Section 8.2
Volume II

MANUFACTURED INCIDENTAL PRECAST CONCRETE PRODUCTS

8.2.1 PURPOSE

The procedure provides guidance for the development and implementation of the inspection and testingQuality Control (QC) Pprograms for the manufacture, storage, and transportation of the iIncidental pPrecast cConcrete pProducts (Products) for Florida Department of Transportation (Department) projects. Incidental precast concrete The Pproducts may include, but are not limited to sound barriers, retaining wall systems, temporary traffic barriers, light pole foundations, sign foundations, pull and junction boxes. Incidental precast products also include prestressed concrete closed-circuit television (CCTV) poles, and prestressed concrete light poles.

8.2.2 AUTHORITY

334.044(2), 334.044(10)(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)

American Society for Testing and Materials (ASTM) Standard Test Methods and Specifications, Philadelphia, Pennsylvania

American Association of State Highway and Transportation Officials (AASHTO), Part I Specifications, and Part II Tests, Washington, D.C

Florida Department of Transportation Specifications for Road and Bridge Construction

Approved Product List (APL), Florida Department of Transportation
Field Sampling and Testing Manual, Florida Department of Transportation

8.2.4 SCOPE

This procedure is used by the Incidental Precast Concrete Structures Products Plants (Plants). These requirements and activities pertain to the inspections,

measurements, and necessary tests to substantiate materials and ~~Structures~~ Products in conformity with the ***Specifications*** and ***Contract Documents***. The Plant's ~~quality control~~QC Pplan ~~(QCP)~~ is designed to provide guidelines that are used to produce ~~Structures~~ Products in conformance to the ***Specifications*** and project ***Plans***.

8.2.5 GENERAL INFORMATION

The Plants are responsible for production, inspection, storage, and shipment of the ~~Structures~~Products. ~~-~~ The delivered ~~Structures~~ Products to the project site shall meet the requirements of the ***Specifications***, ***Plans***, and other ***Contract Documents***.

8.2.6 PLANT QUALIFICATION PROCESS

8.2.6.1 General

Prepare the Plant's proposed QC Plan in accordance with ***FDOT Specifications Section 105*** ~~and ***Materials Manual Section 5.6***~~. Submit the proposed QC Plan to the District Materials and Research Office (DMRO) for the District in which the Plant is located. For out-of-state Plants, submit the proposed QC Plan to the nearest DMRO. Upon the Plant's submittal of a QC Plan, the DMRO will review the proposed QC Plan and make ~~necessary~~ arrangements for the ~~initial~~ Plant qualification review in accordance with ***Materials Manual*** ~~Section~~ 8.2.6.3~~4~~.

~~**Plant Certification**~~

~~Plant certification from an approved agency, as referenced in ***Materials Manual Section 8.5 Volume I***, is not required.~~

8.2.6.2 Review of Plant's Proposed QCP

In the QC Plan, include the work experience, qualifications, and responsibilities of the Plant's production and QC personnel. Identify the on-site production manager, Plant general manager, QC inspectors/technicians, and QC manager. Identify the key quality attributes in the QC Plan. Identify the responsibilities for monitoring key quality attributes and QC data. Include the applicable information required in ***FDOT Specifications Sections 105, 400, 450, 521, 534, 548, 641, 700, 715***, the ***~~Design~~ Standard Plans~~s~~*** and other ***Contract Documents***. ~~-~~ Include a management statement of dedication to quality. Include any available proposed repair methods for minor deficiencies as part of the QC Plan.

The DMRO ensures that the names and qualifications of the Plant's QC personnel are included in the QC Plan and their qualifications meet the requirements of ***FDOT Specification~~s~~ 105***.

A copy of the Plant's proposed repair methods of the structural deficiencies shall be included as part of the QC Plan.

When requested by the Department i~~I~~nspectors, Precast/Prestressed Concrete Institute (PCI) or National Precast Concrete Association (NPCA) certified Plants are required to produce the two most recent PCI or NPCA inspection reports, and the responses/corrections taken by the producer, if applicable.

~~In addition,~~Ensure that the Plant's QC Plan ~~shall~~ includes the~~ir~~ method of compliance with Buy America provisions including:

A. Methods for tracking the placement of all quantities of non-domestic steel and iron.
B. Methods and locations for segregating non-domestic and domestic steel and iron stockpiles.
C. Methods for identifying and cataloging finished products containing non-domestic steel and iron.
D. An example delivery ticket with Buy America compliance statement and dollar amount of non-domestic steel and iron used in the finished products for each delivery.

8.2.6.3 Plant Qualification Review

The Department will perform the ~~initial Plant~~ qualification reviews of the ~~production facilities~~Plants. A~~n initial~~ qualification review includes an in-depth inspection by the Department of a Plant that submits its first QC Plan and Plants that have not produced ~~Structures~~ for the Department projects for more than a year.

Upon the approval of the Plant's QC Plan, the Department will also perform routine, at least monthly, verification inspections, and Plant qualification reviews, at least annually, on all Plants that have continued to furnish ~~Structures~~ Products for the Department projects.

~~If the Plant has not produced any FDOT products for three consecutive months, the verification inspection frequency will be reduced to once every three months until the Plant produces for FDOT projects again. The frequency shall revert back to once per month immediately after the Plant reinitiates production. The QC Manager is responsible to inform the DMRO when the Plant resumes FDOT production.~~

8.2.6.4 Maintenance of Plant Qualifications

Upon the Department's satisfactory review of the proposed QC Plan, in compliance with ***Materials Manual Volume I, Section 5.6***, and a satisfactory Plant qualification review, the DMRO will accept the proposed QC Plan and include the Plant on the Department's ***Production Facility Listing***. Immediately notify the DMRO in writing of any changes to the QC Plan. In case of change(s), revise the QC Plan annually in the form of addenda or complete revision of the entire document. Submit the revised QC Plan or its addenda to the DMRO annually.

Plants that are currently on the Department's ***Production Facility Listing*** will be subject to the Plant qualification review ~~process~~ or routine verification inspection at any time. ~~The Plant qualification review team will perform at least one annual in-depth review of the Plant that is producing for the Department projects.~~ At a minimum, monthly verification inspections will be performed by DMRO personnel. The Plants with an acceptable QC Plan, a satisfactory Department qualification review, and continued satisfactory verification inspections are qualified Plants.

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. The frequency will revert back to once per month immediately after the Plant reinitiates production. The QC manager is responsible to inform the DMRO when the Plant resumes production for Department projects.

8.2.6.5 ~~Department Inspection Access~~Photographs and Videos

~~Florida~~ Allow Department ~~of Transportation~~ representatives ~~shall be allowed~~ to take photographs of disputed infractions occurring within the manufacture of products designated for ~~FDOT~~ Department use. Photographs and videos will be taken for documentation and timely resolution of possible concerns observed and disputed by the facility during ~~official~~ Department Plant inspections.

In the event that ~~FDOT~~ Department inspectors observe a product or action that they feel is in violation of ~~the~~ a ~~***FDOT Standard***~~ ***Specifications***, ***Materials Manual*** or QC Plan requirement and before a picture is taken, the ~~FDOT~~ Department representative must attempt to notify the Plant's QC personnel of the existence of any infraction~~'~~s. ~~existence before a picture is taken.~~ No ~~picture~~ photograph or video will be taken if the infraction is immediately resolved to comply with the ~~***FDOT***~~ ***Specification*** in question.

If Plant personnel cannot be contacted or cannot respond in a timely manner that would otherwise result in a loss of photographic evidence, then a photograph or video may be taken of the specific infraction.

The Plant's QC personnel may dispute the existence of the infraction, in such case the ~~FDOT~~ Department representative may photograph the questionable infraction. The Plant will be allowed to review and comment on all photographs~~s~~, videos, and documentation within 48 hours of their receipt by hand delivery or email~~s~~.

The Department will coordinate with the ~~producers~~ Plant in advance to make arrangements for photographs and videos that will be taken for educational and/or technical publications.

8.2.7 FUNCTION OF RESPONSIBILITIES OF INCIDENTAL PRECAST CONCRETE PLANTS

8.2.7.1 General

The Plants are responsible for the quality of the finished Structures. Provide facilities and qualified QC personnel to perform specified tests and maintain an acceptable quality control program in compliance with the requirements specified herein and the ***Specifications***.

8.2.7.2 Quality Control Manager

The QC m~~M~~anager ~~shall~~ is responsible to ensure that the quality of the products at each Plant meets the quality requirements of the ***Specifications*** and other ***Contract Documents***. The responsibilities of the QC m~~M~~anager include, but are not limited to the following:

A. Maintains the QC approval stamp and applies it to acceptable ~~Structures~~ Products or designates a technician who is working under the direct supervision of the QC manager to apply the Plant approval stamp. The Plant approval stamp mark shall be legible and applied to each ~~Structure~~ Product before its shipment to the project site. The QC stamp shall include the Department's assigned Incidental Precast Concrete (IPC) plant number.

B. Be present at all times during the production of the ~~Structures~~ Products that will be shipped to Department projects. During the temporary absence of the QC m~~M~~anager, a delegate meeting the same qualification requirements and identified in the QC Plan, may perform the QC manager~~M~~ duties.

C. Performs and/or supervises the QC testing and inspection.

D. Ensures that the Plant has a sufficient number of QC technician(s)/i~~I~~nspector(s) to maintain adequate inspection and testing during the production of ~~Structures~~ Products for Department projects. ~~-~~ In lieu of a permanent staff, the Plant may retain the services of an engineering consulting firm or qualified laboratory meeting the

requirements of ***FDOT Specifications Section 105*** ~~and QC personnel qualification of this Section~~.

E. Ensures that testing equipment is properly maintained in accordance with the applicable test methods and ***Specifications***. Makes readily available, the current certification on testing equipment that is requiring calibration.

F. Visually inspects or ensures that a qualified QC technician inspects each ~~Structure~~ Product before shipping to the project site.

G. Ensures that all materials used to manufacture ~~Structures~~ Products are from a Department approved source.

H. Maintains a daily production log of the manufactured ~~Structures~~Products.

~~I.~~ Ensures that all ~~Structures~~ Products are properly stored and marked indelibly with Plant name, assigned plant number, Department project, date of manufacture, and any additional information required by the ***Specifications*** and ***Contract Documents***.

~~J.~~I.

~~K.~~J. Maintains the QC files of material certifications, test data, and inspection results.

~~L.~~K. Arranges monthly meetings with the Department's v~~V~~erification i~~I~~nspector and representatives of the Plant's production personnel when the Plant is producing for ~~FDOT~~ Department projects or according to the reduced frequency schedules to discuss any deficiencies and QC issues.

When the Plant's assigned QC manager discontinues his/her work without advanced notice, the Plant is required to ~~shall~~ notify the D~~istrict~~ MR~~aterials~~ O~~ffice~~ within two-working days and employ reasonable efforts to seek a replacement. During such efforts to seek a replacement, the Plant engineer, technician, or other knowledgeable person designated in the Plant's QC Plan may perform the duties of the QC manager for a period established by the District Materials and Research Engineer (DMRE). ~~-~~This is based on efforts employed by the Plant to seek a qualified replacement and/or by training another person leading up to the next available Department accredited training/certification programs.

8.2.7.3 Quality Control Technicians/Inspectors

The QC inspector may perform any or all of the inspections, sampling, or testing as directed by the QC manager and may stamp the Plant's approved structures, when directed by the QC manager.~~-~~ QC inspectors who perform sampling and testing of plastic concrete shall meet the requirements ***of FDOT~~the~~ Specifications Section 105***.

8.2.7.3.1 Level I Quality Control Inspector

Level I QC inspectors perform routine inspection and testing of incidental precast concrete products, including but not limited to: materials, pre-pour forms, reinforcing steel/fiber placement, concrete placement, curing, and post-placement inspections of finished products. The QC inspectors ~~shall~~ must demonstrate sufficient knowledge of the Plant's QC functions to perform their job responsibilities as defined in the QC Plan, including but not limited to shop drawings, ~~***FDOT***~~ ***Specifications***, ***Standard Plans***, and test methods.

8.2.7.3.2 Level II Quality Control Inspector

In addition to the responsibilities of level I QC inspectors, level II QC inspectors may be involved in the design and verification of concrete mixes, and may evaluate the plant's repair methods and their implementation. Level II inspectors ~~shall~~ must demonstrate understanding of all aspects of the plant's QC functions as defined in the QC Plan, including but not limited to the shop drawings, ~~***FDOT***~~ ***Specifications***, ***Standard Plans***, and test methods.

8.2.7.4 Quality Control of Certified Materials

8.2.7.4.1 General

Ensure that all materials used to manufacture ~~Structures~~ Products are from Department approved sources and comply with requirements as specified herein.

8.2.7.4.2 Reinforcing Steel, Welded Wire Reinforcement and Prestressing Steel

The QC inspectors ~~shall~~ must obtain steel manufacturers' certifications for all ~~welded wire reinforcement~~, reinforcing steel, welded wire reinforcement (WWR), and prestressing steel that are used for the manufacture of ~~Structures~~Products. ~~-~~These certifications shall indicate compliance with the appropriate ASTM or AASHTO standards for wire, wire reinforcement, and for steel bars. The Department v~~V~~erification i~~I~~nspectors will obtain samples of reinforcing steel, ~~welded wire reinforcement~~WWR and prestressing steel ~~twice per year~~from at least one LOT every six months. ~~-~~Reinforcing steel and welded wire reinforcement shall meet the requirements ***of FDOT*** ~~the~~ ***Specifications Section 415***. Prestressing steel shall meet the requirements ***of FDOT*** ~~the~~ ***Specifications Section 450***.

8.2.7.4.2.1 Source of Supply-Steel

~~Incidental Precast Concrete Product producers~~Plants, prior to the use of non-domestic steel or iron materials on a project, must follow the following process:

A. D~~Shall d~~escribe in the QC Plan the method of compliance with the Buy America provisions according to 8.2.6.2~~3~~.

B. After obtaining approval of the QC Plan, and at the beginning of each project, provide a notarized certification on the Producer's letterhead to the Engineer stating that the incidental precast concrete products will be manufactured in accordance with the requirements set forth in the ***FDOT Contract Documents***, the plant's ~~approved~~ accepted QC Plan, and ***Section 6*** (Source of Supply–Steel) of the ***FDOT Standard Specifications***.

C. Implement an accountable system that tracks the monetary value of non-domestic steel or iron used in each product.

D. In the event of Contract modifications in which the use of non-domestic steel or iron is increased, obtain prior authorization from the Engineer.

E. Each delivery ticket must include the dollar amount of non-domestic steel or iron incorporated in the delivered incidental precast products, as well as a compliance statement with Buy America provisions.

F. The stockpile of non-domestic steel or iron shall be identified and segregated from the domestic steel or iron.

G. The stockpile of product which has non-domestic steel or iron shall be identified and segregated from products containing domestic steel or iron.

The DMRO will be responsible for performing audits to verify the Producer's compliance with the Buy America provisions.

8.2.7.4.3 Fiber Reinforced Polymer (FRP) Reinforcing Bar and Prestressing Strand

FRP reinforcing bars and prestressing strand are obtained from producers on the Department's ***Fiber Reinforced Polymer Production Facility Listing***. The QC inspector must obtain the FRP manufacturers' Certificate of Analysis (COA) for each LOT of FRP reinforcing bars and prestressing strand that are used for the manufacture of Products. Each COA shall indicate compliance with ***FDOT Specifications Section 932*** and ***933,*** as appropriate, for FRP bars and prestressing strand. The Department verification inspectors will obtain samples of FRP reinforcing bars and prestressing strand for testing in accordance with ***FDOT Specifications Section 932*** and ***933***, as appropriate.

8.2.7.4.4 Patching Materials

All patching compounds shall comply with the applicable ***Specifications*** and ***Contract Documents***. Pre-mixed packaged compounds may be used, when listed on the current APL. Patch material shall be mixed, applied, and cured in accordance with the manufacturer's recommendations. Cosmetic defects may be repaired in accordance with ***FDOT Specifications Section 450***, if approved by D~~istrict~~ M~~aterials~~ RO~~ffice~~ and is included in the Plant's QC Plan.

8.2.7.5 Calibration of Equipment

Calibration and verification of stressing jacks shall be in accordance with the ***FDOT Specifications Section 450***.

Check or calibrate all QC testing equipment such as the compressive strength testing machines, portable weighing scales, air meters, density buckets, and temperature recording devices for compliance with the applicable ASTM Test Methods and Specifications, ~~;~~ and ~~***Section 9.2***~~ ***Materials Manual Volume I, Section 9.2***.

8.2.7.6 Quality Control of ~~Structure~~ Product Manufacturing

The following are QC inspections and testing, related to operations prior to, during, and after concrete placement.

8.2.7.6.1 Concrete

Unless otherwise shown in the ***Plans*** or required by the ***Specifications***, the concrete produced for the manufacture of ~~project~~ ~~Structures~~ Products shall comply with the requirements specified in ***FDOT*** ~~the~~ ***Specifications Section 346***. When the ***Specifications*** or drawings reference a class of concrete (Example: Class IV), the concrete shall meet all of the requirements for ***FDOT Specifications Section 346*** and ***Materials Manual Volume II, Section 9.2*** ~~***Volume II***~~. In accordance with ***FDOT Specifications Section 346***, each day's concrete production is comprised of one or more LOTs.

8.2.7.6.2 Reinforcing Bar and Prestressing Strand~~eel~~

All r~~R~~einforcing bar~~Steel~~ shall be stored according to ***FDOT Specifications Section 415***. Prestressing strand~~eel~~ shall be stored in accordance with ***FDOT Specifications Section 450***. FRP reinforcement shall also be stored in accordance with the manufacturer's instructions.

8.2.7.6.3 Concrete Forms

Provide c~~C~~oncrete forms made of wood, metal, or other materials meeting the requirements of this Section and ***FDOT Specifications Section 400***.

Forms used in the manufacture of ~~structures~~ Products shall be sufficiently rigid and accurate to maintain the ~~structures~~ Product's designed dimensions and avoid irregularities in the ~~structure~~ Product surface. ~~–~~ Forms not meeting governing document requirements shall be repaired or removed from service.

Ensure that the condition of all forms ~~be~~ are of a quality to produce acceptable ~~Structures~~ Products within the dimensional tolerances. The QC inspector ~~shall~~ must check cleanliness of the forms prior to each use. Check the form dimensions prior to its first use and at least annually for dimensional conformance.

8.2.7.6.3.1 Aluminum Concrete Forms

The Plant shall take the following actions when using aluminum forms for the first time:

A. In the QC Plan include information regarding the application of the protective barrier to minimize the natural reactivity between aluminum and fresh concrete. Also, include the name of the form release agent that will be used.

B. Prior its first use, perform the field demonstration of the proposed aluminum forms by casting a full~~-~~ scale mockup of the precast concrete product. Demonstrate that the use of aluminum form will not cause any adverse effect in the quality of the concrete products.

C. Ensure that after stripping of the forms, the product does not show any sign of bug hole, stain, spall, surface void, and streak in concrete.

D. Ensure that the forms do not show any sign of concrete buildup and sticking on their surfaces and panel edges.

8.2.7.6.4 Reinforcing Bar~~ing~~ and Prestressing ~~Steel~~ Strand Placement

Reinforcing bar and prestressing steel placement shall meet the requirements of ***FDOT Specifications Sections 415*** and ***450, respectively***. Adhere to the additional manufacturer's instructions when placing FRP prestresssing strand. ~~QC personnel shall~~Prior to concrete placement, check the fabrication, positioning, and minimum cover requirements of steel reinforcement and prestressing steel on all manufactured ~~Structures~~Products. QC personnel ~~shall~~ must verify that the steel reinforcement meets the ***Specification*** requirements. ~~The~~ Check the minimum steel area requirements for ~~Structures~~ Products~~shall be checked~~ according to the applicable ***Specifications***, ~~***Design Standard***~~ ***Plans~~s~~***, AASHTO requirements, ASTM requirements, or approved drawings.

8.2.7.6.5 Non-metallic Rebar-Fasteners

8.2.7.6.5.1 General

As an alternative to wire ties, non-metallic rebar fasteners may be used to fasten two reinforcing steel or non-metallic bars of the same or different sizes placed at 90 degrees to each other. The sizes of reinforcing bars vary from #3 to #6 bars. The use of non-metallic rebar fasteners, utilizing a four-point connection, is limited to the fastening of reinforcing bars of precast concrete drainage structures and incidental precast concrete products where no weight other than the weight of concrete is loaded onto the reinforcement.

8.2.7.6.5.2 Properties

The non-metallic rebar fasteners must be able to withstand the stresses due to fastening of steel bars, the handling of the reinforcing steel cages, and

concrete placement operations without permanent deformation, slippage or breakage within a working temperature range of 20 to 150°F. The fasteners shall not exceed the maximum allowable water absorption criteria of 0.5% at 7 days, tested in accordance with ***ASTM D570***.

8.2.7.6.5.3 Approval Process

1. Plants or manufacturers of the fasteners will send a request to demonstrate their use to the appropriate DMRO.
2. Once the request is approved by the DMRO, cast a mock-up of the product intended to be fabricated with the fasteners in lieu of wire ties.
3. Place and position the reinforcement per plan.
4. Use the non-metallic rebar fasteners to fasten the bars at their intersections to ensure no movement of the bars occurs during the placement of concrete. Record the locations of the bars within the element and the intersections of those bars to be able to verify if any movement of the bars has occurred after casting the concrete.
5. Place the concrete in the form, providing the greatest free fall possible given the producers equipment and placement methods. Consolidate, finish, and cure the concrete.
6. Allow time for at least 80% of the design strength to develop. Cast and test cylinders to verify strength has been met.
7. Demonstrate that the bars have not moved from their original location prior to the concrete placement by saw cutting the element and verifying that the rebar intersections are still held held in place by the fasteners, and the concrete cover is not compromised.
8. If the bars have not separated or pulled away from the non-metallic rebar fasteners and the bars are still at their original location, then the fasteners are considered to have served their intended purpose and the fasteners will be approved for use.

Plants must also include guidelines in their QC Plan regarding the protection and use of the fasteners. It is expected that the manufacturers of the non-metallic rebar fasteners provide potential users with sufficient information on the design and installation requirements of their fasteners to ensure proper performance. The guidelines shall also include processes to ensure that the fasteners are held securely enough so that they do not displace or deflect the reinforcing steel or interfere with smooth flow of concrete during placement and consolidation.

Plants using the non-metallic rebar fasteners must obtain manufacturer's certification with each shipment.

8.2.7.6.58.2.7.6.6 Concrete Placement Operation

The placement method shall assure dense and consistent material meeting performance requirements and meet the requirements of ***FDOT Specifications Section 400***. Include placement methods as part of the QC Plan.

8.2.7.6.68.2.7.6.7 Concrete Curing

Cure Structures Products in accordance with the applicable curing methods in ***FDOT Specifications Sections 400 or 450, respectively***. Include curing methods as part of the QC Plan.

8.2.8 QC TESTING AND INSPECTION OF STRUCTURES

8.2.8.1 General

Perform QC inspections and tests at frequencies specified herein along with ***FDOT Specifications Section 346***.

8.2.8.2 Acceptance of Structures

Each LOT of Structures Products is accepted when:

A. The test results and inspections meet the requirements as specified herein and in the applicable ***Specifications***.
B. The Plant has completed all patching and repair work.
C. The QC mManager or his/her designated inspector/technician has stamped the StructuresProducts.
D. The list of the Structures Products is included with each shipment of the products to the project site.

8.2.8.3 Appearance and Inspection of Final Finished Structures

The QC mManager or his/her designated QC inspector performs final inspections of all finished StructuresProducts, before the application of the QC approval stamp, to ensure that the Structures Products are free from deficiencies, and meet the specified dimensional tolerances. Structures Products may be repaired if necessitated by occasional imperfections in the manufacture or damage during handling, and will be considered acceptable if the repairs are sound and properly finished to conform to the dimensional tolerances of the ***Specifications***. Submit the proposed repair method for Department review and approval. Use the repair material from the Department's ***APL*** unless otherwise allowed by the ***Specifications***. Include all Department approved material and methods as part of the Plant's QC Plan. Dimensional tolerances shall comply with the applicable ***Specifications*** and ***Design Standard Plans***.

The QC inspectors ~~shall~~ must perform visual inspection of all finished ~~Structures~~Products, measure the dimensions of at least 20% of the randomly selected units in each LOT, and maintain a record of the inspections, including the deficiencies. Minor deficiencies may be repaired in accordance with the repair methods included as part of the QC Plan. The repair of major damage to a ~~Structure~~ Product requires engineering evaluation meeting the requirements of ***FDOT Specifications Section 450***. The Plant ~~shall~~ must determine the cause of the repetitive nonconformance and develop a corrective action plan. Submit the revised QC Plan to address the type of deficiencies and corrective action taken to prevent or minimize the deficiencies.

8.2.8.4 Repair of Precast Concrete Structures

The Plant's QC manager ~~shall~~ must examine and determine the magnitude of the deficiency. The QC manager may authorize the immediate repair of minor deficiencies in accordance with the repair method that is included as part of the QC Plan. ~~—~~Perform the repair work under the observation of the QC manager or under the observation of personnel working under his/her direct supervision. The Plant's QC personnel ~~shall~~ must document the type of deficiency and the repair method.~~–~~ Major repairs shall be processed in accordance with ***FDOT Specifications Section 450***.

8.2.8.5 Handling and Storage

~~Structures~~ Products shall be handled and stored to prevent damage. The QC inspectors ~~shall~~ must inspect the Product handling operations and appropriate practices that will prevent damage. The QC inspectors ~~shall~~ must monitor ~~Structures~~ Products in storage to ensure that they are stored in the correct stack and are not being damaged by point loading or stacking. Describe the method of storing ~~Structures~~ Products in the QC Plan. Rejected ~~Structures~~ Products shall not be stored in the same area with the acceptable ~~Structures~~Products. Rejected Products shall be culled and marked as rejected.

8.2.8.6 Stamping

The Plant's QC manager or his/her designee ~~shall~~ must affix the Plant's QC stamp to each ~~Structure~~Product, indicating that the manufactured ~~Structure~~ Product meets the requirements of the ***Specifications***, ~~and~~ ***Contract Documents*** and Plant's QC Plan.~~–~~ The QC stamp shall include the ~~plant's~~ Department assigned Incidental Precast Concrete (IPC) number.~~–~~ The stamp configuration shall be included in the QC Plan. The QC stamp shall be clearly applied using waterproof paint or indelible ink.

In the QC Plan include a statement that the Plant's QC stamp will be applied only on the products that are manufactured for Department projects or any other projects that require Department verification inspection.

8.2.8.7 Shipment

Ensure that at the beginning of each project, the Plant provides a notarized statement to the pProject aAdministrator (PA) from a responsible company representative certifying that the Plant will manufacture the products in accordance with the requirements set forth in the ***Contract Documents*** and Plant's approved QC Plan. The QC manager's stamp on each product indicates certification that the product was fabricated in conformance with the Producer's QC Plan, ***Specifications*** and ***Contract Documents***. Ensure that each shipment of precast concrete products to the project site is accompanied with a signed or stamped delivery ticket providing the description and the list of the products.

Each delivery ticket shall include the list of products being shipped, be on the Plant's letterhead and include as a minimum the following information:

A. Project identification number.
B. Date shipped.
C. Cast date.
D. Type of structureProducts.
E. Quantity of structuresProducts.
F. Serial number
F.G. Buy America compliance statement and dollar amount of non-domestic steel and iron used in the finished products for each delivery.

The QC manager or QC personnel working under the direct supervision of the QC manager shall stamp each Structure Product prior to its shipment to the project site. The Plant shall address the shipping policy as part of the QC Plan.

8.2.8.8 Documentation

The QC mManager shall maintain documentation files in each Plant. Documentation shall include the following items, as a minimum:

A. Copy of the approved QC Plan and amendments.
B. Approved shop drawings (if applicable).
C. Applicable ASTM and AASHTO Standards.
D. Applicable ***FDOT Specifications*** and ***Standards Plans***.
E. QC personnel training and qualification records.

F. Materials certification records for reinforcing steel, welded wire reinforcement, prestressing steel or any other materials that are used in the manufacturing of the ~~structures~~Products.

G. Concrete m~~M~~ix designs.

H. E~~Applicable e~~quipment calibration/verifications, including stressing jacks, concrete compression testing machine, laboratory scales and plastic concrete test equipment.

I. Identification number and type of ~~Structures~~Products.

J. Applicable test data.

K. Disposition of all manufactured ~~Structures~~Products.

L. Record of the delivery tickets of each shipment of the products to the job site.

M. Inspections of forms, reinforcement, concrete placement, vibration, finishing and curing (Pre-pour inspection).

N. Inspection of structures after concrete placement (Post-pour inspection).

~~O.~~ Record of all structural deficiencies found as a result of QC inspection and testing or v~~V~~erification inspection and testing and the corrective action taken. A copy of the deficiency reports shall also be maintained in the Plant's permanent file.

~~P.~~O.

~~Q.~~P. Record of minutes from monthly meetings with Verification inspector and representatives from the Plant's QC and Production personnel.

8.2.9 TRAINING

8.2.9.1 General

The Plant's QC personnel who are involved in the inspection and testing of i~~I~~ncidental p~~P~~recast concrete structures shall have the required qualifications as specified in ***FDOT Specifications Section 105***.

The State Materials Office maintains the list of the accredited precast prestressed concrete courses. The list can be found at this link:

http://www.fdot.gov/materials/administration/resources/training/structural/index.shtm

8.2.10 FORMS

None needed~~There are no forms associated with the procedure~~.