

# 400 SERIES

## BRIDGES AND STRUCTURES

### STRUCTURE EXCAVATION (AND FOUNDATIONS)

Job Element	Date	Project Inspector's Signature
Explains in general terms the basic content of the specifications related to a structure excavation.		
Determines the necessary dimensions in order to compute the volume of excavation.		
Computes the volume of excavation.		
Determines the limits of excavation for one structural element.		
Maintains the necessary records associated with a structure excavation.		
Explains the methods and payment for structure excavation.		
Verifies that the contractor performs a structure excavation properly in terms of: <ol style="list-style-type: none"> <li>1. Equipment -----</li> <li>2. Prescribed elevation(s) -----</li> <li>3. Drainage -----</li> <li>4. Foundation -----</li> </ol>		

**400 SERIES**

**BRIDGES AND STRUCTURES**

**STRUCTURE EXCAVATION (AND FOUNDATIONS)**

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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## **400 SERIES**

### **BRIDGES AND STRUCTURES**

#### **STRUCTURE EXCAVATION (AND FOUNDATIONS)**

##### **CQIP CHECKLIST**

<b><u>SECTION</u></b>	<b><u>QUESTIONS</u></b>
401.01	Is the foundation excavation prepared in accordance with the specifications and approved by the Engineer?
401.03	Has the excavated material been deposited away from the stream or protected area to prevent siltation?
401.03(a)1	If required, has excavation been formed inside caissons, cribs, coverdams, or sheet piles?
401.03(a)2	Prior to beginning work, did the contractor submit a plan including location, description, number, and dimensions of temporary structures or other obstructions that will constrict stream flow?
401.03(a)3	Was material deposited in the stream area because of the Contractor's operations removed, and the stream area freed from obstructions caused by the Contractor's operations?
401.03(b)1	When requested, was the foundation explored by rod soundings or drillings to determine the adequacy of the foundations to support the structure?
401.03(b)2	Has the Engineer been consulted when explorations reveal that foundations or subfoundations are inadequate for the structure, or are not within the limits of permissible variation from the bottom of footing elevations?
401.03(c)2	Was the foundation cleaned of all loose material before concrete was placed?
401.03(c)3	Were approach embankments placed and compacted to top of footing elevation prior to excavation for and placement of footings installed above original ground?

## **400 SERIES**

- 401.03(c)4 If the footing is subject to movement because of pressure from overlying or adjacent fill, was the fill compacted in place before the footing was placed?
- 401.03(c)5 When material on which a foundation is to be placed using piles is declared unsatisfactory by the Engineer, was the excavation undercut and backfilled in accordance with this section?
- 401.03(e) Were cofferdams installed according to this section and/or other applicable requirements?
- 401.03(f) Were restrictions on pumping enforced?
- 401.03(i)2 Are the excavated spaces backfilled in uniform lifts and compacted as required by this section – 6” loose measurement?
- 401.03(i)3 Have the concrete strength requirements been met prior to form removal and subsequent backfill?

# 400 SERIES

## BRIDGES AND STRUCTURES

### PILE DRIVING

#### (Sheet Piles and Bearing Piles)

<b>Job Element</b>	<b>Date</b>	<b>Project Inspector's Signature</b>
Explains the difference between sheet piles and bearing piles.		
Describe the different types of bearing piles.		
Correctly determines the tip elevation of a bearing pile.		
Determines that a group of bearing piles is within the allowable tolerances as shown in Table IV-I of the specifications.		
Completes the necessary records related to either a sheet piling or bearing pile placement.		

# **400 SERIES**

## **BRIDGES AND STRUCTURES**

### PILE DRIVING

(Sheet Piles and Bearing Piles)

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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**400 SERIES**  
**BRIDGES AND STRUCTURES**

PILE DRIVING  
(Sheet Piles and Bearing Piles)

CQIP CHECKLIST

<b><u>SECTION</u></b>	<b><u>QUESTIONS</u></b>
403.03	Is the contractor handling, storing, and protecting the piles in accordance with this section?
403.03(d2)	Is welding of splices, points, or point reinforcement performed in accordance with the section on Fabrication Procedures for Steel Structures except for noted certification requirements?
403.05(1)	Was the contractor's order list for precast concrete or timber piles submitted to the Engineer for approval prior to ordering the piles?
403.05(2)	Were driving tests, loading tests, and refined wave equation analyses completed for each substructure element prior to submission of an order list?
403.06(d)1	Has the capability of the hammer to properly drive piles been verified from test pile records?
403.06(d)2	Prior to driving piles, has the contractor furnished the Engineer for approval the completed Pile and Driving Equipment Data Form for each proposed hammer and pile type combination? (Ref.: Special Provisions)
403.06(d)3	At each driving test location, where different subsurface conditions exist, did the contractor furnish a Wave Equation Analysis of pile driveability performed by a Professional Engineer experienced in such work? (Ref.: Special Provisions)
403.06(d)4	If the wave Equation Analysis indicates the possibility of excessive stresses, did the contractor submit to the Engineer proposed corrective measures for approval? (Ref.: Special Provisions)
403.06(f)3	Is the center of gravity of the piles within tolerance, or if not, approved corrections made?
403.06(g)	Were all piles driven to the required bearing capacity?

**400 SERIES**  
**BRIDGES AND STRUCTURES**

**FORM CHECKING - STRUCTURES**

<b>Job Element</b>	<b>Date</b>	<b>Project Inspector's Signature</b>
Explains the different types of forms such as the forms used for the substructure and superstructure.		
Verifies that forms are acceptable in terms of cleanliness and condition.		
Verifies that form bracing and supports are adequately placed.		
Checks the line and grade of the forms.		
Verifies that stay-in-place forms are placed in accordance with respective procedures and requirements.		
Describes the requirements for form removal.		

**400 SERIES**  
**BRIDGES AND STRUCTURES**

**FORM CHECKING - STRUCTURES**

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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**400 SERIES**  
**BRIDGES AND STRUCTURES**

**FORM CHECKING – STRUCTURES**

**CQIP CHECKLIST**

<b><u>SECTION</u></b>	<b><u>QUESTIONS</u></b>
404.03(a)2	Are devices for supporting forms of any type field welded to steel beams or girders?
404.03(a)3	Are the forms mortar tight and of sufficient rigidity to prevent distortion and set and maintained true to line and grade?
404.03(a)4	Were forms treated with an approved oil or form coating material or thoroughly wetted with water immediately before concrete placement?
494,93(a1b)1	Have corrugated metal bridge deck forms been installed in accordance with reviewed fabrication and erection plans?
404.03(a1b)2	Does welding conform to the requirements of the section on Fabrication Procedures for Steel Structures for fillet welds except that 1/8 inch fillet welds will be permitted?
404.03(a1b)3	Are form supports placed in direct contact with the stringer or floor beam flanges by hangers or clips?
404.03(a)2	If the contractor elects to use prestressed deck panel forms, have the redesign details been submitted to the Engineer for acceptance no less than sixty (60) days prior to ordering materials for the work?
404.03(a2b)1	Are precast bridge deck panels adequately supported at panel ends with edges tightly butted together?
404.03(a2b)2	Prior to placement of deck surface concrete on precast deck panels, was all foreign material detrimental to bonding removed by sandblasting, waterblasting, or other approved methods?
404.03(a2b)3	Were deck panel top surfaces thoroughly and continuously water soaked for at least one (1) hour prior to placement of deck surface concrete?
404.03(b)	Did the contractor have a Professional Engineer inspect and provide required certification that the completed falsework assembly conforms to the approved working drawings?

# 400 SERIES

## BRIDGES AND STRUCTURES

### HYDRAULIC CEMENT CONCRETE OPERATIONS

#### (CONCRETE PLACING - STRUCTURES)

(2 pages)

Job Element	Date	Project Inspector's Signature
Explains the placement limitations related to temperature/weather for hydraulic cement concrete (Section 217).		
Computes the area and volume of pours to be made.		
<p>Verifies that hydraulic cement concrete is placed properly in terms of <u>temperature/weather; procedures; line; grade; finishing; curing; and form removal</u> (Sections 217 and 404) at <b>one of the following:</b></p> <p style="margin-left: 40px;">1. incidental concrete items</p> <p style="margin-left: 40px;">2. retaining walls (see also Section 506)</p> <p style="margin-left: 40px;">1. pavement</p> <p style="margin-left: 40px;">2. bridge deck</p> <p style="margin-left: 40px;">3. box culverts</p>	<p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p>	<p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p>
Enters the necessary records related to the above items.		
Completes concrete testing requirements related to the above items.		
<b>Job Elements continued on next page.</b>		

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<b>Job Element</b>	<b>Date</b>	<b>Project Inspector's Signature</b>
Explains the purpose of using a vibrator in concrete.		
Discusses the dropping distance for concrete.		
Explains the various types of concrete and their usage.		

**400 SERIES**

**BRIDGES AND STRUCTURES**

HYDRAULIC CEMENT CONCRETE OPERATIONS  
(CONCRETE PLACING - STRUCTURES)

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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# **400 SERIES**

## **BRIDGES AND STRUCTURES**

### **HYDRAULIC CEMENT CONCRETE OPERATIONS** **(CONCRETE PLACING – STRUCTURES)**

#### **CQIP CHECKLIST**

<b><u>SECTION</u></b>	<b><u>QUESTIONS</u></b>
404.03(c)2	When individual concrete placements exceed twenty-five (25) cubic yards, were the rates in accordance with this section?
404.03(c)3	Was water and debris removed before concrete was placed?
404.03(c)4	Was the concrete placed in its final position in the forms within the time specified in the Materials Section under Hydraulic Cement Concrete?
404.03(c)5	Are specified measures taken to avoid dropping concrete more than five (5) feet where required?
404.04(c)6	Is the concrete placement regulated so that the pressures caused by the fresh concrete does not exceed those used in the design of the forms?
404.03(c)7	Is the concrete being vibrated in a manner to avoid segregation and in accordance with the section on concrete placement and consolidation?
404.03(c)8	Is the concrete placed in continuous layers not more than 12 inches in thickness?
404.03(c)9	Is the work not stopped or temporarily discontinued within 18 inches below the top of any face unless at the underside of copings having thicknesses of not more than 18 inches?
404.03(e)	Was pumping on concrete authorized by the Engineer and accomplished through use of non-aluminum conduit systems?
404.03(g)1	Are construction and expansion joints installed as shown on the plans or as approved by the Engineer?
404.03(g)2	Is asphalt applied to construction joints against which earth fill is placed?
404.03(h)	Are construction joints bonded as specified in the section on joints?

## **400 SERIES**

- 404.03(j) Are the forms and form ties left undisturbed in accordance with Table IV-2 and this section?
- 404.03(k)1 Does curing begin before the sheen disappears from fresh concrete or immediately upon removal of formwork?
- 404.03(k)2 Was curing continuously maintained through the use of a curing agent or medium for not less than seven (7) days?
- 404.03(k)3 Is PE film used for curing of the proper type and secured to prevent wind drifts from drying the concrete?
- 404.03(k)4 Has the curing compound been uniformly sprayed over the surface?
- 404.03(k)5 When the atmospheric temperature is below 40 degrees F, does the method of curing and protecting concrete provide adequate moisture and maintain the temperature as required in this section?
- 404.03(11)1 Is concrete not placed against surfaces whose temperature is below 40 degrees F?
- 404.03(11)2 Did the Contractor perform evaporation rate testing during bridge deck placements and, if necessary, use protective measures to prevent shrinkage crackings?

## 400 SERIES

### BRIDGES AND STRUCTURES

#### BRIDGE DECK CONSTRUCTION (PLACING AND FINISHING BRIDGE DECKS)

<b>Job Element</b>	<b>Date</b>	<b>Project Inspector's Signature</b>
Explains in general terms the specifications related to bridge deck construction. (Section 404)		
Verifies that the deck is properly supported prior to pouring.		
Checks the screed and the supporting devices for longitudinal or transverse screeds.		
Explains the time requirements for the placement, finishing and curing of deck concrete.		
Performs required testing procedures on concrete.		
Uses a straight edge properly.		
Probes the bridge deck properly and records the results.		
Checks the beam evaluation and bolster setting properly.		
Ensures that the concrete forms are removed properly.		
Completes the required documentation for the bridge deck construction.		

**400 SERIES**

**BRIDGES AND STRUCTURES**

**BRIDGE DECK CONSTRUCTION**  
**(PLACING AND FINISHING BRIDGE DECKS)**

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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# **400 SERIES**

## **BRIDGES AND STRUCTURES**

### **BRIDGE DECK CONSTRUCTION** **(PLACING AND FINISHING BRIDGE DECKS)**

#### **CQIP CHECKLIST**

<b><u>SECTION</u></b>	<b><u>QUESTIONS</u></b>
404.04(1)	Was the screed approved by the Engineer prior to beginning of deck placement?
404.04(2)	Are the screeds of required length and supported in accordance with this section?
404.04(3)	Was an approved positive means of permitting access to the surface of the bridge provided for operations requiring access to the deck surface after passage of the screed?
404.04(4)	Was the deck surface tested with a 10 foot straightedge in accordance with this section?
404.05	Have joint opening been accurately formed with proper widths, parallel joint faces and free of spalling areas?
404.06(1)	Have the bridge seat bearing areas been finished within the specified tolerances?
404.06(2)	Are the bearing areas that are to receive elastomeric pads finished to the required roughness in accordance with the section on bearing devices?
404.07	Have the surfaces of the concrete received a finish that will satisfy the requirements of the section on finishing concrete surfaces?
404.07(a)	If the surface cannot be repaired immediately following removal of forms or before the concrete surface has become dry, was the surface kept wet for 1 to 3 hours prior to application of mortar?

## 400 SERIES

### BRIDGES AND STRUCTURES

#### CONSTRUCTION JOINTS, PREFORMED ELASTOMERIC JOINT SEALER, & ELASTOMERIC EXPANSION DAMS (EXPANSION AND CONSTRUCTION JOINTS)

<b>Job Element</b>	<b>Date</b>	<b>Project Inspector's Signature</b>
Describes the various types of construction joints and/or expansion joints as well as their usage.		
Explains when construction joints are needed.		
Explains the specifications related to the following (see Sections 404.05, 420 & 421)  1. Open joints 2. Filled joints 3. Steel joints 4. Waterstops 5. Expansion dams 6. Field-vulcanized joints		
Verifies that the joints are properly cleaned and protected during construction on one (1) bridge.		
Checks for the correct placement of expansion joints, materials and seals at one (1) bridge.		

**400 SERIES**

**BRIDGES AND STRUCTURES**

**CONSTRUCTION JOINTS, PREFORMED ELASTOMERIC JOINT SEALER, & ELASTOMERIC EXPANSION DAMS**  
**(EXPANSION AND CONSTRUCTION JOINTS)**

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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# 400 SERIES

## BRIDGES AND STRUCTURES

### CONSTRUCTION JOINTS, PREFORMED ELASTOMERIC JOINT SEALER, & ELASTOMERIC EXPANSION DAMS EXPANSION AND CONSTRUCTION JOINTS

#### CQIP CHECKLIST

<u>SECTION</u>	<u>QUESTIONS</u>
420.01(1)	Has the joint sealer been installed in reasonably close conformity with the specifications?
420.02	Have all materials been tested for conformity with Section 212, Joint Materials?
420.03(a)1	Is the joint formed to provide the nominal opening at the specified temperature as shown on the plans?
420.03(a)2	Are the sides of the joint parallel to each other?
420.03(a)3	Are edges of concrete adjacent to the joint rounded to a radius of not more than 1/4 inch?
420.03(a)4	Was the joint thoroughly cleaned to remove all foreign material prior to sealer placement?
420.03(b)1	Has the sealer been installed by tools that will not damage the material during installation?
420.03(b)2	Was the prohibition on stretching the sealer during installation adhered to?
420.03(b)3	Was the prohibition on splices in joint sealers less than 50 feet in length adhered to?

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- 420.03(b)4 Were splices for lengths greater than 50 feet limited to 1 splice for each additional 50 feet?
- 420.03(b)5 Are field splices in longitudinal joint sealers sealed with a sealant recommended by the manufacturer?
- 420.03(b)6 Are joint sealers installed so that the top surface of the sealer is  $3/8$  (+/-  $1/16$ ) inch below the surface of the adjacent roadway?
- 421.01 Have the expansion dams been installed in reasonably close conformity with the specifications and with the lines, elevations and locations shown on the plans or as established by the Engineer?
- 421.02 Have all materials been tested for conformity with Section 212, Joint Materials?
- 421.03(1) Has the Contractor submitted working drawings for review by the Engineer?
- 421.03(2) Does the Contractor provide a factory-trained representative on the job site prior to and during the initial installation of the expansion dam?
- 421.03(3) Is the opening between the rigid portions of the expansion dam at roadway level no more than 3-1/2 inches at maximum opening?
- 421.03(4) Does the dam seal the structure to prevent water and other contaminants from seeping onto the substructure?
- 421.03(5) Does the dam have a continuous elastomeric membrane?
- 421.03(6) Do field-vulcanized joints conform to plan details?
- 421.03(7) Are the dams cast in place with top surfaces parallel to the bridge deck?
- 421.03(8) Was concrete placed in such manner as to prevent formation of air pockets in the concrete?
- 421.03(9) Was final sealing accomplished as soon as possible after installation?

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### BRIDGES AND STRUCTURES

#### REINFORCING STEEL

<b>Job Element</b>	<b>Date</b>	<b>Project Inspector's Signature</b>
Verifies that reinforcing steel is stored properly.		
Checks the reinforcing steel for rust, dirt, paint, oil, mill scale or other foreign substances.		
Differentiates between rust and mill scale.		
Explains the proper methods of bending and cutting reinforcing steel.		
Verifies that reinforcing steel is properly lapped and spliced.		
Verifies that a section of reinforcing steel is properly placed, laid out/spaced, and fastened/tied and consists of the proper sizes & types of bars.		
Calculates the correct amount of payment that a contractor is due for placing a section of reinforcing steel.		
Enters the records related to this section of reinforcing steel.		

**400 SERIES**

**BRIDGES AND STRUCTURES**

**REINFORCING STEEL**

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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# **400 SERIES**

## **BRIDGES AND STRUCTURES**

### **REINFORCING STEEL**

#### **CQIP CHECKLIST**

<b><u>SECTION</u></b>	<b><u>QUESTIONS</u></b>
406.03(b)1	Has the reinforcing steel been stored above ground, well drained, and protected against deformation?
406.03(b)2	When placed into work, is the reinforcement steel free from dirt, paint, oil, or other foreign matter?
406.03(b)3	Upon delivery, was epoxy coated reinforcing steel covered with an opaque covering?
406.03(b)4	Was epoxy coated reinforcing steel which was partially embedded or placed in formwork and not covered with concrete covered after 30 days exposure to sunlight?
406.03(d)02	Were reinforcing bars tied according to the section on placing and fastening reinforcing steel?
406.03(d)03	Were provisions made to accurately maintain the position of steel reinforcement during the placing and setting of concrete?
406.03(d)04	Were epoxy or plastic coated wires used to tie epoxy steel?
406.03(d)05	Was all visible damage to epoxy coatings repaired in accordance with the Materials Section on Reinforcing Steel to be Epoxy Coated?
406.03(d)06	Was a minimum of 2-1/2 inches clear distance maintained between the face of the concrete and the reinforcing steel in superstructures unless otherwise noted in the section on placing and fastening reinforcing steel?
406.03(d)07	Was a minimum of 3 inches cover maintained in substructures unless otherwise noted in this section?
406.03(d)08	Have all bars been placed so that the final cast concrete cover is maintained within a tolerance of 0 to +1/2 inch?

## **400 SERIES**

- 406.03(d)09 Where anchor bolts interfere with reinforcing steel, has the position of the steel been adjusted without cutting to permit the anchor bolts to be placed in the proper location?
- 406.03(d)10 Is reinforcing steel in bridge deck slabs and slab spans supported by standard CRSI metal or precast concrete bar supports spaced no more than 4 feet apart transversely or longitudinally?
- 406.03(d)11 In reinforced concrete sections other than bridge slabs, is the reinforcing steel supported and spaced in accordance with this section?
- 406.03(d)12 Was the minimum clear distance between bars at least 1-1/2 times the specified maximum size of coarse aggregate but not less than 1-1/2 inches?
- 406.03(e)1 Was written approval secured from the Engineer for bar splices not shown on the plans?
- 406.03(e)2 Are bars lapped at least 30 bar diameters to make the splice?
- 406.03(e)3 Was welding of reinforcing steel done only if specified on the plans and in accordance with the requirements of Section 407.04(a)?
- 406.03(e)4 Were laps for sheets of welded wire fabric or bar mat reinforcement at least one mesh in width?

# 400 SERIES

## BRIDGES AND STRUCTURES

### STEEL STRUCTURES (STRUCTURAL STEEL) or PRESTRESSED CONCRETE BEAMS

<b>Job Element</b>	<b>Date</b>	<b>Project Inspector's Signature</b>
Verifies that structural steel or concrete beams are handled, stored, and shipped properly.		
Defines the terms "beams" and "girders."		
Checks the camber of a beam or girder.		
Interprets the working/fabrication drawings correctly.		
Verifies that bearing areas conform to specifications prior to placement of structural steel or prestressed concrete beams.		
Verifies the calibration of both a (1) torque wrench and (2) power wrench to be used by a contractor.		
Explains the field welding requirements in terms of (1) the welder and (2) the welding materials.		

**400 SERIES**

**BRIDGES AND STRUCTURES**

**STEEL STRUCTURES (STRUCTURAL STEEL) or**  
**PRESTRESSED CONCRETE BEAMS**

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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# **400 SERIES**

## **BRIDGES AND STRUCTURES**

### **STEEL STRUCTURES (STRUCTURAL STEEL) or** **PRESTRESSED CONCRETE BEAMS**

#### **CQIP CHEKLIST**

<b><u>SECTION</u></b>	<b><u>QUESTIONS</u></b>
407.03(1)	Has the Contractor submitted working drawings for review by the Engineer of all structural steel, bearing assemblies, and anchorage devices?
407.03(2)	Do the working drawings specifically identify each piece other than ASTM A709 Grade A36 steel?
407.04(1)	Does the welding show quality workmanship and are welds of the required size?
407.04(3)	Do the welding electrodes used in structural welding conform to the approved list?
407.04(a)4	Is the surface of the welds relatively even, smooth, and of the required size?
407.04(a)1	Has welding only been performed in locations as noted on the plans or as approved by the Engineer?
407.04(a)3	Have welds that do not conform to the specifications been repaired or removed and replaced or the entire piece rejected?
407.04(a)4	Has a copy of the welder's certificate of qualification and a certificate stating that the welder has not exceeded any period of 3 months without performing satisfactory welding in the required process been submitted to the Department?
407.04(d)1	Are the bolt holes no more than 1/16 inch larger than the nominal bolt size?
407.04(d)2	Have the burrs on the outside of the bolt holes been removed?

## **400 SERIES**

- 407.04(e) Is field flame cutting of structural steel units not done?
- 407.04(j)1 Are the structural steel stud shear connectors the size and spacing as shown on the plans or denoted in the specifications?
- 407.04(j)2 Do the shear connectors project 2 inches above the bottom of the deck slab and 3 inches below the plane of the top of the deck slab?
- 407.04(j)3 When prestressed deck panels for cast-in-place concrete deck slabs are used, has the edge distance of studs been adjusted to provide the necessary support areas for ends of the deck panels.
- 407.04(l) Was shop\field inspection performed in accordance with this section?
- 407.05(1) Have materials and units been stored at least 4 inches above ground on platforms, skids, or other supports?
- 407.05(2) Has the structural steel been stored in such manner that it will not be overstressed, become deformed, or otherwise damaged?
- 407.05(3) Is the structural steel kept free from dirt, grease, or other foreign material, protected from corrosion, and properly drained?
- 407.05(b)1 Has each unit been identified with an erection mark?
- 407.05(b)2 Has the Contractor furnished the materials order shipping statement and erection diagrams?
- 407.06 Prior to beginning erection work, did the Contractor fully inform and obtain approval from the Engineer as to the method to be followed and the amount and character of equipment to be used?
- 407.06(a)1 Were bolt hole misalignments of no more than 1/8 inch corrected by reaming where allowed by the Engineer?
- 407.06(a)2 Was damaged or misfitting steel reported to the Engineer?
- 407.06(c) Were all field connections made with 7/8 inch diameter high-strength bolts where specified?
- 407.06(c)1 Did bolts, nuts, and washers conform to the requirements of the Materials Section on Structural Steel, each being from one manufacturer on any one structure, unless approved by the Engineer?

## **400 SERIES**

- 407.06(c1)2 Prior to installation, did the Contractor perform a field rotational capacity test on two (2) nut, bolt, and washer assemblies for each diameter and length in accordance with the materials section on Structural Steel?
- 407.06(c2)1 Do bolted parts fit solidly together when assembled?
- 407.06(c2)2 Before assembly, were all connecting surfaces, including areas adjacent to the washers, free of scale except for tight mill scale?
- 407.06(c2)3 When required by the plans, were surfaces for bolted splices in main units fabricated of weathering steel and joint surfaces for other connections blast cleaned in accordance with Section 411.04(a)5?
- 407.06(c3)1 On whichever element is being turned during tightening, was a hardened washer installed under the bolt or nut head?
- 407.06(c3)2 Were bolt tensioning devices and complete bolt assemblies tested with an approved tension indicating device at the start of construction and on a periodic basis as determined by the Engineer?
- 407.06(c3)3 Has the device used to calibrate power and torque wrenches been checked for accuracy within the previous 12 months?
- 407.06(c3)4 Is the length of all bolts such that the point of the bolt will be flush with or outside the face of the nut when completely installed without over tensioning the bolt?
- 407.06(c3)5 Are fasteners tightened by the turn-of-nut method, or by the use of a direct tension indicator using a load indicator washer?
- 407.06(c3)6 Was the torque indication corresponding to the calibrating tension noted and used when manual torque wrenches are used?
- 407.06(c3a) Were bolts brought to a snug condition, given a suitable match mark, and then tightened additionally by the amount of nut rotation specified in Table IV-4 when the turn-of-nut method is used?
- 407.06(c3b)1 Is the gap 0.015 inch or less between the direct tension indicator and the bolt head or nut when no washer is used with the indicator?
- 407.06(c3b)2 Is the gap 0.010 inch or less between the indicator and washer if a hardened flat washer is incorporated?

## **400 SERIES**

- 407.06(e)1 Are beam ends, bearing stiffeners, and webs of girders and rolled structural shapes, and other beam sections vertical?
- 407.06(e)2 Are channel flanges turned to the downgrade side where practicable?
- 407.06(e)3 Have steel plates for use with flexible bearing pads been beveled to meet the grade requirements?
- 407.06(i) Have any depressed areas where water can be trapped been completely sealed with polyurethane or other approved sealant prior to painting?

## 400 SERIES

### BRIDGES AND STRUCTURES

#### DISMANTLING & REMOVING EXISTING STRUCTURES OR REMOVING PORTIONS OF EXISTING STRUCTURES

<b>Job Element</b>	<b>Date</b>	<b>Project Inspector's Signature</b>
Describes the requirements in Section 413 for removing an existing structure or portion of an existing structure in terms of elevation and/or grade.		
Verifies that the contractor's plan for removing an existing structure or portion of an existing structure follows the requirements for lead-based paint removal & disposal. (Note: Check for applicability of revisions to Section 413 regarding this activity.)		
Verifies that a structure or portion of a structure is removed in accordance with this Specification.		
Enters the necessary documentation information regarding the removal of a structure or portion of a structure.		
States the method of payment for both the dismantling/removal of a structure and a portion of a structure.		

**400 SERIES**

**BRIDGES AND STRUCTURES**

**DISMANTLING & REMOVING EXISTING STRUCTURES OR  
REMOVING PORTIONS OF EXISTING STRUCTURES**

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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## **400 SERIES**

### **BRIDGES AND STRUCTURES**

#### **DISMANTLING & REMOVING EXISTING STRUCTURES OR REMOVING PORTIONS OF EXISTING STRUCTURES**

##### **CQIP CHECKLIST**

<b><u>SECTION</u></b>	<b><u>QUESTIONS</u></b>
413.02(a)	Is the substructure removed down to stream bed elevation or at least 2' below natural ground or finished grade of an embankment which is to remain in place, including any part or piling that will interfere with new construction?
413.02(a2)1	Has the Contractor submitted for the Engineer's approval a method for dismantling structures to be retained by the Department that will preserve the existing condition of materials?
413.02(a2)2	Have units been match marked for re-erection according to an approved diagram provided by the Department?
413.02(b)1	Is concrete not removed by blasting or other methods which could damage any portion of the structure that will remain in place?
413.02(b)2	Do pneumatic hammers weigh no more than 90 pounds for widening work or 30 pounds for deck repair work?
413.02(b)3	Where permitted, are tractor-mounted hammers being used in accordance with this section?
413.02(b)4	Have all disturbed areas been uniformly graded to natural ground contours that will facilitate drainage and prevent impoundment of water?
413.02(b)5	Has the Contractor received written approval from the Engineer to use hydraulically actuated, jaw type, concrete crushers for parapet removal?
413.02(b)6	Has the removal of concrete parapets on prestressed concrete slab spans or prestressed concrete box beams been performed in accordance with this section?

## **400 SERIES**

- 413.02(c1) When demolition operations involve a Type B structure (as defined in Section 411), has an environmental plan been submitted in accordance with Section 411.08?
- 413.02(c1)2 Has the Contractor complied with this section when the contractor is not required to have an environmental plan?
- 413.02(c2) Has the contractor submitted for review a worker health and safety plan in accordance with this section?

# 400 SERIES

## BRIDGES AND STRUCTURES

### RIPRAP

Job Element	Date	Project Inspector's Signature
Discusses, in general terms the different types of riprap in Section 414.		
Explains the different classes of dry riprap.		
Determines that a slope is properly bedded and placed.		
Verifies that at least <b>one</b> of the following is correctly placed. <b>Circle the one selected:</b> <ol style="list-style-type: none"><li>1. Dumped riprap</li><li>2. Mortared riprap for slopes</li><li>3. Grouted riprap for slopes</li><li>4. Erosion control riprap</li><li>5. Concrete riprap in bags</li></ol>		
Enters the necessary follow-up documentation on the two items noted above.		

**400 SERIES**

**BRIDGES AND STRUCTURES**

**RIPRAP**

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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## **400 SERIES**

### **BRIDGES AND STRUCTURES**

#### **RIPRAP**

#### **CQIP CHECKLIST**

<b><u>SECTION</u></b>	<b><u>QUESTIONS</u></b>
414.03(a)	Does dry riprap conform to the weight and grading requirements of this section for Class I, II, III, or A1?
414.03(a)02	Was dry riprap placed on slopes finished to a reasonably smooth and compact surface within a tolerance of 6 inches of the surface lines shown on the plans?
414.03(a)03	Was riprap bedding uniformly spread to produce a reasonably even surface free of mounds and depressions?
414.03(a)04	Has the entire perimeter of geotextile bedding material been turned down and buried at least 9 inches for anchorage?
414.03(a)05	Do adjacent strips of material overlap at least 18 inches and run up and down the slope?
414.03(a)06	Is damaged material repaired or replaced with a patch of the same material overlapping the damaged area by at least 18 inches?
414.03(a)07	Was displaced material repositioned at the Contractor's expense?
414.03(a)08	Was riprap placed on the embankment no later than 15 days after completion of bedding?
414.03(a)09	Has riprap been placed in one operation in a manner that will produce a reasonably well-graded mass of rock with a minimum practicable percentage of voids?
414.03(a)10	Was the prohibition on dropping riprap onto fabric adhered to?
414.03(a)11	Does the finished riprap conform to the tolerance of +/-1/4 of the thickness of the maximum size stone, with the extremes of this tolerance not continuous over an area of more than 200 square feet?

## **400 SERIES**

- 414.03(a)12 Has the riprap been keyed into natural ground in an approved manner to a depth equal to the bed thickness or to solid rock?
- 414.03(a)13 Does the Contractor maintain riprap until accepted and repair displaced areas at his expense?
- 414.03(b)1 Does dumped riprap conform to the weight and grading requirements of this section, for Type I or II?
- 414.03(b)2 Was dumped riprap placed in the same manner described in this section for dry riprap?
- 414.03(c)1 Is Class II dry riprap used for mortared riprap?
- 414.03(c)2 Is 50% of the mass composed of broad, flat stones laid with the flat surface uppermost and parallel to the slope?
- 414.03(c)3 Are larger stones placed near the base of the slope?
- 414.03(c)4 Are spaces between larger stones filled with stones of suitable size, leaving the surface reasonably smooth and tight?
- 414.03(c)5 Is the stone laid so that the maximum variation from a true plane is not more than 1-1/4 inch in 4 feet?
- 414.03(c)6 Is fresh mortar added to the voids between previously positioned larger stones and smaller stones than shoved into position, forcing excess mortar to the surface?
- 414.03(c)7 Is excess mortar uniformly spread to fill surface voids completely?
- 414.03(d)1 Does grout consist of 1 part hydraulic cement and 3 parts sand thoroughly mixed with water to produce a thick, creamy consistency?
- 414.03(d)2 Are stones of the same sizes placed in the same manner as specified for dry riprap, Class I?
- 414.03(d)3 Was care taken to prevent earth or sand from filling spaces between stones?
- 414.03(d)4 Have all spaces between stones been filled with grout and the surface swept with a stiff broom?

## **400 SERIES**

- 414.03(d)5 Is the prohibition on grouting during freezing weather adhered to?
- 414.03(d)6 In hot, dry weather, is the work protected from sunlight and kept moist for 3 days by the use of saturated burlap?
- 414.03(e)1 Does erosion control stone conform to the weight requirements of this section?
- 414.03(e)2 Was Class I dry riprap placed in a manner to present an irregular or rough surface with a depth no less than two feet?
- 414.03(e)3 Was Class II dry riprap placed in a manner to present an irregular or rough surface with a total depth not less than three feet?
- 414.03(f) Does erosion control riprap rock not exceed 15 inches in its greatest dimension and contain a sufficient percentage of smaller rocks to provide a reasonably dense mass with a thickness of at least 8 inches?
- 414.03(g)1 Has Concrete Riprap in Bags (wet mixture) been performed in accordance with this section?
- 414.03(g)2 Has Concrete Riprap in Bags (dry mixture) been performed in accordance with this section?
- 414.03(i)1 Does the riprap consist of Class A3 concrete that is cast in place, 6 inches in thickness, and of a consistency that permits placement without using top forms?
- 414.03(i)2 Is the welded wire fabric No. 6 gage wire, spaced 6 inches center to center?
- 414.03(i)2)1 Was the slope approved by the Engineer prior to placement of slab riprap?
- 414.03(i)2)2 Is the embankment slope reasonably smooth and dense with a trench dug at the toe of the slope to accommodate the toe of the slab?
- 414.03(i)3)1 Has the concrete been cured in accordance with during concrete in section [316.04(j)] on hydraulic cement concrete pavement?
- 414.03(i)3)2 Is welded wire fabric positioned at the center of the slab, run continuously throughout the slab, and lapped approximately 6 inches at the edges of each sheet of fabric?

## **400 SERIES**

- 414.03(i3)3 Is the berm portion sloped approximately 12:1 to drain away from the abutment?
- 414.03(i3)4 Has the joint between the slab and abutment been sealed to a depth of at least ½ inch with hot-poured joint sealer?
- 414.03(i3)5 Does the toe of the slab extend to an elevation of at least 3 feet below the toe of the fill?
- 414.03(i3)6 Was the lower edge of the slab increased approximately 6 inches in thickness by tapering on the underside to its nominal thickness 3 feet up the slope from the lower edge of the slab?
- 414.03(i3a) Is the slab placed in alternate blocks approximately 4 feet square when using the block method?
- 414.03(i3b)1 Is the slab placed in alternate, continuous strips with joints and dimensions conforming to the requirements of this section, when using the strip method?
- 414.03(i3b)2 Does the surface not vary more than ½ inch under a 10-foot straightedge?

# 400 SERIES

## BRIDGES AND STRUCTURES

### CONCRETE AND SLOPE PROTECTION

Job Element	Date	Project Inspector's Signature
Explains in general terms the different types of concrete slop protection in Section 415.		
Explains when slope protection is needed.		
Verifies the proper placement of <b>one</b> of the following: 1. precise concrete block slope protection 2. concrete slab slope protection		
Completes the required documentation for the different types of concrete slope protection.		

**400 SERIES**

**BRIDGES AND STRUCTURES**

**CONCRETE SLOPE PROTECTION**

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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# **400 SERIES**

## **BRIDGES AND STRUCTURES**

### **CONCRETE SLOPE PROTECTION**

#### **CQIP CHECKLIST**

<b><u>SECTION</u></b>	<b><u>QUESTIONS</u></b>
415.03(a)1	Was subgrade for concrete block or slab slope protection constructed at required distance below slope surface with soft sections and unsuitable material replaced, and compacted to smooth, uniform surface?
415.03(a)2	Was the foundation course spread to a depth of 2 inches and treated at the recommended rate with an approved highly insoluble soil sterilent?
415.03(a)3	Are blocks laid with continuous joints extending horizontally and staggered joints extending up or down the slope?
415.03(a)4	Have joints between blocks been filled with mortar?
415.03(a)5	Has cast in place edging been placed as specified in this section?
415.03(b)1	Was the cast in place slab at least 4 inches in thickness and placed in accordance with this section?
415.03(b)2	Were approved splash blocks connecting with the paved ditch provided under downspouts draining onto the slope protection?
415.03(b)1	Have concrete portions, consisting of a concrete paved ditch and concrete strip approximately 3 feet in width along with stone placed to a depth of 7 to 9 inches, been furnished for combination concrete slab and stone slope protection?
415.03(b)2	Was the subgrade prepared in accordance with the section on Concrete Slab Riprap for Stream Crossings and treated with an approved herbicide?
415.03(b)3	Does stone used for combination concrete slab and stone slope protection conform to the requirements of the materials section on Crusher Run Aggregate and project no more than 3 inches above the concrete?

**400 SERIES**

**BRIDGES AND STRUCTURES**

**DAMP-PROOFING**

<b>Job Element</b>	<b>Date</b>	<b>Project Inspector's Signature</b>
Describes the information in Section 417.		
Verifies that the surface of the concrete is properly prepared.		
Verifies that the primer and the asphalt seal coat are applied properly.		
Completes required documentation.		

**400 SERIES**

**BRIDGES AND STRUCTURES**

**DAMP-PROOFING**

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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# **400 SERIES**

## **BRIDGES AND STRUCTURES**

### **DAMP-PROOFING**

#### **CQIP CHECKLIST**

<b><u>SECTION</u></b>	<b><u>QUESTIONS</u></b>
417.01	Is the work being performed in accordance with the plans and specifications?
417.02	Do materials used for damp-proofing conform to the requirements of the materials section on damp-proofing and waterproofing?
417.03(a)	Is the surface being damp-proofed cleaned of all loose foreign material and dry?
417.03(b)1	Has the cleaned surface been brush or spray painted with at least 2 coats of primer using at least 1/8 gallon per square yard of surface per coat?
417.03(b)2	Has an application of at least 1/10 gallon per square yard of asphalt seal coat been applied to the primed surface by brush?
417.03(b)3	Was care taken to confine the asphalt to be damp-proofed and not dripped or spread on any other parts of the structure?

## 400 SERIES

### BRIDGES AND STRUCTURES

#### DRILLED SHAFTS

<b>Job Element</b>	<b>Date</b>	<b>Project Inspector's Signature</b>
Determine the location, dimensions, plumbness, drilling time, elevation of water table, and seepage.		
Observe placement of rebar cage. Discuss the importance of the 2 1/2" cover around edges.		
Verifies that structure was placed properly in <b>one</b> of the following:  1. Dry Shafts  2. Wet Shafts  3. Casing  Explain differences of each.		
Enters the necessary records related to the above items.		
Explain various methods of excavation.		
Discuss the differences of materials encountered at all elevations.		
Observe CSL Integrity Test tube installation and testing.		

**400 SERIES**

**BRIDGES AND STRUCTURES**

**DRILLED SHAFTS**

General description of how competencies were completed:

Trainee's Comments:

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Project Inspector's Comments:

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# **400 SERIES**

## **BRIDGES AND STRUCTURES**

### **DRILLED SHAFTS**

#### **CQIP CHECKLIST**

Has the contractor's Drill Shaft Installation Plan been approved?

When required, was the trial shaft cut-off 2-feet below finished grade and disturbed areas restored to original condition?

When performing drilled shafts utilizing the Dry Construction Method, a) was less than 12" of water present after 1hr with no pumping, b) were sides and bottom stable without detrimental caving, sloshing, or swelling over a 4-hour period?

When performing drilled shafts using the Wet Construction Method, was a minimum of 5 feet of positive head of fluid above groundwater table maintained?

If the contractor proposed the use of slurry, do they have a slurry management plan?

Was the center of the drilled shaft within 3 inches of plan position in the horizontal plane at the plan elevation for the top of the shaft?

Was the minimum 2 1/2" cover maintained between the outside of the reinforcing cage and the side of the excavated hole?

If the steel cage was spliced, was it done properly in accordance with contract documents?

Was the correct placement method used? Tremies, pumps, drop chutes, etc.

Did the contractor overflow the shaft until good concrete flowed?

Were CSL tubes installed parallel and as far away from longitudinal bars as possible?

Was the Drilled Shaft Concrete Volumes Form filled out to plot theoretical and actual concrete volume curves?