

Administration and Inspection Activities for Prestressed Concrete - Precast Girders

(As Specified in OPSS 909 ~~and SSP 109S24~~)

909.01 SCOPE

This CAIS covers the construction administration and inspection requirements ~~for fabrication, delivery, and the~~ installation of precast prestressed concrete girders ~~with steel reinforcement~~ as specified in OPSS 909, November ~~2016 and SSP 109S24, March 2018.~~2025.

909.02 REFERENCES

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

Ontario Provincial Standard Specifications, Construction:

OPSS 909 Prestressed Concrete - Precast Girders

Ontario Provincial Standard Specifications, Materials:

~~OPSS 1213 Hot Applied Rubberized Asphalt Waterproofing Membrane~~

~~MTO Standard Special Provisions:~~

~~SSP 109S24 Amendment to OPSS 909, November 2016 – Additional Requirements~~

~~OPSS 1355 Precast Concrete – Materials and Production~~

Construction Administration and Inspection Specifications (CAIS):

~~CAIS 905 Steel Reinforcement for~~1355 Precast Concrete

~~CAIS 910 Stressing Systems for Post Tensioning~~

~~CAIS 919 Formwork and Falsework~~

~~CAIS 929 Abrasive Blast Cleaning – Concrete Construction~~

~~CAIS 1002 Aggregates – Concrete~~

~~CAIS 1213 Hot Applied Rubberized Asphalt Waterproofing Membrane~~

~~CAIS 1302 Water~~

~~CAIS 1350 Concrete – Materials and Production~~

~~CAIS 1440 Steel Reinforcement for Concrete~~

Ontario Ministry of Transportation Publications

Structural Manual

MTO Forms:

~~PH-CC-322 Concrete Construction Report~~
~~PH-CC-440 MERO Sample Transmittal Form~~
~~PH-CC-433A Concrete Mix Design Submission Form A~~
PH-CC-701 Request to Proceed
PH-CC-702 Notice to Proceed

909.03 DEFINITIONS

For the ~~purpose~~purposes of this CAIS, the definitions shall be as specified in OPSS 909.

909.04 DESIGN AND SUBMISSION REQUIREMENTS

909.04.01 Design Requirements

909.04.01.01 General

Administrative Activities:

1	M	Check that any <u>the</u> design is as per <u>according to</u> CSA-S6 and , the MTO Structural Manual, <u>Division 1 and the Contract Documents</u> .	-
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909.04.01.02 Permissible Changes from the Contract Drawings

909.04.01.02.01 General

Administrative Activities:

1	M	Receive changes from the Contract Drawings and for permissible changes, verify that they are as specified in OPSS 909.04.01.02.	-
2	M	If changes are not permissible as specified in OPSS 909.04.01.02, Notify MTO <u>MTO's Quality Assurance Section</u> .	-

909.04.01.02.02 Prestressing of Girders

Administrative Activities:

1	-	Check that any permissible changes to prestressing of girders are as specified in OPSS 909.04.01.02.02.	-
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909.04.01.02.03 Reinforcing of Girders

Administrative Activities:

1	-	Check that any permissible changes to reinforcing of girders are as specified in OPSS 909.04.01.02.03.	-
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909.04.01.02.04 Other Design Details

Administrative Activities:

1	-	Check that any permissible changes to other design details of girders are as specified in OPSS 909.04.01.02.04.	-
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909.04.01.03 Temporary Bracing

Administrative Activities:

1	M	Check that the temporary bracing details are provided and in conformance with the Contract Documents and as specified in OPSS 909.04.01.03.	-
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909.04.02 Submission Requirements

909.04.02.01 Working Drawings

Administrative Activities:

1	M	Check <u>Verify</u> that <u>one electronic copy in PDF format of</u> the Working Drawings and, including supporting documents <u>documentation</u> , are submitted and contain <u>received at least 7 Days prior to commencement of fabrication of the</u> information listed as specified in OPSS 909.04.02.01 and Contract Documents girders, or 35 Days when other authorities are involved in the <u>approval of the design or construction.</u>	-
2	M	Verify that 3 sets of fabrication Working Drawings including supporting documents are submitted and received at least 7 Days prior to commencement of fabrication of the girders, or 35 Days when <u>When</u> other authorities are involved in the approval of the design or construction, <u>verify that one additional copy of the Working Drawings and supporting documentation submission is provided for each authority.</u>	-
3	M SSI	Receive <u>Review the</u> Working Drawings and review submission for conformance with the Contract Documents <u>supporting documents and Check that they contain the information listed in OPSS 909.04.02.01.</u>	-
4	-	After reviewing the Working Drawings and technical documentation submissions, submit with comments, to the <u>Contractor, MTO Contract Services Administrator (CSA)</u> and MTO Structural within 2 Business Days of receipt.	-
5	-	Ensure a final copy of all Contractor submissions is shared with inspection staff and available to perform on-site administration and inspection duties.	-
6	-	Ensure a final copy is sent to MTO Structural <u>Section</u> .	-

7	M	Review and provide a written response of acceptability within 10 Business Days for any design proposals that are submitted.	-
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909.04.02.02 Concrete Mix Design

~~Administrative Activities:~~

1	M	Receive and review concrete mix design according to CAIS 1350.	-
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909.04.02.03 Concrete Plant Certification

~~Administrative Activities:~~

1	M	Receive plant's certificates with the concrete mix design submission	-
2	M	Verify that the precast concrete girders are fabricated at a precast plant certified according to OPSS 909.04.02.03. If concrete will be supplied by a ready-mixed concrete supplier check that documentation has been submitted verifying that the plant is certified by Concrete Ontario.	-

909.04.02.04 Control of Concrete Temperature

~~Administrative Activities:~~

1	-	Check that the concrete temperature control plan is submitted one week prior to commencement of fabrication of girders for information purposes.	-
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909.04.02.05 Manufacturer's Certificate of Conformance and Precast Report

~~Administrative Activities:~~

1	M	Receive the Contractor's Manufacturer's Certificate of Conformance, and precast report for each shipment of prestressed/ precast girders at least 5 Business Days prior to shipping from the precasting plant.	-
2	M	Receive the Request to Proceed from the Contractor, before the delivery of the prestressed precast girders 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 conform with the requirements of the Contract Documents and OPSS 909.04.02.05.	-
4	M	Check that the prestressed precast girders are 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 girders with defects and deficiencies causing rejection according to the Contract Documents, are not included in the Work.	-
7	M	Issue a Notice to Proceed, in a timely manner, and prior to delivering the prestressed / precast girder to the site.	-

~~Administrative Activities: Activities related to MTO's Centralized Precast Retainer~~

1	M	Provide the following information to MTO Concrete section's centralized retainer inspector: • Precast concrete plant's contact information for the centralized retainer to coordinate inspection. • Shop drawings of girders. • Contract specific specifications. • Change orders relating to manufacturing process, drawing, etc. • Production schedule. • Approved repair proposal.	-
2	-	Receive and upload the inspection report from the centralized retainer in WBCMS for each Contract.	-
3	M	Review the inspection report and issues emails from the centralized retainer and act on the non-conformances identified by the centralized retainer.	-

Change

~~909.04.02.06~~ **Design Proposals**

Administrative Activities:

1	-	Receive <u>one electronic copy in PDF format</u> and check 5 copies of the <u>Check any design proposalchange proposals</u> . Check that they also bear the seal and signature of the design Engineer and the design checking Engineer.	-
2	-	Issue a response for the design <u>change</u> proposal within 10 Business Days.	-

909.05 MATERIALS

909.05.01 Bearing Plate

~~Administrative Activities:~~

1	M	Verify that the bearing plate, anchor studs and galvanizing meet the requirements in the OPSS 909.05.01.	-
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909.05.02 ~~————~~ **Burlap**

~~Administrative Activities:~~

1	M	Check the burlap material requirements as per OPSS 909.05.02.	-
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909.05.03 ~~————~~ **Precast Concrete Girders**

~~Administrative Activities:~~

~~Administrative Activities:~~

4	-	Check that concrete mix design submitted is according to CAIS 1350, Contract Documents and meeting requirements in OPSS 909.05.03.	-
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909.05.04 ~~————~~ **Concrete Sealers**

~~Administrative Activities:~~

1	-	Receive the Owner's list of acceptable sealers from MTO Quality Assurance.	-
2	-	Check the concrete sealers are from Owner's list of acceptable sealers.	-

909.05.05 ~~————~~ **Elastomeric Coating**

~~Administrative Activities:~~

1	-	Check elastomeric coating material requirements as per OPSS 1213.	-
2	-	As specified in CAIS 1213.	-

909.05.06 ~~————~~ **Formwork**

~~Administrative Activities:~~

4	-	Check formwork requirements as per CAIS 919.	-
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909.05.07 ~~————~~ **Hardware**

~~Administrative Activities:~~

4	-	Check all hardware requirements as per OPSS 909.05.07.	-
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~~909.05.08~~ ~~Moisture Vapour Barrier~~

~~Administrative Activities:~~

1	-	Check the moisture vapour barrier requirements as per OPSS 909.05.08.	-
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~~909.05.09~~ ~~Post-Tensioning Material~~

~~Administrative Activities:~~

1	-	Check post-tensioning material requirements as per CAIS 910.	-
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~~909.05.10~~ ~~Proprietary Patching Materials~~

~~Administrative Activities:~~

1	-	Receive the Owner's list of proprietary patching materials from MTO Quality Assurance.	-
2	-	Check the proprietary patching materials are from MTO's List of Concrete Patching Materials.	-

~~909.05.11~~ ~~Steel Reinforcement~~

~~Administrative Activities:~~

1	-	Check steel reinforcement according to CAIS 1440.	-
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~~909.05.12~~ ~~Water~~

~~Administrative Activities:~~

1	-	Check water according to CAIS 1302.	-
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~~909.06~~ ~~EQUIPMENT~~

~~909.06.01~~ ~~Chipping Hammers~~

~~Administrative Activities:~~

1	-	Check that chipping hammers are according to OPSS 909.06.01.	-
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909.06.02 — Pretensioning and Post-Tensioning

Administrative Activities:

4	-	<u>Check the pre-tensioning and post-tensioning equipment is as specified in OPSS 909.06.02.</u>	-
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909.06.03 — Thermocouples and Dataloggers

Administrative Activities:

4	-	<u>Check that the temperature monitoring and recording system is meeting the requirements of OPSS 909.06.03.</u>	-
1	-	<u>Check that precast concrete girders are as specified in OPSS 1355 in its entirety. For precast concrete girders, additional inspection and administrative activities shall be as specified in CAIS 1355.</u>	-

909.07 CONSTRUCTION

909.07.01 General

Inspection of Elements Prior to Installation

Administrative Activities:

<u>1</u>	<u>M</u>	<u>If any defects or deficiencies are present on the girders, receive notification from the contractor.</u>	-
<u>2</u>	<u>M</u>	<u>If no defects or deficiencies are present or have been repaired, receive the MTO for PH-CC-701, Request to Proceed from the Contractor, after delivery of the girders to site before installation.</u>	-
<u>43</u>	<u>-M</u>	<u>Check each girder's identification number and casting date. Check that the girders are fabricated according to the Working Drawings and Contract Documents, and Check girders for dimensional tolerances, sweep and defects and deficiencies prior to installation.</u>	<u>- 100%</u>
<u>4</u>	<u>M</u>	<u>If defects or deficiencies are found, Notify the Contractor of the type, size, and quantity and which element that they occur on.</u>	-
<u>5</u>	-	<u>Check that the repairs have been completed according to the Defects and Deficiencies clause of OPSS 1355.</u>	-
<u>6</u>	-	<u>Once the girders and any repairs are acceptable, issue MTO form PH-CC-702, Notice to Proceed, to the Contractor.</u>	-

~~Administrative Activities:~~

4	-	Receive written notification 7 Days prior to commencement of fabrication.	-
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909.07.02 Precast Plant Certification

~~Administrative Activities:~~

4	-	Check the compliance of the plant with the certification requirements as specified in OPSS 909.07.02.	-
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909.07.20 Concrete Cover Measurement

~~Administrative Activities:~~

4	-	Check the Contractor's concrete cover measurement on each girder conforms to the requirements of OPSS 909.07.20 in the Precast Report submitted.	-
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909.07.21 Dimensional Measurements

~~Administrative Activities:~~

4	-	Check the Contractor's dimensional measurements on each girder conform to the requirements of OPSS 909.07.21 in the Precast Report submitted	-
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909.07.22 Access for Quality Assurance

~~Administrative Activities:~~

4	-	Check the access for quality assurance requirements as described in OPSS 909.07.22.	-
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909.07.23 Delivery

~~Administrative Activities:~~

4	-	Check that written notification of delivery of girders is provided 3 Business Days prior to delivery.	-
2	-	Check the delivery requirements as described in OPSS 909.07.23.	-

909.07.24 Installation of Girders

Inspection Activities:

1	M	Check that the girders delivered to site are fabricated and installed according with to the <u>Working Drawings and the Contract Documents, including all surface defects and other dimensional tolerances. Check surface defects and the girder sweep prior to girder installation.</u>	100%
2	M	Immediately after installation, check Check that the <u>forces resulting from the lifting devices acting on the girders are temporarily braced and measure the sweep of each girder not inclined to the vertical at an angle exceeding 30 degrees.</u>	100%
3	-	<u>Check that the girders are lifted and placed in a manner to ensure they are not overstressed, unstable, or unsafe at any time.</u>	<u>100%</u>
34	M	Immediately after installation, Check that the girders have been are properly braced in accordance with according to the <u>Working Drawings and the Contract immediately after the installation.</u> Documents.	100%
45	M	After placing the side by side precast concrete box girders without distribution slab at their final locations, check that the lifting devices are not cut until all traverse bars extruded from the girders are inspected and found not damaged. Check and measure the sweep of each girder immediately after installation. <u>Ensure sweep is within the tolerances specified in Table 1 of OPSS 909.</u>	100%
56	M	Check all the girders are to be permanently connected within the same construction season.	100%
7	-	<u>Check installed girders for any defects and deficiencies. If there are any defects and deficiencies, Notify the Contractor in writing. Check repairs to ensure they meet the approved repair proposal, OPSS 1355 and the Contract Documents.</u>	<u>100%</u>

Administrative Activities:

1	M	Receive written notification of the installation date at least 3 Business Days prior to the commencement of field installation operations.	-
2	-	Check the installation requirements as described in OPSS 909.07.24.	-
32	-	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, prior to girder erection. Alert MTO Structural if top of bearing seat elevations or span dimensions are not as specified in the Contract Documents.	-
3	-	<u>Check that a copy of the Working Drawings is kept on site during installation of the girders.</u>	-

<u>4</u>	-	<u>If repairs are required to installed girders, receive and Review repair proposal.</u>	-
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909.07.03 Installation Tolerances

Inspection 909.07.25 Repair of Defects and Deficiencies Repairable by Standard Methods

Administrative Activities:

<u>4</u>	-	<u>Receive repair proposal from the Contractor for the defects or deficiencies listed in OPSS 909, Table 2.</u>	-
<u>2</u>	-	<u>Check that if a repair proposal is submitted in the precast report.</u>	-
<u>31</u>	<u>M</u>	<u>Check that girders satisfy the repair proposal is following the requirements as installation tolerances specified in Table 1 of OPSS 909 including: all causes, preventative actions, and corrective actions including repair methods and materials as specified in OPSS 909.08.10.04. Consult with MTO as necessary the Contract Documents.</u>	<u>-100%</u>
<u>4</u>	-	<u>Provide a written response to the Contractor indicating whether the Engineer's assessment is deemed acceptable and if deemed unacceptable, the precast and prestressed girders shall be rejected and replaced by the Contractor.</u>	-

909.07.2604 Inspection after the Installation of the Girders

Administrative Activities:

Administrative Activities:

<u>4</u>	<u>M</u>	<u>Receive a Request to Proceed, for each structure, after the installation of the girders within a construction stage.</u>	-
<u>2</u>	<u>M</u>	<u>Issue a Notice to Proceed in a timely manner for the next operation to proceed.</u>	-
<u>1</u>	<u>M</u>	<u>Receive a MTO form PH-CC-701, Request to Proceed, after the installation of each girder type for each structure within a construction stage and prior to the cutting or removal of any temporary lifting, setting, or levelling devices, or casting of concrete or grouted joints.</u>	-
<u>2</u>	<u>M</u>	<u>Issue a MTO form PH-CC-702, Notice to Proceed in a timely manner for the next operation to proceed.</u>	-

909.07.27 ~~Material Sampling for Acceptance Testing~~

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~~Inspection Activities:~~

1	-	Sample steel reinforcement according to CAIS 905 when requested by the Owner; water, admixtures and cementing materials according to CAIS 1350.	100%
2	-	Prior to coring, witness the detection of reinforcing steel by covermeter and ensure cores do not contain reinforcement or other embedded material. Check that the cores are in accordance with OPSS 909.07.27.03.03.	100%
3	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%
4	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. Check that the core holes are filled as per OPSS 909.07.27.03.03.	100%

~~Administrative Activities~~

1	M	Receive submission from the Contractor, a list of girders and their identification numbers within 24 hours of completion of a lot.	-
2	M	After all the precast girders in the Lot have been fabricated, randomly select one member from each Lot for acceptance testing, and randomly select a location for core removal within that precast girder. Advise the Contractor which girder is to be cored and the coring location.	-
3	M	Obtain from the Contractor the planned time and site of coring (job site or precast plant) for each Lot. (Note: One precast girder in each lot is to be cored at an age of 7-10 days, to remove 5 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 girder is 4 to 14 days of age).	-

909.07.28 Management of Excess Materials

Administrative Activities:

~~Administrative Activities:~~

4	-	Check the management of excess materials are done in accordance with the Contract Documents.	-
1	-	<u>Check that management of excess materials is as specified in the Contract Documents.</u>	-

909.08**QUALITY ASSURANCE****909.08.01****General**

Inspection Activities:

1	-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 girder from which the disputed acceptance core was obtained. Inspect the girders to Check that the acceptance of girders is as specified in OPSS 909 and the Contract Documents.	100%
2	-	Check that the referee core is properly labelled. Take possession of the core and deliver it to the referee laboratory designated by MTO.	100%
3	-	Conduct a visual inspection deemed necessary to assess the effectiveness of surface finish and repairs.	100%
42	-M	Randomly select a minimum of one girder from each lot for verification of concrete cover and dimensional measurements. If the concrete cover and dimensional measurements of the girder does not meet the tolerances of the Contract Documents and OPSS 909 Table 1, inform MTO immediately. Inspect the girder for defects or deficiencies as specified in OPSS 1355. Additional inspection activities shall be as specified in CAIS 1355.	100%

Administrative Activities:

4	-	Check the acceptance of girders against the Contract Documents and OPSS 909.08.	-
2	-	Obtain and review acceptance test results for compressive strength, air void system and rapid chloride permeability.	-
3	-	Obtain and review acceptance test results for water, admixtures and cementing materials.	-
4	-	Check the lot size based on the production rate for sampling of the test prior to commencing production as per OPSS 909.	-
5	-	Identify which girders make up each Lot, in accordance with the Contract Documents.	-
6	-	Verify girders with defects and deficiencies causing rejections as specified in OPSS 909.08.10.03 are rejected and replaced.	-

Administrative Activities:

1	:	Check that the acceptance of girders is according to the Contract Documents and OPSS 909.08.	:
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<u>2</u>	-	<u>For precast concrete girder, Check that quality assurance and acceptance is as specified in OPSS 1355. Check that precast concrete girders meet the quality assurance requirement as specified in OPSS 1355, including acceptable 28-Day compressive strength, air void system parameters, and rapid chloride permeability. For precast concrete girders, additional administrative activities shall be as specified in CAIS 1355.</u>	-
<u>3</u>	-	<u>Notify MTO's Quality Assurance Section for any girder that fails to meet the acceptance requirements. Provide written notification to the Contractor, after consultation with MTO, for rejectable work.</u>	-

909.08.02 **Acceptance of Installation Tolerances**

Inspection Activities:

<u>1</u>	<u>SSI</u>	<u>Once notification that the girders are ready for verification measurements is received, Check that the girders have been installed to the tolerances specified in Table 1 of OPSS 909.</u>	<u>100%</u>
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Administrative Activities:

<u>1</u>	-	<u>Receive notification from the Contractor that the girders have been installed.</u>	-
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909.08.03 **Field Inspection**

Inspection Activities:

<u>1</u>	<u>M</u>	<u>Inspect the girders and the work for any defects and deficiencies. Notify MTO's Quality Assurance Section of any defects or deficiencies.</u>	<u>100%</u>
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909.10 BASIS OF PAYMENT

Administrative Activities:

<u>1</u>	-	<u>Basis of payment shall be as specified in OPSS 909.</u>	-
<u>2</u>	-	<u>Calculate the payment adjustment for individual lots of concrete precast girders as specified in OPSS 909.</u>	-

~~WARRANT: Always with OPSS 909, Construction Specification for Prestressed Concrete Precast Girders.~~