

Section 8.2

Volume I

QUALITY ASSURANCE PROGRAM OF INCIDENTAL PRECAST CONCRETE PRODUCTS

8.2.1 PURPOSE

This procedure provides guidance to Florida Department of Transportation (Department) personnel and their designees related to the implementation of the quality assurance (QA) programs for incidental precast concrete structures (Structures). The Structures may include, but are not limited to sound barriers, retaining wall systems, temporary traffic barriers, light pole foundations, sign foundations, pull junction boxes, and prestressed concrete poles.

8.2.2 AUTHORITY

Sections 20.23(4)(a) and 334.048(3), Florida Statutes

8.2.3 REFERENCES

Code of Federal Regulations (CFR), Federal-Aid Policy Guide (FAPG), Subchapter G – Engineering and Traffic Operations, Part 637 – Construction Inspection and Approval, Subpart B – Quality Assurance Procedures for Construction Sections

Standard Plans for Road and Bridge Construction, Topic No. 625-010-003, Florida Department of Transportation (FDOT)

Florida Department of Transportation Standard Specifications for Road and Bridge Construction

Materials Manual Volume II, Section 8.2 Incidental Precast Concrete Products, Florida Department of Transportation

Approved Products List (APL), Florida Department of Transportation

Materials Acceptance and Certification (MAC) System, Florida Department of Transportation

Materials Acceptance and Certification system (MAC) QC Program Maintenance User Manual

8.2.4 SCOPE

Primary offices affected by this procedure include the State Materials Office (SMO), District Materials and Research Offices (DMRO), District Construction

Offices (DCO), State Structures Design Office (SDO) and State Traffic Operations Office.

8.2.5 GENERAL INFORMATION

The Incidental Precast Concrete Structures Plants (Plants) produce, inspect, store, and ship Structures meeting the requirements of the **Specifications** and other **Contract Documents**. The DMRO verifies that manufactured Structures conform to the requirements of the **Contract Documents**. The DMRO accepts their Quality Control (QC) Plans and inspects the Plants prior to the commencement of production for Department projects.

8.2.6 DMRO RESPONSIBILITIES

8.2.6.1 Plant Qualification Review

The Plant submits the proposed QC Plan in compliance with **Materials Manual Section 5.6**. The (DMRO) makes arrangements for the Plant qualification review, including Plants that are submitting their first QC Plan as well as for Plants that have not produced for any Department projects for more than one year.

The DMRO forms the Plant qualification review team and performs the review. The qualification review team shall include the District and State Materials Offices precast/prestressed concrete representatives. The qualification review team may also include other personnel, including District structural materials engineers, District concrete production managers, District and State structures engineers, District and State traffic operations engineers, the verification inspectors, and representative(s) of the Federal Highway Administration (FHWA).

The qualification review team reviews the Plant's manufacturing process, QC testing, inspection, and documentation. The qualification review team may also review the Plant's records, forming, reinforcing steel placement, concrete placement operations, storage, and shipment of the products.

Upon the satisfactory Plant qualification reviews, the DMRO accepts (approves) the proposed QC Plan and documents the Plant's status in the Materials Acceptance and Certification system (MAC).

8.2.6.2 Maintenance of Plant QC Plan and Qualification

The Plant submits, in writing, any changes to QC Plan to the DMRO and annually submits the revised QC Plan or its addendum, if there are any changes.

Plants that are on the Department's **Production Facility Listing** will be subject to a Plant qualification review or routine verification inspection at any time. At a minimum, monthly verification inspections will be performed by DMRO personnel. If the qualification review team or verification inspectors find any

process which would result in products not meeting the **Specifications** or other **Contract Documents**, they shall immediately bring it to the attention of the Plant. The Plants with acceptable QC Plans and satisfactory qualification reviews are considered to be qualified Plants.

8.2.6.3 Routine Inspection and Materials Testing of Qualified Plants

The verification inspector performs monthly inspection. The DMRO shall make sure that the Plants perform all QC sampling and testing of **346 Specification** designated class of concrete in accordance with **FDOT Specifications Section 346**.

If the Plant has not produced for Department projects for three consecutive months, the verification inspection frequency will be reduced to once every three months until the Plant produces for Department projects again. In addition, sampling and testing of materials is waived during periods that the Plant is not producing for Department projects. The minimum verification, sampling, and testing frequencies shall revert back immediately after the Plant reinitiates production for Department projects.

8.2.6.4 Responsibilities of the Verification Inspector

Following are the general responsibilities of the verification inspector:

- A. At a minimum frequency of once per month, reviews the records for materials received at the Plant and/or incorporated into the fabrication of Structures, including the certified physical property reports.
- B. Verifies that the QC inspectors maintain the required certification documents.
- C. Randomly selects samples from at least one LOT of reinforcing steel, welded wire reinforcement (WWR), and prestressing strand every six months.
- D. Verifies that the Plant is complying with the Buy America requirements outlined in **Materials Manual Volume II, Section 8.2**.
- E. Samples other Structures material components, as needed.
- F. Checks the handling and storage for each material component of Structures.
- G. Visually checks the condition of steel reinforcement.
- H. Ensures that the Plant's QC manager and inspectors are performing inspections in compliance with the QC Plan.
- I. Performs random spot-checks of the finished Structures to ensure that they are fabricated in compliance with the requirements of the **Contract Documents**.
- J. Performs in-depth reviews of some phases of work, as needed.

- K. Advises the QC manager of any observed deficiency.
- L. Performs spot checks of the repair methods.
- M. Advises the QC manager of the acceptability status of QC test results.
- N. Documents the results of the inspections in MAC. Verification inspectors shall perform plant inspections in accordance with the QC Program (QCP) checklists in MAC. The results of the inspections shall be documented in MAC if the inspector has the access, otherwise verification inspectors shall document results of the QCP checklist inspections outside of the MAC system for each required inspection. Copies of the most current checklists can be accessed by anyone at <https://mac.fdot.gov> by clicking the Reports tab link and navigating to the Inspection/Evaluation Checklists under the Production Facility tab, choosing QCP under Checklist type, and selecting the appropriate Production Facility.

8.2.6.5 Sampling and Testing of Structure Material Components

A. Reinforcing Steel

Each LOT of reinforcing steel is accepted based on the certified mill analysis from the steel manufacturing plant and Department's verification samples. Select samples randomly from at least one LOT every six months.

A sample shall consist of three seven-foot long bars. Send one of the bars from each LOT to the SMO for testing. Properly identify and tag the remaining two bars as check samples for future testing in the event of a failure.

If the sample meets the requirements of the **Specifications**, accept the LOT. All reinforcing steel materials subsequent to the previous passing verification tests are considered acceptable.

If the sample fails to meet the requirements of the **Specifications**, send the remaining two check samples for testing. Reject the LOT of reinforcing steel if the results of any two samples of the same LOT fail.

B. Welded Wire Reinforcement (WWR)

Each LOT of WWR is accepted based on the certified mill analysis from the steel manufacturing plant and Department's verification samples. Select samples randomly from at least one LOT every six months.

A sample shall consist of three sections, three-foot by three-foot each. Send one of the sections from each LOT to the SMO for testing. Properly identify and tag the remaining two sections as check samples for future testing in the event of a failure.

If the sample meets the requirements of the **Specifications**, accept the LOT. All WWR materials subsequent to the previous passing verification tests are considered acceptable. If the sample fails to meet the

requirements of the **Specifications**, send the remaining two check samples for testing. Reject the LOT of WWR if the results of any two samples of the same LOT fail.

C. Prestressing Steel

Each LOT of prestressing steel is accepted based on the certified mill analysis from the steel manufacturing plant and Department's verification samples. Select samples randomly from at least one LOT every six months.

A sample shall consist of three five-foot long strands. Send one of the five-foot long strands from each LOT to the SMO for testing. Properly identify and tag the remaining two strands as check samples for future testing in the event of a failure.

If the sample meets the requirements of the **Specifications**, accept the LOT. All prestressing steel materials subsequent to the previous passing verification tests are considered acceptable.

If the sample fails to meet the requirements of the **Specifications**, send the remaining two check samples for testing. Reject the LOT of prestressing steel if the results of any two samples of the same LOT fail.

D. Fiber Reinforced Polymer (FRP) Reinforcement

FRP reinforcing bars are obtained from producers on the Department's **Fiber Reinforced Polymer Production Facility Listing**. FRP reinforcing from each producer is accepted based on the requirements of **FDOT Specifications Section 932**.

8.2.6.6 Inspection and Testing Prior to and During Structures Manufacturing Process

The verification inspector performs the following inspections, prior to and during concrete placement:

- A. Reviews the **Plans, Standard Plans**, shop drawings, **Specifications**, and performs a random review of the Plant's fabrication methods, procedures, workmanship, and quality control inspection records.
- B. Checks the Plant's basis for acceptance of miscellaneous Structures materials.
- C. Performs a random review and visual inspections of all other major phases of work, such as formwork, and reinforcing steel placement.
- D. Inspects delivery, placement, and consolidation process of concrete.
- E. Inspects finishing and curing process of concrete.
- F. Inspects the storage of materials that will be used for the manufacturing of Structures.

G. Documents the results of the inspections in MAC.

8.2.6.7 Post-Manufacturing Inspection of Structures

The verification inspector performs the following during the inspection of stored Structures at the Plant:

- A. Verifies the QC testing and inspection records of manufactured Structures.
- B. Inspects any finished manufactured Structures, including the products that are stored in the Plant's area designated for storage of Department's products.
- C. Visually inspects the manufactured Structures and randomly selects at least one of the stamped LOTs to determine if the Structures are free from deficiencies. Checks the dimensions of the Structures to verify they meet the specified dimensional tolerances.
- D. Performs visual inspection of all stored manufactured Structures and measure the dimensions of at least 5% of the randomly selected Structures in the LOT.
- E. Advises the QC manager to reject any Structure that does not fully comply with the requirements of the **Specifications** or other **Contract Documents**.
- F. Advises the Plant to remove the acceptance stamps from rejected Structures.
- G. Visually inspects the repaired Structures and repair methods.
- H. After each inspection, the verification inspector provides a list of deficiencies and discusses them with the Plant's QC manager.
- I. Documents the results of the inspections in MAC.

8.2.6.8 Acceptance Status of QC Test Results

The verification inspector performs monthly inspection. The verification inspector may observe QC sampling and testing or perform tests to verify the QC testing. Perform verification tests in accordance with **FDOT Specifications Section 346**. In case of observation, the verification inspector will visually inspect the testing procedures and results to ensure they are in compliance with specifications.

8.2.6.9 Close-out Meeting and Documentation

Following are the responsibilities of the verification inspector upon completion of each inspection:

- A. Meets with the QC manager at the completion of each inspection. During the meetings, the verification inspector discusses deficiencies found during the inspections.

- B. Maintains the documentation of the inspection activities, as well as key discussions with the Plant personnel.
- C. Maintains a record of the verification testing and disposition of all material samples taken for testing.
- D. For each component, the verification inspector assures that the QC manager maintains documents indicating compliance with requirements of the QC Plan.
- E. Documents deficiencies that have caused the suspension of the Plant's QC Plan and maintains documentation of the Plant's corrective actions.
- F. Documents the results of the inspections in MAC.

8.2.6.10 Independent Assurance (IA) Inspection and Testing

IA sampling and testing are performed in accordance with *Materials Manual Section 5.5*.

8.2.6.11 Independent Verification (IV)

The Department may perform IV at any time by sampling and testing any Structure or its material ingredients. This is a checking function outside of the verification program.

8.2.6.12 Process Reviews

The SMO will perform annual process reviews in each District and generate a report. The intent of the process reviews is to ensure consistency in procedures and policy enforcement across the state. The review includes the verification of *Materials Manual Volume I, MAC QC Program Maintenance User Manual*, and any other relevant document requirements. DMRO will respond to any action items outlined in the report within the specified time frame.

8.2.7 SMO RESPONSIBILITIES

Following are responsibilities of the SMO:

- A. Provides precast/prestressed concrete materials technical support for the DMRO and Construction personnel.
- B. Serves as a member of the Plant qualification review team.
- C. Performs process reviews with DMRO precast concrete personnel and generates a report.
- D. Provides information regarding specification changes and inspection procedures to the DMRO.
- E. Coordinates with the Plant, DMRO, and Construction Personnel to discuss any repeated deficiencies of the manufactured Structures.

- F. Reviews the proposed training and qualification programs and issues the accreditation letters to the qualified providers.
- G. Maintains the list of the accredited precast/prestressed concrete courses.
- H. May accompany DMRO personnel during monthly Plant inspections, and Independent Verifications.

8.2.8 STATE STRUCTURES DESIGN OFFICE RESPONSIBILITIES

The State Structures Design Office approves any changes to the standard structural drawings.

8.2.9 DISTRICT CONSTRUCTION OFFICE RESPONSIBILITIES

Project personnel accept only Structures that are properly marked by the Plant's approved QC stamp. Project personnel do not accept any Structure that has been severely damaged during delivery or unloading.

The personnel at the project site shall make sure that a legible QC stamp is affixed to each Structure that is received at the job site.

Ensure that at the beginning of each project, the Plant provides a notarized statement to the project administrator (PA) from a responsible company designated representative certifying that the Plant will manufacture the products in accordance with the requirements set forth in the **Contract Documents** and the Plant's approved QC Plan. The sample certification statement may be viewed at the SMO web site.

Ensure that each delivery ticket of the shipped products includes the Financial Project Number, manufactured date, and serial number of each product.

8.2.10 Training

8.2.10.1 General

Ensure that the Plant's QC personnel and Department inspectors who are involved in the inspection and testing of the Structures have the required qualifications as specified in **FDOT Specifications Section 105**.

Ensure the Plant's QC Plan include a copy of the certificates of their qualified QC personnel.

8.2.10.2 Department Verification Inspectors of Incidental Precast Concrete Structures

The Department Inspectors who are involved in the testing and inspection of Incidental precast/prestressed concrete structures shall be Level II Quality Control Inspectors.

8.2.11 Forms

None needed.