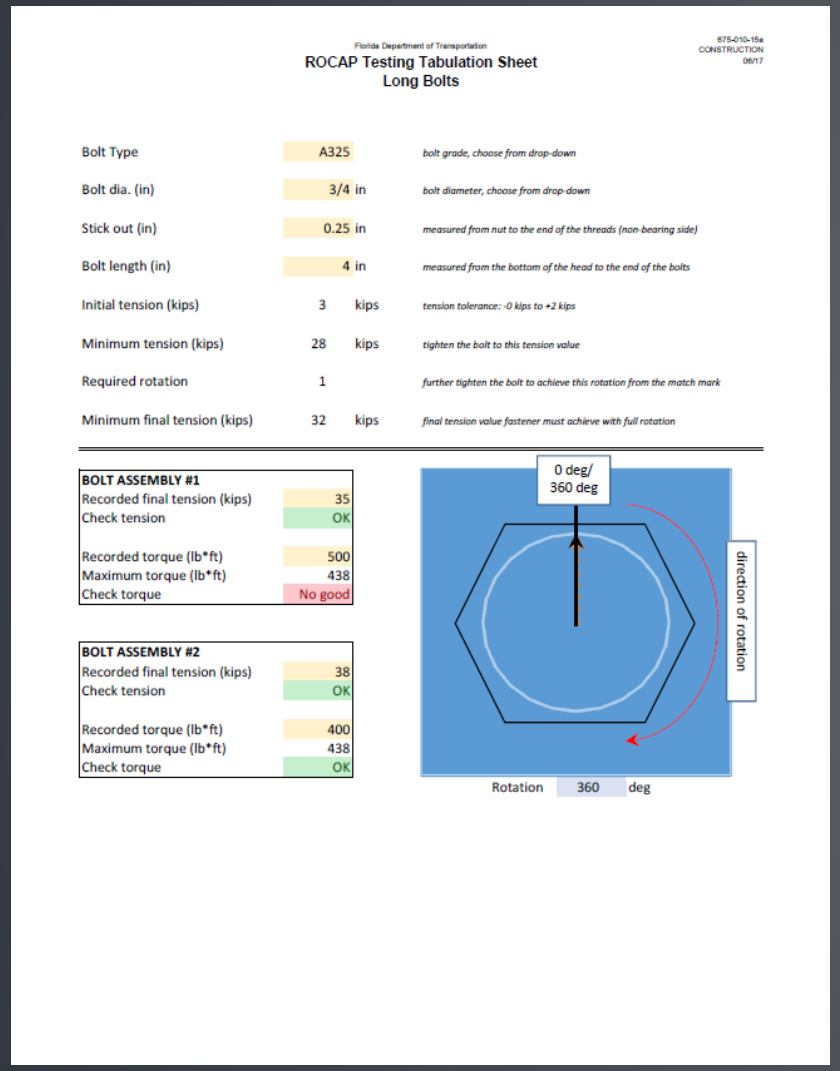
Description of Proposed Repair:

Listing of attached supportive information:

Prepared by: _____
(Structural Steel Fabricator Quality Control Manager) (Date)

- Records must be kept of:
  - Job Inspection Snug Tight Torque Test for Bolts
  - Rotational Capacity Test for Bolts (ROCAP)
  - Steel Girder Shear Connector (shear studs) Bend Test
- Fabrication schedule
- Consultant Inspection of fabrication
- Non-compliances of fabricated components

CPAM 10.9
STRUCTURAL STEEL AND MISCELLANEOUS METAL COMPONENTS



Florida Department of Transportation

875-010-15a
CONSTRUCTION
06/17

ROCAP Testing Tabulation Sheet
Long Bolts

Bolt Type	A325		*bolt grade, choose from drop-down*
Bolt dia. (in)	3/4	in	*bolt diameter, choose from drop-down*
Stick out (in)	0.25	in	*measured from nut to the end of the threads (non-bearing side)*
Bolt length (in)	4	in	*measured from the bottom of the head to the end of the bolts*
Initial tension (kips)	3	kips	*tension tolerance: -0 kips to +2 kips*
Minimum tension (kips)	28	kips	*tighten the bolt to this tension value*
Required rotation	1		*further tighten the bolt to achieve this rotation from the match mark*
Minimum final tension (kips)	32	kips	*final tension value fastener must achieve with full rotation*

BOLT ASSEMBLY #1	
Recorded final tension (kips)	35
Check tension	OK
Recorded torque (lb*ft)	500
Maximum torque (lb*ft)	438
Check torque	No good

BOLT ASSEMBLY #2	
Recorded final tension (kips)	38
Check tension	OK
Recorded torque (lb*ft)	400
Maximum torque (lb*ft)	438
Check torque	OK

Rotation 360 deg

CPAM 10.9 STRUCTURAL STEEL AND MISCELLANEOUS METAL COMPONENTS

CPAM 10.9 STRUCTURAL STEEL AND MISCELLANEOUS METAL COMPONENTS

CPAM 10.10 Bridge Construction Issues that Must Involve State Construction Structures Engineer

- Complex or Category II Bridge issues:
  - Steel
  - Segmental
  - Movable
  - Post-tensioned
- Changes to As-Built condition
- Modification of Plans/ Cost Savings Initiatives
- Non-compliances of Steel/Prestressed items

Topic #625-000-002
FDOT Design Manual January 1, 2026

121.3.2 Category 2 Structures

All structure types not listed above are classified as Category 2 Structures unless exempted by the SDO. In addition to, or in lieu of, the criteria listed above, a structure is classified as a Category 2 Structure when any of the following are present:

(1) Bridge substructures containing any of the following:

- (a) Post-tensioned components
- (b) Straddle piers
- (c) Integral caps
- (d) Mildly reinforced pier column with net sustained tension on the extreme fiber under permanent service loads in the final condition

(2) Bridges designed for vessel collision or bridges with superstructures subject to the application of wave loads per ***Drainage Manual*** ***Section 4.9.5***.

(3) Bridges with non-redundant foundations, micropiles, or auger cast piles

(4) Any component designed using Fiber Reinforced Polymer (FRP) composite materials except components in the ***Standard Plans*** that include FRP composite materials

(5) Braided underpass structures where the beams or flat slab superstructure element is not oriented parallel to traffic of the overlying roadway and a portion of the superstructure and substructure extends beyond the limits of the overlying traffic barriers

CPAM 10.11 General Structures Construction Issues

- Notifying District Structures Maintenance Engineer of in-service dates and acceptance inspections
- As-Bid vs. As-Built Load Ratings—changes?
- Department-owned temporary bridging

Specification Sections

- 5 – Control of the Work
- 346 – Portland Cement Concrete
- 400 – Concrete Structures
- 450 – Precast Prestressed Concrete Construction
- 460 – Structural Steel and Miscellaneous Metals
- **Not all Structures Specs specifically addressed here**

Spec 5—Construction Affecting Public Safety

- Construction Affecting Public Safety
  - Signed and sealed erection plan prior to erection
  - Daily inspections of structure
  - Specialty Engineer certification prior to opening facility below
- Signed and sealed stability calculations
- Table of Temporary Bracing Details

ED BEAM STABILITY AND TEMPORARY BRACING NOTES:
am stability and design temporary beam bracing, including connections, in accordance with the Specifications and the FDOT Structures Manual.
ion:
ate the beam stability and bracing requirements against the design assumptions including:
adings given in the plans.
eam Camber (less than 6 inches) and Beam Sweep (in compliance with Specification 450 requirements).
earings given in the plans.
ely connect bracing to each beam. Do not allow the bracing to exert any vertical force on the outer edge of the top flange. Preform all bolt
in beams and fill after use in accordance with the Specifications.

OF PRESTRESSED I-BEAM TEMPORARY BRACING MINIMUM REQUIREMENTS AND LOADS — Table Date 8-05-15

BEAM NO.	STAGE 1	STAGE 2			STAGE 3	
	BRACE ENDS PRIOR TO CRANE RELEASE?[1] (YES/NO)	TOTAL LINES OF BRACING[2,3,7]	MINIMUM NUMBER OF ADJACENT BEAMS ERECTED	HORIZONTAL LOAD AT EACH BRACE[4] (KIP)	TOTAL LINES OF BRACING[3,5,7]	OVERTURNING MOMENT AT EACH BRACE[6] (KIP-FT)

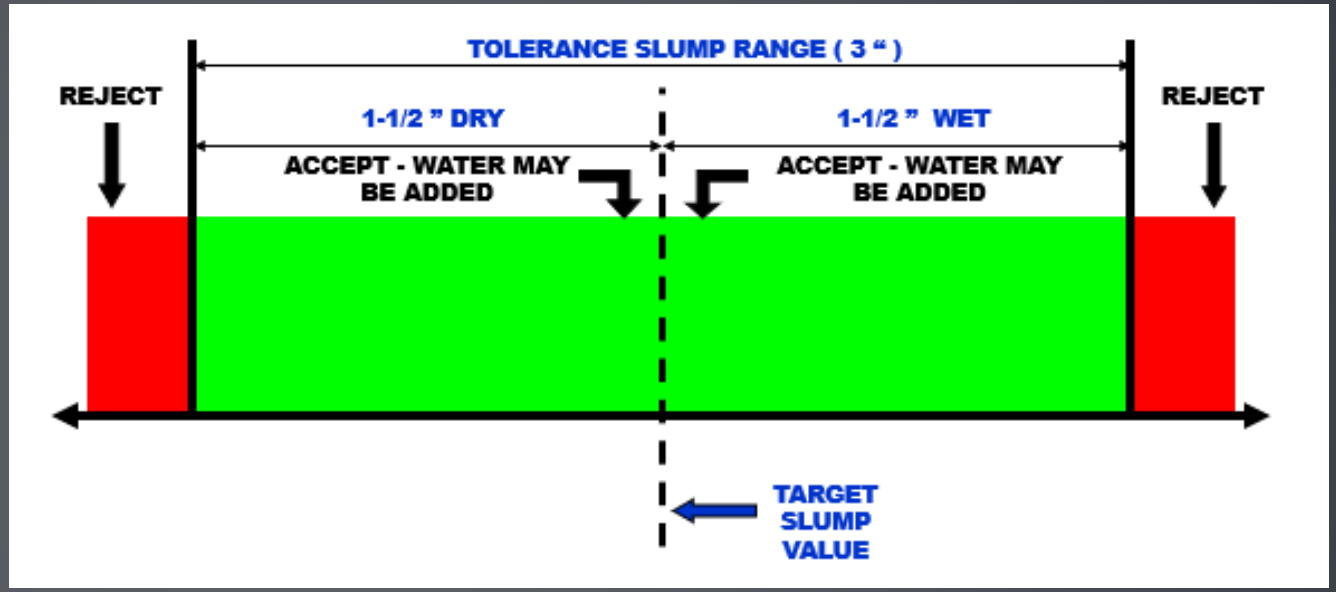
acing loads to be determined by the Contractor.
s of Stage 2 bracing, including end bracing, are required to be installed within 24 hours after initial beam placement.
pace bracing along the length of the beams allowing for variations due connection conflicts and skew.
ength III loads applied to beam at brace point (see SDG 11.6).
s of Stage 3 bracing, including end bracing, are required to be installed prior to deck placement.
ength I overturning moment applied to beam at brace point (see SDG 11.6).
op drawings for temporary bracing plan including locations of preformed beam holes/inserts.

SPEC 5—TEMPORARY BRACING

Spec 346—Plastic Concrete Properties

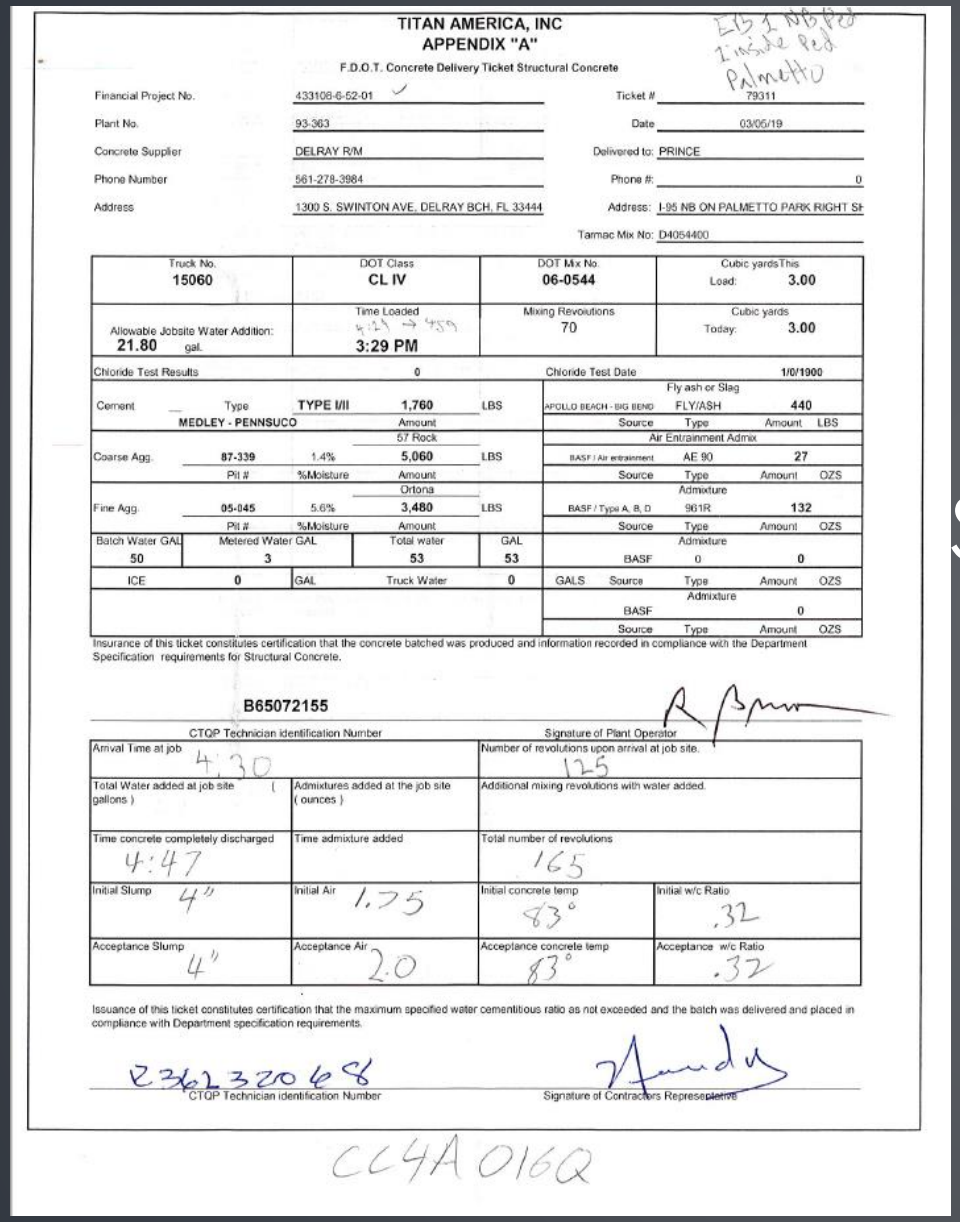
- Every load requires water cement ratio (w/c) calculation
- Slump test when there is question of water content– consistency must be observed for each truck
- When water is added at the site, truck must be retested
- Test trucks after rejected truck for slump—including the first adjusted truck and begin a new LOT
- Also included are temperature, air entrainment
- VT/CEI/Engineer verifies roughly once per four LOTs

SPEC 346—PLASTIC PROPERTIES



Spec 346—Concrete Class, Sampling, Transit Time

- Department-approval of reduced sampling frequency
- Higher class concrete can be used for lower strength
- Transit Time is the time for all concrete to be discharged from the truck taken from when water is first introduced
- Placement Time of 15 minutes after Transit Time to get concrete to its final position; time extension may be requested



TITAN AMERICA, INC
APPENDIX "A"

F.D.O.T. Concrete Delivery Ticket Structural Concrete

EB I NB PD Inside Rd Palmetto

Financial Project No.	433108-6-52-01 ✓	Ticket #	79311
Plant No.	93-363	Date	03/05/19
Concrete Supplier	DELRAY R/M	Delivered to:	PRINCE
Phone Number	561-278-3984	Phone #:	0
Address	1300 S. SWINTON AVE. DELRAY BCH, FL 33444	Address:	I-95 NB ON PALMETTO PARK RIGHT SI
		Tarmac Mix No:	D4054400

Truck No.	DOT Class	DOT Mix No.	Cubic yards This Load:
15060	CL IV	06-0544	3.00
Allowable Jobsite Water Addition: 21.80 gal.	Time Loaded 4:29 → 4:59 3:29 PM	Mixing Revolutions 70	Cubic yards Today: 3.00

Chloride Test Results: 0 — Chloride Test Date: 1/0/1900

Cement	Type: TYPE I/II		1,760	LBS	Fly ash or Slag: APOLLO BEACH - BIG BEND	FLY/ASH	440
	MEDLEY - PENNSUCO		Amount		Source	Type	Amount LBS
			57 Rock		Air Entrainment Admix: BASF / Air entrainment	AE 90	27
Coarse Agg.	87-339	1.4%	5,060	LBS	Source	Type	Amount OZS
	Pit #	%Moisture	Amount				
			Ortona		Admixture: BASF / Type A, B, D	961R	132
Fine Agg.	05-045	5.6%	3,480	LBS	Source	Type	Amount OZS
	Pit #	%Moisture	Amount				

Batch Water GAL	Metered Water GAL	Total water	GAL	Admixture		
50	3	53	53	BASF	0	0

ICE	0	GAL	Truck Water	0	GALS	Source	Type	Amount	OZS
					Admixture: BASF			0	
					Source		Type	Amount	OZS

Insurance of this ticket constitutes certification that the concrete batched was produced and information recorded in compliance with the Department Specification requirements for Structural Concrete.

B65072155
CTQP Technician Identification Number

Signature of Plant Operator

Arrival Time at job: 4:30		Number of revolutions upon arrival at job site: 125	
Total Water added at job site (gallons)	Admixtures added at the job site (ounces)	Additional mixing revolutions with water added.	
Time concrete completely discharged: 4:47	Time admixture added	Total number of revolutions: 165	
Initial Slump: 4"	Initial Air: 1.75	Initial concrete temp: 83°	Initial w/c Ratio: .32
Acceptance Slump: 4"	Acceptance Air: 2.0	Acceptance concrete temp: 83°	Acceptance w/c Ratio: .32

Issuance of this ticket constitutes certification that the maximum specified water cementitious ratio as not exceeded and the batch was delivered and placed in compliance with Department specification requirements.

23623206 8
CTQP Technician Identification Number

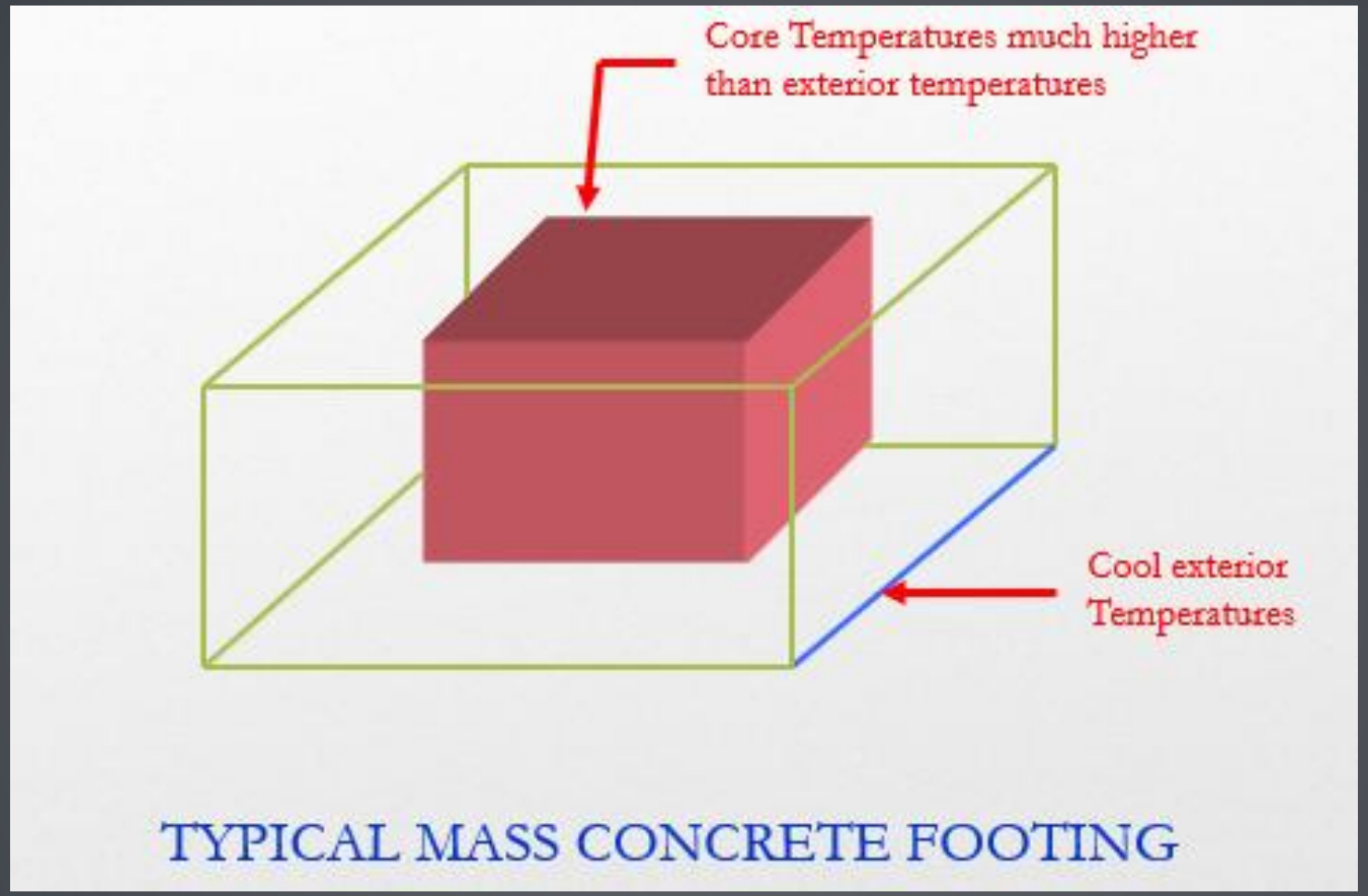
Signature of Contractors Representative

CC4A016Q

SPEC 346—DELIVERY TICKET

Spec 346—Mass Concrete

- Mass Concrete Control Plan
- Temperature readings every 6 hours until:
  - Max temperature differential (35°F max) and
  - Max temperature (180°F max) and diminishes
- Controls remain until core temperature within 50°F of ambient
- Specialty Engineer must be engaged to advise if issues arise



SPEC 346—MASS CONCRETE

SPEC 346—MASS CONCRETE

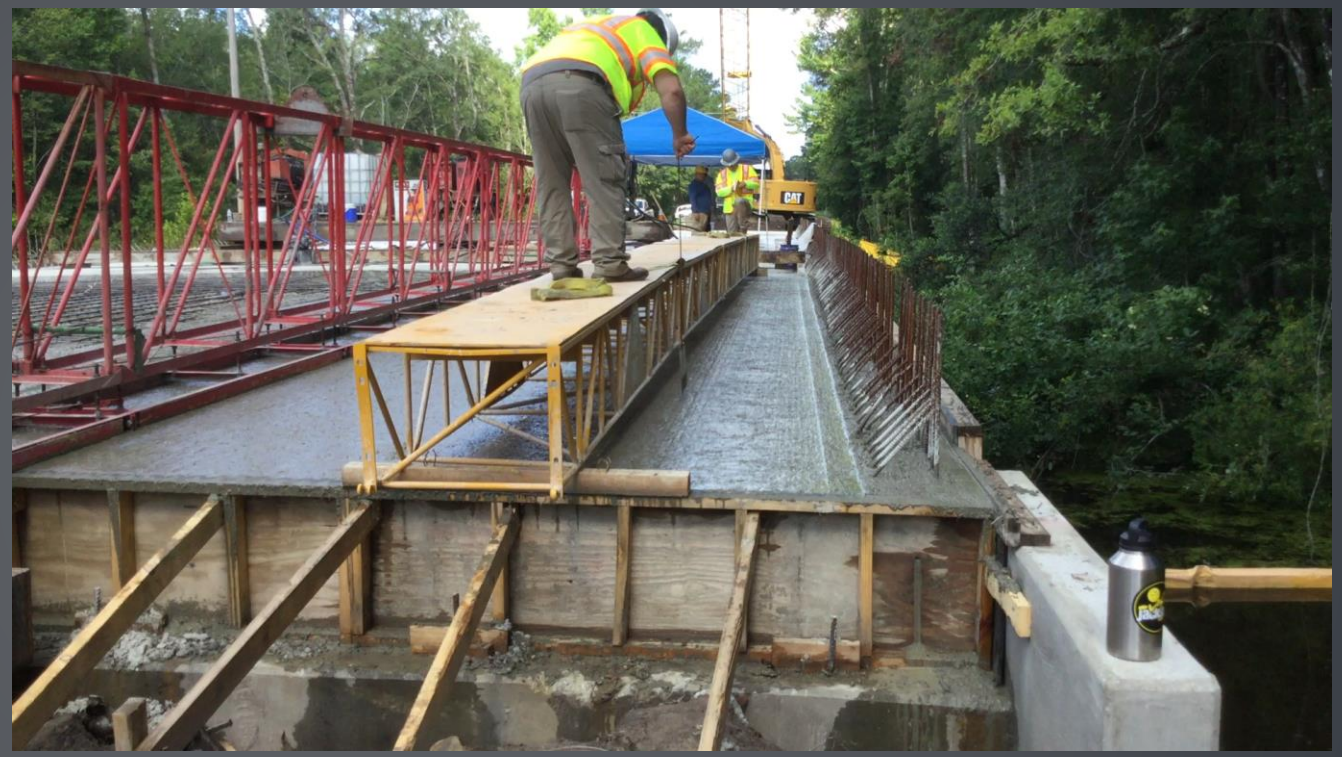
SPEC 400—FOOTING PLACEMENT

- Cofferdam preparation—seal concrete or precast "bathtub"
  - Water seepage
  - Standing water prior to concrete placement
  - Primary pump capacity plus backup pump
- 20 inch or less lift thickness when placing concrete
- Mass concrete monitoring devices protected during concrete placement

SPEC 400—DECK PLACEMENT

- Placement sequence/ direction
- Screed demonstration
- Curing compound applied within 120 minutes of initial placement
- Compound spread rate/quantity reported to the Engineer
- Placement and maintenance of curing blankets (over barrier)

SPEC 400—DECK PLACEMENT



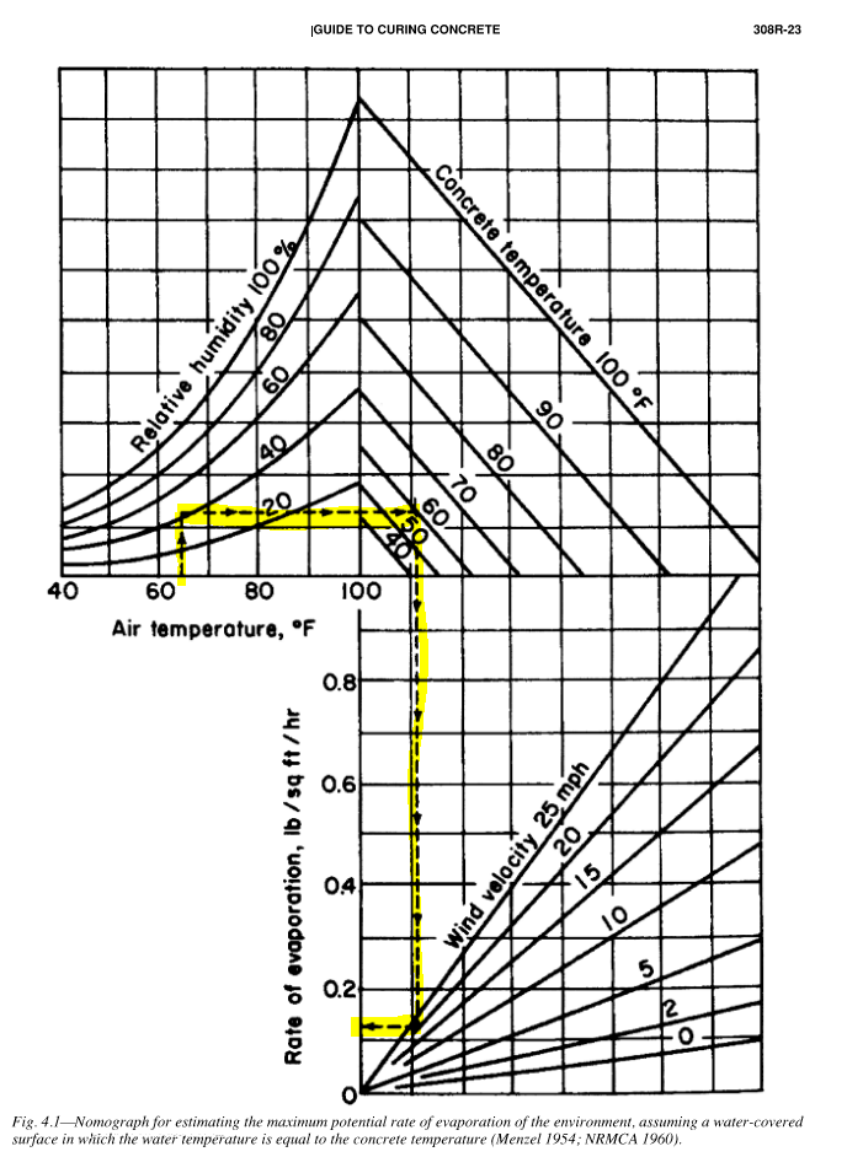


Fig. 4.1—Nomograph for estimating the maximum potential rate of evaporation of the environment, assuming a water-covered surface in which the water temperature is equal to the concrete temperature (Menzel 1954; NRMCA 1960).

SPEC 400—DECK PLACEMENT

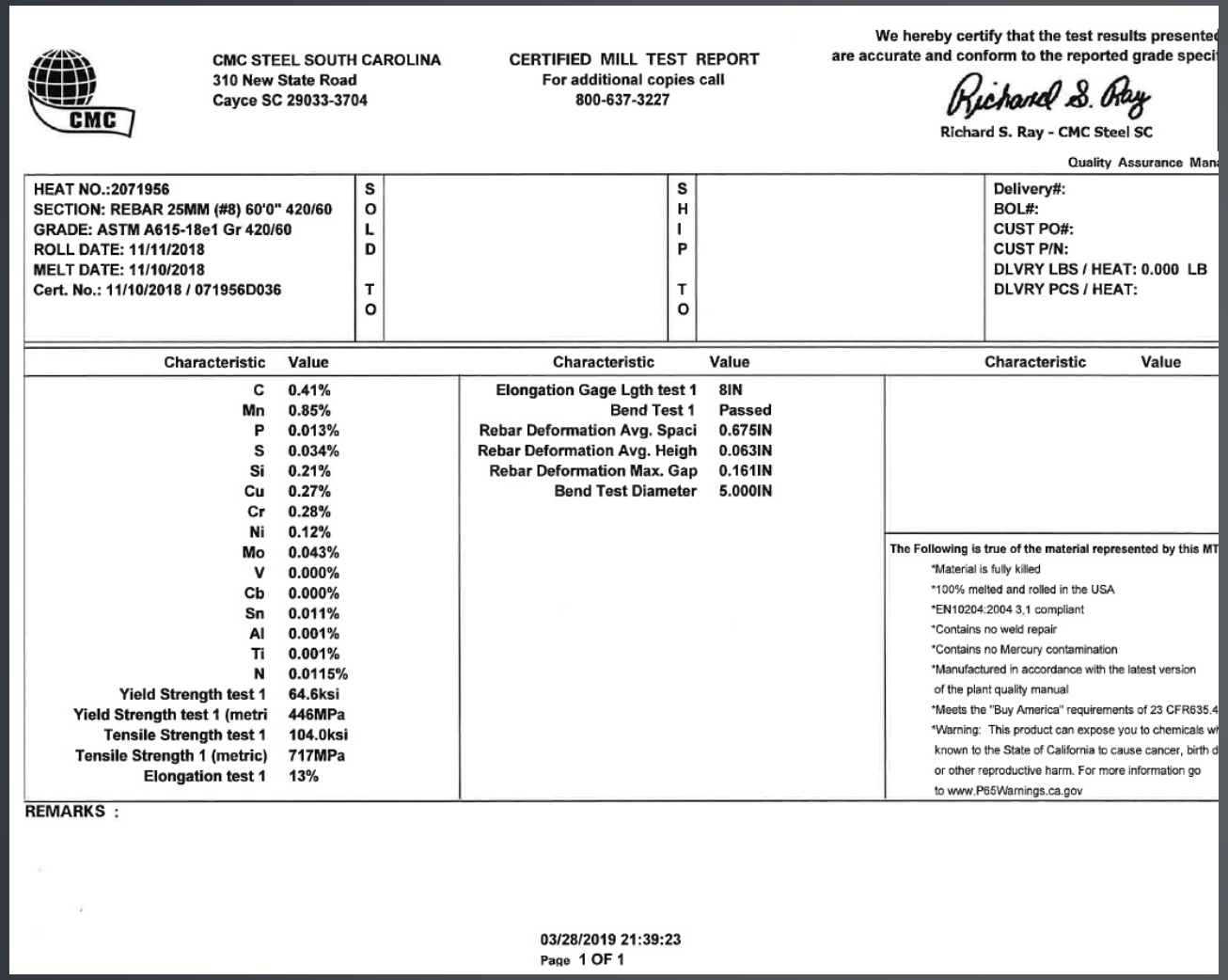
- Evaporation rate determined by:
  - Air temperature, relative humidity
  - Concrete temperature
  - Wind Velocity (15 mph max)
- If evaporation rate exceeds 0.1 lbs/ft^2/hr including:
  - Evaporation retarder
  - Water fogging
  - Chilled mix water
  - Wind screens

SPECS 400/450—CAMBER

- Monthly camber estimates in the precast yard
- Camber tolerance of 1 inch from design camber in Plans
- Contractor takes appropriate actions (400-7.13.1) to get girder stirrups to “fit” with the deck

SPECS 400/415/460/502—REBAR, SIP FORMS, SHEAR CONNECTORS

- Field welding per Spec 460 only if Engineer approval or if on the Plans
- No welding of SIP forms to flanges
- Bending of reinforcement with Engineer's permission
- Store rebar above ground on dunnage
- Shear stud installation in the field with bend testing



CMC STEEL SOUTH CAROLINA
310 New State Road
Cayce SC 29033-3704

CERTIFIED MILL TEST REPORT
For additional copies call
800-637-3227

We hereby certify that the test results presented
are accurate and conform to the reported grade specif

Richard S. Ray

Richard S. Ray - CMC Steel SC

Quality Assurance Mana

HEAT NO.:2071956 SECTION: REBAR 25MM (#8) 60'0" 420/60 GRADE: ASTM A615-18e1 Gr 420/60 ROLL DATE: 11/11/2018 MELT DATE: 11/10/2018 Cert. No.: 11/10/2018 / 071956D036	SOLD TO		SHIP TO		Delivery#: BOL#: CUST PO#: CUST P/N: DLVRY LBS / HEAT: 0.000 LB DLVRY PCS / HEAT:

Characteristic	Value	Characteristic	Value
C	0.41%	Elongation Gage Lgth test 1	8IN
Mn	0.85%	Bend Test 1	Passed
P	0.013%	Rebar Deformation Avg. Spaci	0.675IN
S	0.034%	Rebar Deformation Avg. Heigh	0.063IN
Si	0.21%	Rebar Deformation Max. Gap	0.161IN
Cu	0.27%	Bend Test Diameter	5.000IN
Cr	0.28%		
Ni	0.12%		
Mo	0.043%		
V	0.000%		
Cb	0.000%		
Sn	0.011%		
Al	0.001%		
Ti	0.001%		
N	0.0115%		
Yield Strength test 1	64.6ksi		
Yield Strength test 1 (metri	446MPa		
Tensile Strength test 1	104.0ksi		
Tensile Strength 1 (metric)	717MPa		
Elongation test 1	13%		

Characteristic Value

The Following is true of the material represented by this MT

*Material is fully killed
*100% melted and rolled in the USA
*EN10204:2004 3,1 compliant
*Contains no weld repair
*Contains no Mercury contamination
*Manufactured in accordance with the latest version of the plant quality manual
*Meets the "Buy America" requirements of 23 CFR635.4
*Warning: This product can expose you to chemicals wh known to the State of California to cause cancer, birth d or other reproductive harm. For more information go to www.P65Warnings.ca.gov

REMARKS :

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SPEC 6—BUY AMERICA

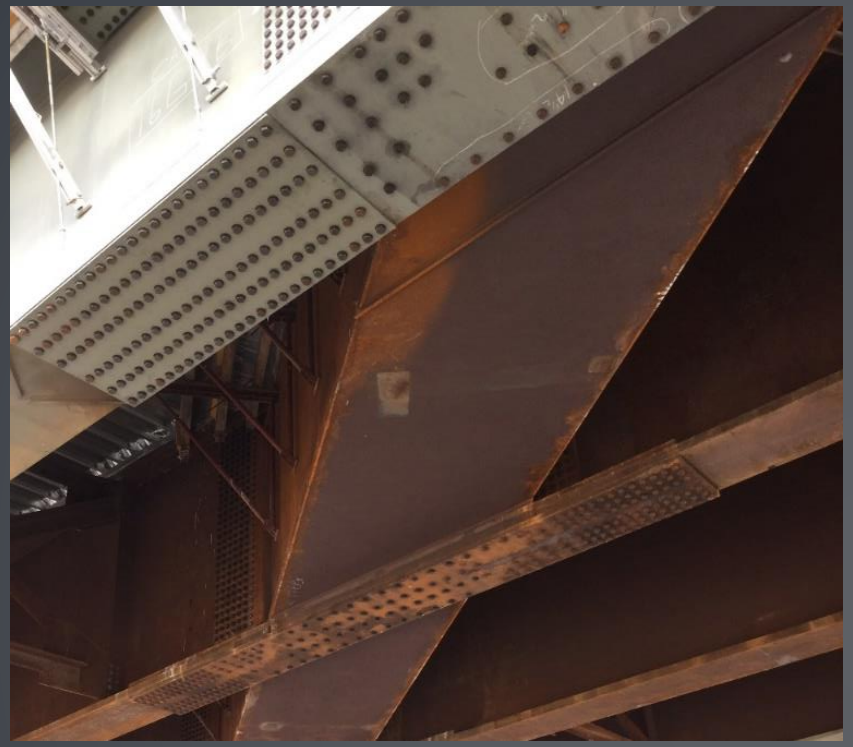
- Buy America applicable to steel incorporated in the finished work, not the temporary condition
- Not just for Projects with FHWA funding during Construction
- Included if the corridor had FHWA funding through PD&E
- Mill certs need state “Made in USA”

SPECS 400/460/461—BEARINGS, ANCHOR BOLTS

- Inspection of bearings for deformation and general condition
- Anchor bolt hole misalignment
- Expansion and contraction from temperature

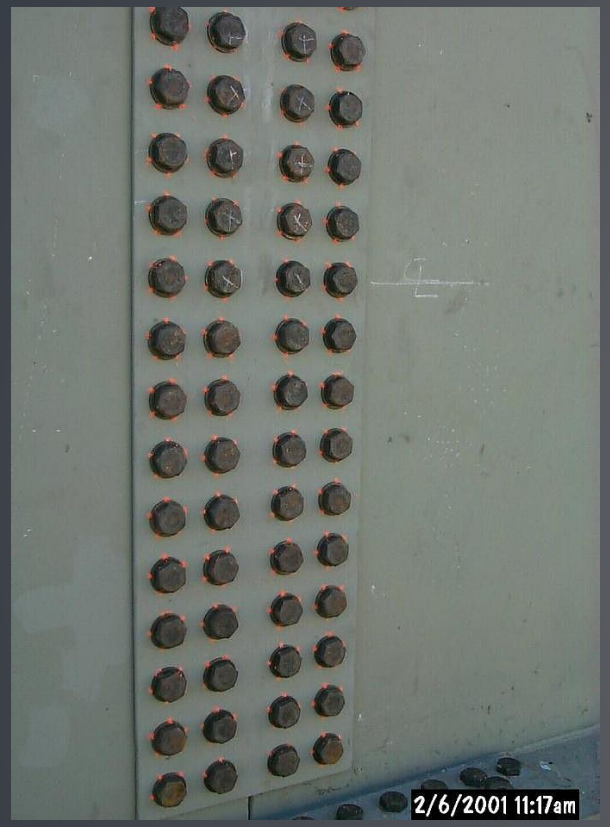
Spec 460—Material

- The Department default material requirement for structural steel superstructures is weathering steel if 4 miles from the coast or greater
- If site conditions are acceptable, painting not required, reduction in maintenance costs over the life of the bridge
- Exceptions permitted but must be approved by the Chief Engineer, requiring justification by the District



SPEC 460—STRUCTURAL STEEL AND MISCELLANEOUS METALS

WEATHERING STEEL GIRDERS

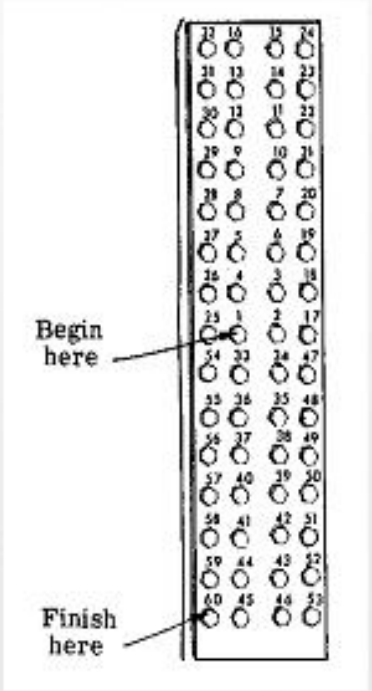


SPEC 460—BOLTING

- Turn-Of-Nut method
- ROCAP/Job-Inspection Snug Tight Torque performed in the field
- Bolt tightening sequence
- Erection Plan
- DTI's – Direct Tension Indicators

SPEC 460—BOLTING

Bolt Tightening Sequence



The Sequence of Tightening is CRITICAL

→Most rigid, to least rigid

SPEC 460 SKIDMORE-WILHELM TENSION CALIBRATOR

SPEC 460—TURN OF NUT BOLTING

SPEC 460—BOLTING

- Checking Snug Tight Tension with a Calibrated Torque Wrench

- CONTRACTOR'S ENGINEER OF RECORD

Contractor's Engineer

This table provides brief clarifications to the works that are allowed to be performed by Contractor's Engineer of Record, Department Approved Specialty Engineer and Specialty Engineer as defined in Specification Section 1. For definitions, additional information and further clarifications refer to Specification Section 1.

Work Type	Contractor's Engineer of Record	Department Approved Specialty Engineer	Specialty Engineer
Re-design	Yes	No	No
Cost Savings Initiative Proposal	Yes	No	No
Details of the permanent work not fully detailed in the plans	Yes	Yes	Yes
Design and details of the permanent work declared to be minor or non-structural including minor repairs	Yes	Yes	Yes
Design and details of the permanent work declared to be major or structural including major repairs	Yes	Yes*	No
Design and drawings of temporary works, such as falsework, formwork, etc.	Yes	Yes	Yes

*The work must also be checked by another Department Approved Specialty Engineer

Qualifications and Certifications

- CTQP Concrete Field Technician - Level I
- CTQP Concrete Field Inspector - Level II
- CTQP Grouting Technician - Level I & 2
- CTQP Post-Tensioning Technician - Level I & 2
- ACI, PTI, and ASBI issue certifications for successful completion
- ASBI Certification in Flexible Filler Injection
- Technicians certified by these agencies
- Not considered qualified for FDOT work until qualification by CTQP

Spec 462 & 960 – Post-Tensioning

- Old Specifications utilized preapproved PT systems which can still be found on FDOT's website: Structures Design Office Post-Tensioning Jan 2016 Later Specifications
- New approach relies on CEI/EOR to review PT shop drawings and test reports for each project.
- Components and systems detailed in the approved PT drawings MUST be adhered to with no substitutions (excluding local zone reinforcement)
- The sensitivity of PT system performance to the components and workmanship of installation require strict adherence to the approved PT shop drawings that MUST be enforced by the CEI

Spec 462 & 960 – Post-Tensioning

- Current Specifications 462 have adopted a new dehumidification procedure to ensure standing water and moisture is removed from tendons utilizing flexible filler prior to tendon installation and flexible filler injection
- Key points to be aware of:
  - Ensuring the duct stays dry before and after tendon installation
  - Storage requirements for components
  - Ensure proper concrete consolidation around congested anchor regions with local zone reinforcing
  - Accurately install and position/support PT systems prior to concrete placement (duct supports, spiral positioning, etc.)
  - Ensure all Contractor field testing conducted prior to concreting; contractor inspections
  - Adhere to the time limitations outlined in 462 for time between tendon installation and filler injection as well as time between filler injection and pour-back construction
  - Mock-up requirements
  - Grout problems
  - Flexible filler problems

Training and Reference Tools

- Office of Construction and CTQP Websites contain most structures construction training materials including piles and drilled shafts as downloads
  - https://www.ctqpflorida.com/
- Structures Related Websites:
- State Construction Office Training: Self Study
- State Construction Office, Structures Webpage
  - http://www.fdot.gov/construction/
- State Structures Design Office Website
  - http://www.fdot.gov/structures/

Contact

- State Construction Structures Engineer
  - Krickstein.torres@dot.state.fl.us
  - (850) 414-4190

  Construction Structures Website:
- https://www.fdot.gov/construction/structures/Structures.shtm