



## WSDOT Standard Practice QC 6

### *Annual Prestressed Plant Review and Approval Process*

#### 1. Scope

This standard specifies requirements and procedures for WSDOT annual approval of all manufacturing facilities producing prestressed concrete girders or precast prestressed concrete members in accordance with WSDOT *Standard Specifications* Section 6-02.3(25). Standard Practice QC 6 also applies to precast concrete units that are prestressed as identified in WSDOT *Standard Specifications* Section 6-02.3(9).

#### 2. Referenced Documents

- 2.1 Precast/Prestressed Concrete Institute Certification Program
- 2.2 WSDOT Qualified Products List
- 2.3 WSDOT Standard Specification

#### 3. Terminology

- 3.1 **Plant** – Manufacturing facility producing prestressed concrete members with single plant location.
- 3.2 **NRMCA** – National Ready Mix Concrete Association
- 3.3 **PCI** – Precast/Prestressed Concrete Institute
- 3.4 **RAM** - Request for Approval of Material (WSDOT [Form 350-071](#)) document submitted by the plant, identifying their material sources for WSDOT approval.
- 3.5 **Quality Control** – Quality control inspection and documentation provided by the plant.
- 3.6 **QPL** – WSDOT Qualified Products List
- 3.7 **WSDOT** – Washington State Department of Transportation
- 3.8 **WSDOT Annual Approval** – The approval process defined in WSDOT Standard Practice QC 6.
- 3.9 **WSDOT Fabrication Inspector** – Quality Assurance inspector provided by the WSDOT Headquarters Materials Laboratory Materials and Fabrication Inspection Office.

#### 4. Significance and Use

- 4.1 This Standard Practice specifies procedures for approving plants on an annual basis and maintaining a plant approval document reviewed annually. Submittal documents pre approve specific documentation identified in this Standard Practice; replacing the requirement for contract specific submittals. Modifications can be made to the plants submittal at any time during the annual approval period.

#### 5. Annual Plant Approval Requirements

- 5.1 Plants shall be initially approved through the QPL or RAM approval process. Plants shall not begin fabricating prestressed members prior to receiving WSDOT annual plant approval.
- 5.2 Maintain current PCI certification for the type of prestressed member being manufactured.
- 5.3 Maintain quality control staff meeting the training and certification requirements specified by the PCI plant certification program.
- 5.4 Submit and maintain an annual approval document detailed in Section 6. Plants must complete and maintain all submittal requirements to remain in active approval status.
- 5.5 Submit annually by December 1<sup>st</sup> a document identifying the plant has reviewed their annual approval document and identifies whether the plant approval document remains unchanged, or details any anticipated revisions.
- 5.6 Successful completion of initial WSDOT plant approval detailed in Section 7 or successful maintenance of annual approval status detailed in Section 10.

#### 6. Plant Submittal Requirement

- 6.1 Plants shall initially submit a document for annual approval that covers the submittal requirements of this section starting with Section 6.1.1. The document may be submitted by mail or submitted electronically. Submit documents to the WSDOT Transportation Technical Engineer.
- 6.1.1 Table of Contents
- 6.1.2 Table of Organization.
- 6.1.3 RAM documents. Submit RAM documents for the following materials.
- Concrete Ready Mix Batch Plant (as applicable)
  - Epoxy Coated Reinforcing Steel
  - Fabrication Facilities Manufacturing Welded Embeds and Fabricating Reinforcing Steel
  - Prestress Strand
  - Reinforcing Steel

- 6.1.4 Concrete mix designs. Submit mix designs on the latest revision of WSDOT Form 350-040. Mix designs are to be filled out completely. Aggregate, cement, slag, and admixtures must be from WSDOT approved sources. Mix design submittal shall include the following for each mix design;
- Compressive strength break history. A minimum of 15 sets (2 cylinders per set)
  - Cement mill certification report
  - Chloride Ion test results
- 6.1.5 Curing procedures. Submit the procedure that will be used to cure prestressed members. Identify whether accelerated curing will be used and detail the procedure for monitoring and documenting curing operations.
- 6.1.6 Fabrication procedures and drawings. This submittal is for standard fabrication procedures and specialized fabrication procedures. Specialized procedures may be added to the annual plant submittal as approved by the WSDOT Bridge and Structures Office, to facilitate fabrication of prestressed members. Examples of specialized procedures are as follows:
- Tensioning and Detensioning procedures
  - Hold down devices
  - Other procedures and drawings as determined by the Plant.
- 6.1.7 Weld procedures. Submit weld procedures for welding of embed plates or other structures as applicable to the plants manufacturing process.
- 6.1.8 Repair procedures. Submit repair procedures for anticipated repair scenarios. Approved repair procedures can be used during fabrication of prestressed members without further WSDOT engineering approval. Repair procedures must be detailed, including dimensional limits, and specific repair materials identified by material type, and brand name. Submittal shall include catalog cuts for repair materials.
- 6.1.9 Quality control plan. Submit quality control procedures and inspection forms. Inspection forms shall include information for the following.
- Pre Pour Inspection Report
  - Wet Concrete Testing Report
  - Stressing Record
  - Compressive Strength Testing Report
  - Non Conformance Report
  - Post Pour Inspection Report
- 6.1.10 Ready mix batch plant NRMCA as applicable. Not required for plants in house batch plant.

- 6.1.11 Problem resolution form. Submit a plant specific problem resolution form. Appendix "B" has an example of the Problem Resolution Form. This form is used to expedite resolution of construction issues encountered during fabrication of prestressed concrete members.
- 6.1.12 Certificate of Compliance Document: Submit the form that will be used for the Certificate of Compliance document.
- 6.1.13 Final documentation package. Detail or outline the documents that will be provided to the WSDOT Materials and Fabrication Inspector prior to WSDOT final approval of prestressed members. Documents required in the final document package are as listed below.
- Pre Pour Inspection Report
  - Wet Concrete Testing Report
  - Compressive Strength Testing Report
  - Post Pour Inspection Report
  - Gradation Reports
  - Cure Charts for accelerated curing
  - Stressing Records
  - Non Conformance Reports
  - Problem Resolution documents
  - Certificate of Compliance
  - Certificate of Materials Origin (for projects with "Buy America" Requirement, WSDOT Form 350-109)
  - Mill certs
    - Cement
    - Epoxy Coated Reinforcing Steel
    - Fly Ash
    - Micro Silica
    - Prestress Strand
    - Reinforcing Steel
    - Slag
    - Steel components

## 7. Initial Plant Approval Process

- 7.1 Upon receiving the plants initial submittal, WSDOT will review the contents of the submittal in preparation for WSDOT's initial plant approval meeting with representatives of the plant.
- 7.2 WSDOT will be allowed 90 days for review of the plants initial submittal document. Time for review will be longer if submittals are incomplete.

- 7.3 WSDOT review responsibilities.
  - 7.3.1 WSDOT Transportation Technical Engineer. Overall responsibility for annual approval and submittal review process. Coordinates all annual approval submittal activities. Reviews for acceptance all documentation with the exception of mix designs, specialized fabrication procedures, and repair procedures.
  - 7.3.2 WSDOT Headquarters Materials Laboratory Fabrication Inspection Office. Responsible for review and approval of mix designs.
  - 7.3.3 WSDOT Construction Office. Responsible for review and approval of repair procedures.
  - 7.3.4 WSDOT Bridge and Structures Office. Responsible for approval of specialized fabrication procedures, and review and approval of welding procedures.
- 7.4 Review process.
  - 7.4.1 The WSDOT Transportation Technical Engineer will review portions of the plant submittal and will send specific sections referenced in Section 7.3 to the respective approving authorities.
  - 7.4.2 Approving authorities will send reviewed documents back to the WSDOT Transportation Technical Engineer.
  - 7.4.3 The WSDOT Transportation Technical Engineer will review the status of the submittals returned from the approving authorities and incorporate the documents into the annual plant approval document.
  - 7.4.4 Submittal documents will be signed or stamped “Approved”, “Approved as Noted”, “Not Approved”, or Accepted depending on their review status.
  - 7.4.5 RAM documents will be coded with acceptance codes by the WSDOT Transportation Technical Engineer. RAM codes for specific items are referenced in Appendix “C” of this Standard Practice.
  - 7.4.6 The WSDOT Transportation Technical Engineer will make an itemized list of review comments and action items and will place them at the front of the annual submittal document returned to the plant at the time of the initial plant approval meeting. If time allows, the Transportation Technical Engineer will work directly with representatives from the plant to address review comments prior to the initial plant approval meeting.
  - 7.4.7 The WSDOT Transportation Technical Engineer will schedule the initial plant approval meeting and will send the plant a letter and email notifying them of the date and time WSDOT will be at the plant for the initial plant approval meeting.

- 7.4.8 WSDOT will perform a formal audit of the plants facility, and operating and quality control procedures prior to the initial plant approval meeting. WSDOT will contact the plant and inform them of the date and time a WSDOT inspector will be at the plant for an inspection audit. The audit will follow the outline detailed in Appendix A.
- 7.4.9 WSDOT will provide the plant with an electronic version of the reviewed annual approval document within 30 days following completion of the initial plant approval meeting.

## 8. Initial Plant Approval Meeting

### 8.1 Scheduling

- 8.1.1 An initial plant approval meeting will be scheduled after WSDOT has completed its review of the plants initial submittal. The meeting will be held at the plants physical location. WSDOT will notify the plant of the date and time the meeting will be held.

### 8.2 Attendees

- 8.2.1 WSDOT attendees will include at a minimum, the WSDOT Transportation Technical Engineer and a supervising inspector from the Materials and Fabrication Inspection Office.
- 8.2.2 Attendees from the plant shall include at a minimum the plant manager, production manager, and quality control manager, or their respective representatives.

### 8.3 Meeting Agenda

- 8.3.1 The meeting agenda will focus on comments from WSDOT's review of the plants annual approval document submittal, and WSDOT's plant inspection audit completed prior to the meeting.
- 8.3.2 WSDOT will inform the plant of their approval status upon completion of the initial approval meeting. Any deficiencies that would prevent approval will be identified and discussed during the meeting.

## 9. Initial Plant Approval Status Notification

- 9.1 Within 30 days following the initial plant approval meeting, the WSDOT Transportation Technical Engineer will send the plant a letter informing the plant of their approval status and the period of effectiveness. Any deficiencies identified during the annual plant review and audit that would prevent annual approval will be identified in the letter.

## 10. Maintenance of Plant Approval Status After Initial Approval

- 10.1 Annual approval documents will remain in affect indefinitely as long as the document is maintained each calendar year.
- 10.2 The WSDOT Transportation Technical Engineer will send each plant a letter in October requesting a document identifying the plant has reviewed their annual approval document and identifies whether the plant approval documents remain unchanged, or details any anticipated revisions. The letter will also detail any changes to WSDOT's program that would affect the annual approval document. The document and any revisions ready for submittal shall be sent electronically to the WSDOT Transportation Technical Engineer no later than December 1<sup>st</sup>.
- 10.3 Revisions to mix designs will be processed through the QPL or reviewed during WSDOT project specific work activities. WSDOT will provide plants with a cost estimate for review of mix designs submitted through the QPL process. Costs associated with mix design reviews for project specific work activities will be based on the same process for review through the RAM process. Only mix designs reviewed by the WSDOT Headquarters Materials Laboratory will be added to the annual plant approval document.
- 10.4 Revisions submitted by the plant will be reviewed as detailed in Section 7.4.1 through 7.4.5.
- 10.5 The WSDOT Transportation Technical Engineer will review annual plant approval documents in December. Review comments will be provided to plants for their action by January 15<sup>th</sup>. Upon resolution of review comments, the WSDOT Transportation Technical Engineer will document revisions to the annual approval document and will maintain revision control by adding "Approved", "Approved as Noted", "Not Approved", or "Accepted" revisions to the document and providing plants with an electronic version of the plants complete approval document. WSDOT will provide a revision control document at the front of the annual approval document, which details the changes from the previous version.
- 10.6 Onsite inspection audits will be performed by WSDOT when the plant starts its first project each calendar year. Audits will not be performed by WSDOT until there is work taking place. If a calendar year passes without an active project, WSDOT will perform an inspection audit when WSDOT project specific work starts. The audit will follow the outline detailed in Appendix A.

## 11. Annual Maintenance Approval Status Notification

- 11.1 Upon successful completion of WSDOT's annual plant approval document review and onsite plant inspection audit as applicable, the WSDOT Transportation Technical Engineer will send the plant a letter informing the plant of their approval status and the period of effectiveness. Any deficiencies identified during the annual plant review that would prevent annual approval will be identified in the letter.

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## Appendix A Precast / Prestress Plant Inspection Audit

Plant: \_\_\_\_\_ Date: \_\_\_\_\_

Phone Number: \_\_\_\_\_ Contact Person: \_\_\_\_\_

Plant Reviewed by: \_\_\_\_\_

Review Results: Acceptable      Unacceptable

### Materials

#### Concrete Cylinders

Is cylinder fabrication and testing in accordance with WSDOT test methods?      Yes      No

Does cylinder storage comply with specifications?      Yes      No

Is cylinder capping acceptable?      Yes      No

Method of capping:      Sulphur      Rubber caps      Other \_\_\_\_\_

What types of molds are used?      Paper      Plastic      Steel      Securer

Is cylinder testing machine calibrated?      Yes      No

Comments: \_\_\_\_\_

#### Cement

Is cement from an approved source?      Yes      No

Are cement certifications available?      Yes      No

Is cement storage acceptable?      Yes      No

Comments: \_\_\_\_\_



**Aggregate**

Has aggregate source been approved by WSDOT? Yes No

Does plant use WSDOT grading? Yes No

Is aggregate sampled and tested prior to use? Yes No

Is aggregate storage acceptable? Yes No

Comments: \_\_\_\_\_

**Reinforcing Steel**

Are mill test certificates available? Yes No

Is fabrication acceptable? Yes No

Is storage acceptable? Yes No

Comments: \_\_\_\_\_

**Forms**

Are forms clean, straight and in good condition? Yes No

Are forms checked for dimensions prior to use? Yes No

Comments: \_\_\_\_\_

**Batch Plant**

Does batch plant meet the certification requirements of the WSDOT Std. Spec. Yes No

Date of scale calibration: \_\_\_\_\_

Comments: \_\_\_\_\_

### Fabrication

#### Set up

Is reinforcing steel placed per contract	Yes	No
Is steel tied according to specifications and held in place during concrete placement?	Yes	No
Is the plant aware tack welding is not permitted?	Yes	No
Is there a Plant QC hold point for inspection prior to setting forms?	Yes	No

Comments: \_\_\_\_\_

#### Concrete Placement

Is concrete delivered in a timely manner?	Yes	No
Is plant using approved concrete mix design?	Yes	No
Is required concrete testing being done?	Yes	No
Is there adequate equipment for concrete placement in forms?	Yes	No
Is concrete placed per specifications?	Yes	No

Comments: \_\_\_\_\_

#### Curing

Is temperature measuring equipment acceptable?	Yes	No
Is product protected during curing?	Yes	No
Are test cylinders cured under same conditions as product?	Yes	No

What type of curing system is used?

Radiant \_\_\_\_\_

Hot air \_\_\_\_\_

Convection \_\_\_\_\_

Conducted Steam \_\_\_\_\_

Other \_\_\_\_\_

Comments: \_\_\_\_\_

**Stripping Procedures**

Are concrete cylinders for verification of stripping strength representative of the product? Yes No

Is required stripping strength being verified with cylinder breaks prior to stripping? Yes No

Comments: \_\_\_\_\_

**Inspection**

Does plant inspection staff have a good understanding of their job responsibilities? Yes No

Does plant inspection staff have adequate Training? Yes No

Is plant inspection staff familiar with the WSDOT Annual Approval process and procedures? Yes No

Are approved shop drawings, plans, and calculations available? Yes No

Are quality control procedures being followed? Yes No

Are quality control reports being filled out Properly? Yes No

Has the plant quality control department verified product repairs, workmanship, and finish are acceptable? Yes No

Comments: \_\_\_\_\_

**Product Handling and Storage**

Are products handled and stored properly? Yes No

Comments: \_\_\_\_\_

## Overall Review Comments

## Review Attendees

Name	Job Description	Phone/Email

### Appendix B Manufacturers Name Precast Problem Resolution Request

Date: \_\_\_\_\_

Submitted To: \_\_\_\_\_

WSDOT Construction Engineer      Email: PrecastPRR@wsdot.wa.gov

Contractor \_\_\_\_\_

Fax: \_\_\_\_\_/Email: \_\_\_\_\_

WSDOT Contract No: \_\_\_\_\_

Project Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Submitted By (Contact Person): \_\_\_\_\_

Telephone No: \_\_\_\_\_ Fax No: \_\_\_\_\_

Email: \_\_\_\_\_

Priority:    High      Medium      Low

Request Response Time: \_\_\_\_\_

Description of Problem:

Proposed Resolution:

WSDOT Fabrication Inspector's Name and Signature:

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

## Appendix C RAM Acceptance Codes

Products	RAM Code
Concrete Ready Mix Batch Plant	8
Epoxy Coated Reinforcing Steel	2, 5, 6
Fabrication Facilities (Steel Embeds & Fabricating Rebar)	8
Prestress Strand	1, 2, 6
Reinforcing Steel	2, 6

### RAM Acceptance Action Codes

- 1) Acceptance based upon 'Satisfactory' Test Report for samples of materials to be incorporated into the project.
- 2) Mfg. Cert. of Compliance for 'Acceptance' prior to use of material.
- 3) Catalog Cuts for 'Acceptance' prior to use of material.
- 4) Not Listed (No relevance to annual submittal process)
- 5) Only Materials Tagged 'Approved for Shipment'
- 6) Submit Certificate of Materials Origin to Project Engineer Office.(Only for projects with "Buy America" requirement.
- 7) Not Listed (No relevance to annual submittal process)
- 8) Source Approved
- 9) Approval Withheld; submit samples for preliminary evaluation
- 10) Approval Withheld
- 11) Miscellaneous Acceptance Criteria