
Administration and Inspection Activities for Precast Concrete Bridge Elements and Systems

(As Specified in SSP 999S31)

1.0 SCOPE

This CAIS covers the construction administration and inspection requirements for precast concrete bridge elements and systems as specified in SSP 999S31, May 2024.

2.0 REFERENCES

This CAIS refers to the following standards, specifications, or publications:

Ontario Provincial Standard Specifications, Construction:

OPSS 100	MTO General Conditions of Contract
OPSS 905	Steel Reinforcement for Concrete
OPSS 910	Stressing Systems for Post Tensioning
OPSS 919	Formwork and Falsework
OPSS 1213	Hot Applied Rubberized Asphalt Waterproofing Membrane
OPSS 1350	Concrete – Materials and Production
OPSS 1440	Steel Reinforcement for Concrete

MTO Standard Special Provisions:

SSP 999S31	Requirements for Precast Concrete Bridge Elements (Non-Prestressed and Prestressed)
SSP 199S64	General Requirements for Referee Testing

Construction Administration and Inspection Specifications (CAIS):

CAIS 905	Concrete Reinforcement
CAIS 1350	Material Specification for Concrete - Materials and Production

MTO Forms:

PH-CC-701	Request to Proceed
PH-CC-702	Notice to Proceed
PH-CC-821	Manufacturer's Certificate of Conformance

3.0 DEFINITIONS

For the purpose of this CAIS, the definitions shall be as specified in SSP 999S31.

4.0 DESIGN AND SUBMISSION REQUIREMENTS

4.01 Design Requirements

4.01.01 Precast Bridge Elements and System

Administrative Activities:

1	-	Check that any design is as per CSA-S6 and the MTO's Structural Manual.	-
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4.01.02 Concrete Mix Design

Administrative Activities:

1	-	Check that the concrete mix design meets the requirements of OPSS 1350 and the Contract Documents.	-
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4.01.03 Formwork and Falsework

Administrative Activities:

1	-	Check that the formwork and falsework design meets the requirements of OPSS 919.	-
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4.02 Submission Requirements

4.02.01 Working Drawings

Administrative Activities:

1	M	Check that the Working Drawings and supporting documents are submitted and contain the information specified in SSP 999S31 and the Contract Documents.	-
2	M	Verify that an electronic copy of all Working Drawings including supporting documents are submitted at least 7 Days prior to commencement of fabrication of the elements, or 5 weeks when other authorities are involved in the approval of the design or construction.	-
3	M	Check that the Working Drawings and supporting documents are submitted and contain the information listed in the Contract Documents.	-
4	M	Receive and review the qualifications of the engineer responsible for the assembly plan at least 4 weeks prior to commencement of the work. Verify that the qualifications include a statement that the Engineer is familiar with the equipment the Contractor has available for assembly, and erection of the precast elements.	-

5	M	After reviewing the Contractor's submissions, submit with comments, to MTO CSA and MTO Regional Structural Section within 2 days of receipt. Ensure a final copy of all Contractor submissions is shared with inspection staff and available on site for enforcement and ensure a final copy is sent to the MTO Regional Structural Section.	-
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4.02.02 Welding

Administrative Activities:

1	M	If resistance welding is planned for fabrication of steel reinforcement cages receive proposal 7 Days prior to fabrication and check that it meets the requirements of the Contract.	-
2	M	After reviewing the contractors welding proposal, submit with comments to MTO CSA and MTO Regional Structural Section within 2 Days of receipt.	-

4.02.03 Concrete Mix Design

Administrative Activities:

1	M	Check that the concrete mix design submission contains the information required by the Contract Documents. Obtain Form A portion of the concrete mix design along with any supporting documentation at least 7 Days prior to placement of concrete and review it to determine that it meets the contract requirements. Check that all materials are from approved lists and meet the requirements of the Contract Documents.	-
2	M	Check that the MTO Quality Assurance Section has received Form B portion of the concrete mix design from the concrete supplier prior to placement of concrete.	-
3	-	Check if self-consolidating concrete is proposed to be used and notify MTO's Quality Assurance section for acceptance.	-

4.02.04 Concrete Plant Certification

Administrative Activities:

1	M	Receive precast plant's certificates with the concrete mix design submission.	-
2	M	Verify that the precast and pre-stressed elements are fabricated at a precast plant certified according to SSP 999S31 Clause 4.02.05. If concrete will be supplied by a ready-mixed concrete supplier check that documentation has been submitted verifying that the plant is certified by RMCAO.	-

4.02.05 Control of Concrete Temperature

Administrative Activities:

1	M	Receive the concrete temperature control plan 7 Days prior to the commencement of fabrication of the precast element.	-
2	M	Check the temperature dataloggers prior to use on the contract, to verify thermocouple function, readings and that it can provide unalterable records during the recording period.	-
3	M	Provide written notification to the Contractor that the temperature monitoring and recording system is deemed acceptable to the MTO.	-

4.02.06 Manufacturer's Certificate of Conformance and Precast Report

Administrative Activities:

1	M	Receive MTO PH-CC-821 Contractor's Manufacturer's Certificate of Conformance, and precast report for each shipment of prestressed / precast elements at least 5 Business Days prior to shipping from the precast plant.	-
2	M	Receive MTO form PH-CC-701 Request to Proceed from the Contractor, before the delivery of the prestressed / precast element to the site.	-
3	M	Check that the submissions by the Contractor, including the Manufacturer's Certificate of Conformance, precast report and Request to Proceed meet the requirements of the Contract Documents.	-
4	M	Check that the prestressed / precast element is fabricated according to the Contract Documents, prior to delivery to the site.	-
5	M	Check that defects and deficiencies repairable by standard methods are repaired according to the Contract Documents.	-
6	M	Check that precast and prestressed elements with defects and deficiencies causing rejection according to the Contract Documents, are not included in the Work.	-
7	M	Issue MTO PH-CC-702 Notice to Proceed, in a timely manner, and prior to delivering the pre-stressed / precast elements to the site.	-

Administrative Activities: Activities related to coordination with MTO's Centralized Precast Retainer

1	M	Provide the following information to MTO Concrete Section's centralized retainer inspector: <ul style="list-style-type: none"> • Precast concrete plant's contact information for the centralized retainer to coordinate inspection. • Shop drawings of elements. • Contract specific specifications. • Change orders relating to manufacturing process, drawing, etc. • Production schedule. • Approved repair proposal. 	-
2	-	Upload the inspection report from the centralized retainer to WBCMS for each Contract.	-
3	M	Review the inspection report and issues emails from the centralized retainer and act by providing details by INC element #, photos, descriptions of the issue on the non-conformances identified by the centralized retainer.	-

5.0 MATERIALS

Administrative Activities:

1	-	Check that concrete and all other materials are as specified in SSP 999S31 and the Contract Documents.	-
2	-	Check if self consolidating concrete is proposed to be used and notify MTO's Quality Assurance section for acceptance.	-
3	-	Verify the concrete sealers, if used, are from the Owner's list of acceptable sealers.	-
4	-	Check that elastomeric coatings, if used, are according to OPSS 1213.	-
5	-	Check that associated hardware and mechanical connectors, if used, are according to OPSS 905.	-
6	-	Check that the post-tensioning material, including grout, is according to OPSS 910.	-
7	-	Check that prestressing steel, if used, and steel reinforcement are according to OPSS 1440.	-
8	-	Verify proprietary patching materials are from the Owner's Proprietary Patching Materials list.	-

6.0 EQUIPMENT

Inspection Activities:

1	-	If used, check that chipping hammers meet the requirements of SP999S31.	25%
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2		Check that the post-tensioning equipment is according to OPSS 910.	100%
3	-	Check that the temperature monitoring and recording system is as specified in SSP 999S31 Subsection 6.07.	100%
4	-	Check that all other equipment is according to SSP 999S31 Section 6.0.	100%

7.0 CONSTRUCTION

7.01 Fabrication

7.01.01 General

Inspection Activities:

1	-	Check each element's identification number and casting date.	100%
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Administrative Activities:

1	-	Receive Contractor's written notification a minimum of 7 Days prior to commencement of precast element fabrication.	-
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7.01.02 Precast Plant Certification

Administrative Activities:

1	-	Check the compliance of the plant with the certification requirements as specified in SP999S31.	-
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7.01.20 Material Sampling and Testing

Inspection Activities:

1	-	Sample steel reinforcement according to CAIS 905; water, admixtures and cementing materials according to CAIS 1350, when requested by the Owner.	100%
2	-	Witness sampling of cementing materials, limestone filler (if applicable), admixtures and water (when other than municipal drinking water is used) and check that sampling is as specified in OPSS 1350.07.05.02.	100%
3	M	Receive submission from the Contractor, a list of elements and their identification numbers within 24 hours of completion of a lot.	100%
4	M	After all the precast elements in the lot have been fabricated, randomly select one element from each lot for acceptance testing, and randomly select a location for core removal within that precast element. Advise the Contractor which element is to be cored and the coring location.	100%

5	M	Obtain from the Contractor the planned time and site of coring (job site or precast plant) for each lot (note: One precast element in each lot is to be cored at an age of 7 to 10 days, to remove 6 cores, for air void system, rapid chloride permeability and compressive strength testing respectively. Coring may take place at the job site or at the precast plant, wherever the precast element is at 7 to 10 days of age).	100%
6	M	Prior to coring, witness the detection of reinforcing steel by covermeter and Check that cores do not contain reinforcement or other embedded material. Check that cores are as specified.	100%
7	M	Witness the removal of cores when core removal is to take place on site. When coring is conducted at the precast plant, witness or have a representative witness the coring.	100%
8	M	Upon removal of the core samples, verify that cores are properly labelled and placed in the security bags provided by the MTO. Immediately take possession of the cores and deliver them to the designated laboratory for testing by the MTO.	100%

Administrative Activities:

1	-	If prestressing steel is used in the element check that the fabricator has demonstrated that the concrete strength has reached what was specified in the Contract Documents.	-
2	-	Check that the fabricator has demonstrated that the concrete strength has reached what was specified in the Working Drawings prior to stripping the formwork.	-
3	-	Check that the Contractor's concrete cover measurement on each element conforms to the requirements of SP 999S31 in the Precast Report submitted.	-
4	-	Check that the Contractor's dimensional measurements on each girder conform to the requirements of SP 999S31 in the Precast Report submitted.	-

7.03 Delivery

Administrative Activities:

1	-	Receive Contractor's written notification a minimum of 3 Business Days prior to delivery of the element.	-
2	-	Check the delivery is as specified in SSP 999S31 Subsection 7.03.	-

7.04**Installation**

Inspection Activities:

1	M	Check that the Workings Drawings meeting the requirements of the Contract Documents are on site and are being followed during installation of the precast and pre-stressed elements.	100%
2	M	Check that precast and prestressed elements with defects and deficiencies causing rejection according to the Contract Documents, are not included in the Work.	100%
3	M	Check that precast and prestressed elements that required repair are repaired according to SP999S31 prior to installation.	100%
4	M	Check that the installation of the precast elements meets the requirements of the Contract Documents.	100%
5	M	Check that the elements have been properly braced after the installation.	100%

Administrative Activities:

1	-	Receive Contractor's written notification a minimum of 3 Business Days prior to the commencement of field installation operations.	-
2	-	If repairs are required prior to installation of the elements, receive MTO form PH-CC-701 Request to Proceed from the Contractor, prior to the installation of the elements that require repair.	-
3	-	Check that repairs have been completed according to SP999S31.	-
4	-	Issue MTO PH-CC-702 Notice to Proceed, in a timely manner, and prior to elements that required repair being installed.	-
5	-	Receive and Check the Contractor's submission required under GC 7.02.07 regarding the certification by an Ontario Land Surveyor or Engineer for grade and layout of the component.	-

7.06**Inspection after the Installation of the Elements**

Administrative Activities:

1	M	Receive and check MTO PH-CC-701 Request to Proceed from the Contractor, after the installation of all elements for each structure within a construction stage.	-
2	M	Issue MTO PH-CC-702 Notice to Proceed, in a timely manner, and prior to the next operation.	-

7.07 Repair of Defects and Deficiencies Repairable by Standard Methods

Administrative Activities:

1	-	Receive repair proposal from the Contractor when more than one of the defects or deficiencies listed in SSP 999S31 Table 2 is located in the same area in the element.	-
2	-	Check that the repair proposal is submitted in the precast report.	-
3	-	For defects and deficiencies that are not repairable by standard methods and that are not rejectable, provide a written response to the Contractor indicating whether the Engineer's assessment is deemed acceptable and if deemed unacceptable, the precast elements shall be rejected and replaced by the Contractor.	-
4	-	Consult with MTO as necessary.	-
5	-	Provide a written response to the Contractor indicating whether the Engineer's assessment is deemed acceptable and if deemed unacceptable, the precast and pre-stressed elements shall be rejected and replaced by the Contractor.	-

7.08 Management of Excess Material

Administrative Activities:

1	-	Check that management of excess material is done according to the Contract Documents.	-
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8.0 QUALITY ASSURANCE

Inspection Activities:

1	M	After delivery and prior to installation, check for any surface defects not repaired adequately or dimensional measurements not appearing within tolerance.	100%
2	M	After deliver and prior to installation randomly select a minimum of two elements and check that precast elements and systems meet fabrication tolerances of Table 2 of SP999S31 and the Contract Documents. If the installation tolerances do not meet the Contract requirements inform the MTO immediately.	100%
3	M	If referee testing of compressive strength, air void system, or rapid chloride permeability is invoked, witness the removal of the core(s) for referee testing from the same precast element from which the disputed acceptance cores were obtained.	100%
4	M	After delivery and prior to installation, check that the referee core is properly labelled. Take possession of the core and deliver it to the referee laboratory designated by MTO.	100%

5	M	Conduct a visual inspection to assess surface finish and the acceptability of repairs.	100%
6	M	After delivery and prior to installation, randomly select a minimum of two precast elements from each lot for verification of concrete cover and dimensional measurements. If the concrete cover measurements of any of the precast elements measured does not meet the tolerances of the Contract Documents, inform MTO immediately.	100%
7	M	Check that core holes are repaired in accordance to the Contract Documents.	100%
8	M	After installation randomly select a minimum of two elements and check that precast elements and systems meet the installation tolerances of Table 3 of SP999S31 and the Contract Documents. If the installation tolerances do not meet the Contract requirements inform the MTO immediately.	100%

Administrative Activities:

1	M	Obtain and review acceptance test results for compressive strength, air void system and rapid chloride permeability.	-
2	M	Obtain and review acceptance test results for water, admixtures and cementing materials.	-
3	M	If referee testing is invoked by the contractor, obtain and review results of referee testing according to the contract documents. The cost of referee testing shall be according to SP199S64. The party responsible for the cost of referee testing shall be according to SP999S31.	
4	-	Check the lot size based on the production rate prior to commencing production as per SSP 999S31.	-
5	-	Identify which elements make up each lot (as defined in the Contract Documents).	-
6	-	Verify that elements with defects and deficiencies causing rejections as specified in SSP 999S31 Subsection 08.09 are rejected and replaced.	-

10.0 BASIS OF PAYMENT

Administrative Activities:

1	-	Basis of payment shall be as specified.	-
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WARRANT: Always with SSP 999S31, Construction Requirements for Precast Concrete Bridge Elements (Non-Prestressed and Prestressed).