

SECTION 105 CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS

105-1 General.

105-1.1 Quality Control Documentation.

105-1.1.1 Submission of Materials Certification and Reporting Test Results:

Provide certifications prior to placement of materials. Report test results at completion of the test and meet the requirements of the applicable Specifications.

105-1.1.2 Database(s): Obtain access to the Department's databases prior to testing and/or material placement. Database access information is available through the Department's website. Enter all required and specified documentation and test results in the Department databases.

105-1.1.3 Worksheets: Make available to the Department, when requested, worksheets used for collecting test information. Ensure the worksheets at a minimum contain the following:

- a. Project Identification Number,
- b. Time and Date,
- c. Laboratory Identification and Name,
- d. Training Identification Numbers (TIN) and initials,
- e. Record details as specified within the test method.

105-1.2 Inspections to Assure Compliance with Acceptance Criteria.

105-1.2.1 General: The Department is not obligated to make an inspection of materials at the source of supply, manufacture, or fabrication. Provide the Engineer with unrestricted entry at all times to such parts of the facilities that concern the manufacture, fabrication, or production of the ordered materials. Bear all costs incurred in determining whether the material meets the requirements of these Specifications.

105-1.2.2 Quality Control Inspection: Provide all necessary inspection to assure effective Quality Control of the operations related to materials acceptance. This includes but is not limited to sampling and testing, production, storage, delivery, construction and placement. Ensure that the equipment used in the production and testing of the materials provides accurate and precise measurements in accordance with the applicable Specifications. Maintain a record of all inspections, including but not limited to, date of inspection, results of inspection, and any subsequent corrective actions taken. Make available to the Department the inspection records, when requested.

105-1.2.3 Notification of Placing Order: Order materials sufficiently in advance of their incorporation in the work to allow time for sampling, testing and inspection. Notify the Engineer, prior to placing orders for materials.

Submit to the Engineer a fabrication schedule for all items requiring commercial inspection, before or at the preconstruction meeting. These items include, but are not limited to steel bridge components, overhead cantilevered sign supports with cantilevered arms exceeding 41 feet, moveable bridge components or any other item identified as an item requiring commercial inspection in the Contract Documents.

Notify the Engineer at least 30 days before beginning any production and include a production schedule.

105-2 Additional Requirements for Lump Sum Projects.

Prepare and submit to the Engineer a project-specific list of material items and quantities to be used on the project as a Job Guide Schedule in the same format as the current Sampling, Testing, and Reporting Guide 21 calendar days prior to commencement of construction. Provide up-to-date quantities for the items on the Job Guide Schedule to the Engineer with each monthly progress estimate. The Department may not authorize payment of any progress estimate not accompanied by updated Job Guide Schedule quantities. Maintain the Job Guide Schedule throughout the project including the quantity placed since the previous submittal, and total to date quantity and any additional materials placed. Do not commence work activities that require testing until the Job Guide Schedule has been reviewed and accepted by the Engineer. At final acceptance, submit a final Job Guide Schedule that includes all materials used on the project in the same format as the monthly reports.

105-3 Quality Control Program.

105-3.1 General: Certain operations require personnel with specific qualifications. Certain materials require production under an approved Quality Control (QC) Plan to ensure that these materials meet the requirements of the Contract Documents. Applicable materials include hot mix asphalt, Portland cement concrete (Structural), earthwork, cementitious materials, timber, steel and miscellaneous metals, galvanized metal products, prestressed and/or precast concrete products and drainage products. For all applicable materials included in the Contract, submit a QC Plan prepared in accordance with the requirements of this Section to the Engineer. Do not incorporate any of these materials into the project prior to the Engineer's approval of the QC Plan.

Steel and Miscellaneous Metal products, including aluminum, are defined as the metal components of bridges, including pedestrian and moveable bridges, overhead and cantilevered sign supports, ladders and platforms, bearings, end wall grates, roadway gratings, drainage items, expansion joints, roadway decking, shear connectors, handrails, galvanized products, fencing, guardrail, light poles, high mast light poles, standard mast arm assemblies and Monotube assemblies, stay in-place forms, casing pipe, strain poles, fasteners, connectors and other hardware.

Exceptions to these materials are the production of hot mix asphalt Traffic Levels A and B only when the Contractor has selected Option 2 Mixture Acceptance.

When accreditation or certification is required, make supporting documents from the two previous inspections performed by the accrediting or certifying agency available to the Department upon request.

Obtain Department approval prior to beginning production. Meet and maintain the approved Quality Control Program requirements at all times. Production and construction of these products without the Department's prior approval of a Quality Control Program may result in rejection of the products. Continued approval will be subject to satisfactory results from Department evaluations, including the Independent Assurance program. In cases of non-compliance with the approved Quality Control Program, identify all affected material and do not incorporate or supply to the Department projects. The following conditions may result in suspension of a Quality Control Program:

- a. Failure to timely supply information required.
- b. Repeated failure of material to meet Standard Specification requirements.
- c. Failure to take immediate corrective action relative to deficiencies in the performance of the Quality Control Program.

d. Certifying materials that are not produced under an approved Quality Control Program for use on Department projects.

e. Failure to correct any deficiencies related to any requirement of the Quality Control Program, having received notice from the Department, within the amount of time defined in the notice.

105-3.2 Compliance with the Materials Manual.

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:
www2.dot.state.fl.us/specificationsestimates/materialsmanual/section61.pdf .

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:
www2.dot.state.fl.us/specificationsestimates/materialsmanual/section62.pdf .

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:
www2.dot.state.fl.us/specificationsestimates/materialsmanual/section63.pdf .

Producers of Precast/Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3 of the Department's Materials Manual, which may be viewed at the following URLs:
www2.dot.state.fl.us/specificationsestimates/materialsmanual/section81.pdf .
www2.dot.state.fl.us/specificationsestimates/materialsmanual/section83.pdf .

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:
www2.dot.state.fl.us/specificationsestimates/materialsmanual/section84.pdf

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:
www2.dot.state.fl.us/specificationsestimates/materialsmanual/section82.pdf .

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:
www2.dot.state.fl.us/specificationsestimates/materialsmanual/section92.pdf .

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1 and 11.2 of the Department's Materials Manual, which may be viewed at the following URLs:
www2.dot.state.fl.us/specificationsestimates/materialsmanual/section111.pdf .
www2.dot.state.fl.us/specificationsestimates/materialsmanual/section112.pdf .

105-3.3 Hot Mix Asphalt , Portland Cement Concrete (Structural), Earthwork, Cementitious Materials, Timber, Steel and Miscellaneous Metals, Galvanized Metal Products, Prestressed and/or Precast Concrete Products and Drainage Products Quality Control Program: Have an accepted Quality Control Program, developed in accordance with this Section, during the production of materials to be used on Department projects.

105-3.4 Prestressed Concrete Quality Control Program: Ensure that prestressed concrete plants participating in the Department's Acceptance Program are qualified.

Obtaining qualification requires a current certification from a Department approved precast prestressed concrete plant certification agency and a Department approved Quality Control Plan, meeting the requirements of this Section. The list of Department approved certification agencies is available on the website of the State Materials Office.

105-3.5 Steel and Miscellaneous Metals Quality Control Program: Ensure that the fabricators of Steel and miscellaneous metal products participating in the Department's Quality Control Acceptance Program are qualified. Obtaining qualification requires an accepted Quality Control Plan, developed in accordance with this Section. A current American Institute for Steel Construction (AISC) certification is a requirement for the Quality Control Acceptance Program of the steel and miscellaneous metal fabricators, provided that AISC certification program is available for the category of the fabrication products.

105-3.6 Producers Quality Control Plan Submittal: Depending on the type of products, the producers shall submit their proposed Quality Control Plans to the State Materials Office or to the District Materials Office, as described below:

105-3.6.1 State Materials Office: Producers of cementitious materials, steel and miscellaneous metals, galvanized metal products, and aggregates must submit their proposed Quality Control Plan to the State Materials Office for review and acceptance.

105-3.6.2 District Materials Office: Producers of hot mix asphalt, Portland cement concrete (Structural), earthwork, timber, prestressed and/or precast concrete products and drainage products must submit their proposed Quality Control Plan to the local District Materials Office for acceptance. Producers located outside the State must contact the State Materials Office for address information of the District Materials Office responsible for the review of the proposed Quality Control Program.

105-3.7 Quality Control Plan Review and Acceptance: The Department will respond to the producer within 21 calendar days of receipt of the proposed Quality Control Program. The Department may perform evaluation activities to verify compliance with submitted documents prior to acceptance.

If the Quality Control Program must be revised for any reason, including non-compliance, submit the revision to the Department. The Department will respond to the producer within 7 calendar days of receipt of the revised Quality Control Program.

105-3.8 Contractor's Quality Control Plan: Have an approved Quality Control Plan meeting the requirements of this Section for the transportation, storage, placement, and other related construction operations required by the Contract Documents.

105-4 Contractor Certification of Compliance.

Provide the Engineer with a notarized monthly certification of compliance with the requirements of this Section, to accompany each progress estimate, on a form provided by the Engineer. The Department may not authorize payment of any progress estimate not accompanied by an executed certification document.

Final payment in accordance with 9-8 will not be made until a final notarized certification summarizing all QC exceptions has been submitted.

105-5 Guidelines for Development of the Quality Control Plan.

105-5.1 General: Use the following guidelines for developing the QC Plan. Provide detailed policies, methods and procedures to ensure the specified quality of all applicable materials and related production and field operations. Include other items in addition to these guidelines as necessary.

105-5.2 Personnel:

105-5.2.1 Qualifications: Submit the Training Identification Numbers (TIN) for all technicians performing sampling, testing and inspection for both field and laboratory tests. Include employed and subcontracted technicians.

105-5.2.2 Level of Responsibility: Identify the primary contact for the Department. Identify roles and responsibilities of various personnel involved in the QC process.

105-5.3 Raw Materials:

105-5.3.1 Source: Identify the sources of raw materials. Provide locations and plant or mine numbers when applicable.

105-5.3.2 Certification: Describe methods of verifying compliance of certification with the specifications.

105-5.3.3 Disposition of Failing Materials: Describe the system for controlling non-conforming materials, including procedures for identification, isolation and disposition.

105-5.4 Storage Facilities for Raw Materials: Describe measures and methods, including bedding details, for preventing segregation, contamination and degradation.

Describe methods of identifying individual materials. Where applicable, submit a site plan showing the locations of various materials.

105-5.5 Production Equipment: Describe calibration frequencies, maintenance schedule and procedures for production equipment.

105-5.6 Plant Requirements:

105-5.6.1 Plant Identification: For those facilities producing materials listed in Article 105-3, provide the mailing address, physical address including county and X-Y (Latitude and Longitude) coordinates of the plant, telephone and fax numbers, E-mail address, primary contact at the plant, responsible person in charge, facility number provided by the Department, Owner information and Vendor Number and other information as required.

105-5.6.2 Process Control System: Describe the methods and measures established to ensure Contract compliance for the produced materials that are supplemental to the QC sampling and testing program described in the Contract Documents. These methods and measures will include, but are not limited to, inspection schedule, additional sampling and testing, maintenance schedule, etc.

105-5.6.3 Loading and Shipping Control: Describe the methods and measures for preventing segregation, contamination and degradation during loading and shipping operations. Describe the methods established for materials to be in compliance with the specifications at the point of use.

105-5.6.4 Types of Products Generated: Describe the products the plant is approved to produce under Department guidelines.

105-5.7 Other Requirements:

105-5.7.1 Copy of Certification: Attach examples of certifications issued by the plant/Contractor for the products approved by the Department.

105-5.7.2 Statement of Compliance: Include a statement of compliance with all quality requirements set forth by the Department in the Contract Documents and Department manuals.

105-5.7.3 Information on Producers with Accepted Quality Control Programs: Identify the Producers of materials listed in 105-3.1 for the project. Include the Department's Facility Id number as part of the identification. All producers must have accepted QC Programs and be listed on the Department's List of Producers with Accepted QC Programs.

105-5.7.4 Describing Documentation Procedure: Identify location of document storage to enable Department review. Include QC charts, qualification/accreditation records, inspection reports, and other pertinent/supporting documents for an approved QC Plan.

105-5.8 Final Manufactured Product - Plant Operations: Describe inspection schedule and methods for identifying defects and non-compliance with the specifications. Describe corrective actions and methods to resolve them.

105-5.8.1 Storage: When storage of the produced materials is required and it is not defined in the Contract Documents, describe the methods and duration for storage. Include measures and methods for preventing segregation, contamination and degradation during storage.

105-5.8.2 Disposition of Failing Materials: When not described in the specifications, describe the methods and measures for identifying and controlling the failing materials. Include preventive and corrective measures. Describe disposition of failing materials.

105-5.9 Final Manufactured Product - Field Operations:

105-5.9.1 Transportation: Describe the method of delivery from the point of production/storage to the point of placement.

105-5.9.2 Storage: When storage of the produced materials is required and it is not defined in the Contract Documents, describe the methods and duration for storage. Include measures and methods for preventing segregation, contamination and degradation during storage.

105-5.9.3 Placement: Describe the methods and identify the type of equipment used in incorporation of the materials into the project.

105-5.9.4 Disposition of Failing Materials: When not described in the specifications, describe the methods and measures for identifying and controlling the failing materials. Include preventive and corrective measures. Describe disposition of failing materials.

105-6 Lab Qualification Program.

Testing Laboratories participating in the Department's Acceptance Program must have current Department qualification when testing materials that are used on Department projects. In addition, they must have one of the following:

- a. Current AASHTO (AAP) accreditation.
- b. Inspected on a regular basis per ASTM D 3740 for earthwork, ASTM D 3666 for asphalt and ASTM C 1077 for concrete for test methods used in the Acceptance Program, with all deficiencies corrected, and under the supervision of a Specialty Engineer.
- c. Current Construction Materials Engineering Council (CMEC) program accreditation or other independent inspection program accreditation acceptable to the Engineer and equivalent to a. or b. above.

After meeting the criteria described above, submit a Laboratory Qualification Application to the Department. The application is available from the Department's website. Obtain the Department's qualification prior to beginning testing. The Department may inspect the laboratory for compliance with the accreditation requirements prior to issuing qualification.

Meet and maintain the qualification requirements at all times. Testing without Department's qualification may result in a rejection of the test results. Continued qualifications are subject to satisfactory results from Department evaluations, including Independent Assurance evaluations. In case of suspension or disqualification, prior to resumption of testing, resolve the issues to the Department's satisfaction and obtain reinstatement of qualification. The following conditions may result in suspension of a laboratory's qualified status:

- a. Failure to timely supply required information.
- b. Loss of accredited status.

- c. Failure to correct deficiencies in a timely manner.
- d. Unsatisfactory performance.
- e. Changing the laboratory's physical location.
- f. Delays in reporting the test data in the Department's database.
- g. Incomplete or inaccurate reporting.
- h. Using unqualified technicians performing testing.

It is prohibited for any contract laboratory or staff to perform Contractor Quality Control testing and any other Acceptance Program testing on the same contract.

105-7 Quality Control Plan Submittal.

Submit the QC Plan to the Engineer for approval within 21 calendar days after the Contract Award. The Engineer will review the QC Plan and respond to the Contractor within 21 calendar days of receipt.

If at any time the Contractor is not in compliance with the approved QC Plan, or a part thereof, affected portions of the plan will be disapproved. Cease work in the affected operation(s) and submit a revision to the Engineer. If the QC Plan, or a part thereof, must be revised, submit the revision to the Engineer. The Engineer will review the revision and respond within seven calendar days of receipt.

Continue to work on operations that are still in compliance with the approved sections of the QC Plan.

105-8 Personnel Qualifications.

105-8.1 General: Provide qualified personnel for sampling, testing and inspection of materials and construction activities. Ensure that qualifications are maintained during the course of sampling, testing and inspection.

Construction operations that require a qualified technician must not begin until the Department verifies that the technician is on the CTQP list of qualified technicians. The CTQP lists are subject to satisfactory results from periodic Independent Assurance evaluations.

105-8.2 QC Manager: Designate a QC Manager who has full authority to act as the Contractor's agent to institute any and all actions necessary for the successful implementation of the QC Plan. The QC Manager must speak and understand English. The QC Manager must be on-site at the project on a daily basis or always available upon four hours notice to administer the QC Plan. This includes administering, implementing, monitoring, and as necessary, adjusting the processes to ensure compliance with the Contract Documents. Ensure that the QC Manager is qualified as such through the Construction Training/Qualification Program.

Under the direction of the QC Manager, and using Department's standard forms provided by the Engineer, summarize the daily QC activities including testing and material sampling. Since erasures are strictly prohibited on all reports and forms, use blue or colored ink. Do not use black ink. If manual corrections to original data are necessary, strike through, correct, and date the entry, including the initials of the person making the correction. Make copies of the completed forms available for the Department to review daily unless otherwise required in the specifications. Ensure that the QC test data is entered into the Department's database on a daily basis. Maintain all QC related reports and documentation for a period of three years from final acceptance of the project. Make copies available for review by the Department upon request.

105-8.3 Worksite Traffic Supervisor: Provide a Worksite Traffic Supervisor who is responsible for initiating, installing, and maintaining all traffic control devices as described in Section 102 and in the Contract Documents. Ensure that the Worksite Traffic Supervisor is

certified in the advanced training category by a Department approved training Provider. Approved Providers will be posted on the Department's website at the following URL address: www.dot.state.fl.us/rddesign/MOT/MOT.htm . Use approved alternate Worksite Traffic Supervisors when necessary.

105-8.4 Flagger: Provide trained flaggers to direct traffic where one-way operation in a single lane is in effect and in other situations as required. The Worksite Traffic Supervisor or others as approved by the Department will provide training for flaggers.

105-8.5 Earthwork Quality Control Personnel:

105-8.5.1 Earthwork Level I: Ensure the technician who samples soil and earthwork materials from the roadway project, takes earthwork moisture and density readings, and records those data in the Density Log Book holds a Construction Training and Qualification Program (CTQP) Earthwork Construction Inspection Level I qualification.

105-8.5.2 Earthwork Level II: Ensure the technician responsible for determining the disposition of soil and earthwork materials on the roadway, and for interpreting and meeting Contract Document requirements holds a CTQP Earthwork Construction Inspection Level II qualification.

105-8.6 Asphalt Quality Control Personnel:

105-8.6.1 Plant Technicians: For asphalt plant operations, provide a QC technician, qualified as a CTQP Asphalt Plant Level II technician, available at the asphalt plant at all times when producing mix for the Department. Perform all asphalt plant related testing with a CTQP Asphalt Plant Level I technician. When the Contractor has identified Option 2 Mixture Acceptance for Traffic Levels A and B, no qualified personnel are required at the plant.

105-8.6.2 Paving Technicians: For paving operations, keep a qualified CTQP Asphalt Paving Level II technician on the roadway at all times when placing asphalt mix for the Department, and perform all testing with a CTQP Asphalt Paving Level I technician. As an exception, measurements of cross-slope, temperature and yield (spread rate) can be performed by someone under the supervision of a CTQP Paving Level II technician.

105-8.6.3 Mix Designer: Ensure all mix designs are developed by individuals who are CTQP qualified as an Asphalt Hot Mix Designer.

105-8.6.4 Documentation: Document all QC procedures, inspection, and all test results and make them available for review by the Engineer throughout the life of the Contract. Identify in the asphalt producer's Quality Control Plan the Quality Control Manager(s) and/or Asphalt Plant Level II technician(s) responsible for the decision to resume production after a quality control failure.

105-8.7 Concrete QC Personnel:

105-8.7.1 Concrete Field Technician - Level I: Ensure technicians performing plastic property testing on concrete for materials acceptance are qualified CTQP Concrete Field Technicians Level I. Plastic property testing will include but not be limited to slump, temperature, air content, water-to-cementitious materials ratio calculation, and making and curing concrete cylinders. Duties will include initial sampling and testing to confirm specification compliance prior to beginning concrete placements, ensuring timely placement of initial cure and providing for the transport of compressive strength samples to the designated laboratories. Technicians who test concrete properties or perform Verification testing for the Department must possess this qualification.

105-8.7.2 Concrete Field Technician - Level II: Ensure field technicians responsible for the quality of concrete being placed on major bridge projects are qualified CTQP

Concrete Field Technicians Level II. A Level II Technician must be present on the jobsite during all concrete placements. Prior to the placement of concrete, the technician will inspect the element to be cast to ensure compliance with Contract Documents. A Level II Technician's duties may include ensuring that concrete testing, inspection, and curing in the field is performed in accordance with the Contract Documents. The QC Technician will inform the Verification Technician of anticipated concrete placements and LOT sizes.

105-8.7.3 Concrete Laboratory Technician - Level I: Ensure technicians testing cylinders and recording concrete strength for material acceptance are qualified CTQP Concrete Laboratory Technicians Level I. Duties include final curing, compressive strength testing, and the recording/reporting of all test data.

105-8.7.4 Concrete Production Facility Manager for Quality Control: Ensure each concrete production facility has a Facility Manager for QC with the following qualifications:

1. CTQP Concrete Laboratory Technician Level I, CTQP Concrete Field Technician-Level I, and CTQP Batch Plant Operator. As alternatives to these qualifications, the Department will accept:

Prestressed Concrete Institute (PCI) Level III or
National Ready Mixed Concrete Association (NRMCA) Concrete Technologist Level II, as equivalent qualifications.

2. Three years of QC experience directly related to cement concrete production.

3. Demonstrated proficiency in implementing, supervising, and maintaining surveillance over a QC Program.

4. Experience and certification in performance of required QC tests and statistical evaluation of QC test results.

105-8.7.5 Concrete Mix Designer: Ensure all mix designs are developed by individuals who are qualified under one of the following:

1. CTQP Concrete Lab Technician Level II;
2. National Ready Mix Concrete Association Level 2 Production Control Technician Certification;

3. Precast Concrete Pipe, Box Culverts, Drainage Structures, and Incidental Precast Concrete Level II Quality Control Inspector meeting the requirements of 105-8.11; or

4. PCI Quality Control Level III certification.

105-8.8 Supervisory Personnel-Bridge Structures:

105-8.8.1 General: Provide supervisory personnel meeting the qualification requirements detailed in this Article. Submit qualifications to the Engineer at the pre-construction conference. Do not begin Construction until the qualifications of supervisory personnel have been approved by the Engineer.

105-8.8.2 Proof of License or Certification: Submit a copy of the Professional Engineer license current and in force issued by the state in which registration is held. The license must be for the field of engineering that the construction work involves such as Civil, Electrical or Mechanical. Under certain circumstances Florida registration may be required.

Submit a copy of the license issued by the State of Florida for tradesmen that require a license indicating that the license is in force and is current. Submit a copy of the

certification issued by the Instrumentation, Systems and Automation Society of America for each Certified Control Systems Technician.

105-8.8.3 Experience Record: Submit the following information for supervisory personnel to substantiate their experience record. The supervisor (project engineer, superintendent/manager or foreman) seeking approval must provide a notarized certification statement attesting to the completeness and accuracy of the information submitted. Provide the following experience information for each individual seeking approval as a supervisor:

Project owner's name and telephone number of an owner's representative, project identification number, state, city, county, highway number and feature intersected.

Provide a detailed description of each bridge construction experience, and the level of supervisory authority during that experience. Report the duration in weeks, as well as begin and end dates, for each experience period.

Provide the name, address and telephone number of an individual that can verify that the experience being reported is accurate. This individual should have been an immediate supervisor unless the supervisor cannot be contacted in which case another individual with direct knowledge of the experience is acceptable.

105-8.8.4 Concrete Post-Tensioned Segmental Box Girder Construction:

Ensure the individuals filling the following positions meet the minimum requirements as follows:

105-8.8.4.1 Project Engineer-New Construction: Ensure the Project Engineer is a registered professional engineer with five years of bridge construction experience. Ensure a minimum of three years of experience is in Segmental Box Girder Construction Engineering and includes a minimum of one year in segmental casting yard operations and related surveying, one year in segment erection and related surveying, including post-tensioning and grouting of longitudinal tendons and a minimum of one year as the Project Engineer in responsible charge of Segmental Box Girder Construction Engineering.

105-8.8.4.2 Project Engineer-Repair and Rehabilitation: Ensure the Project Engineer is a registered Professional Engineer with five years of bridge construction experience. Ensure a minimum of three years of experience is in Segmental Box Girder Construction Engineering and includes one year of post-tensioning and grouting of longitudinal tendons and a minimum of one year as the Project Engineer in responsible charge of Segmental Box Girder rehabilitation engineering or Segmental Box Girder new construction engineering.

105-8.8.4.3 Project Superintendent/Manager-New Construction: Ensure the Project Superintendent/Manager has a minimum of ten years of bridge construction experience or is a registered professional engineer with five years of bridge construction experience. Ensure that a minimum of three years of experience is in Segmental Box Girder construction operations and includes a minimum of one year in the casting yard operations and related surveying, one year in segment erection and related surveying including post-tensioning and grouting of longitudinal tendons and a minimum of one year as the Project Superintendent/Manager in responsible charge of Segmental Box Girder construction operations.

105-8.8.4.4 Project Superintendent/Manager-Repair and Rehabilitation: Ensure the Project Superintendent/Manager has a minimum of five years of bridge construction experience or is a registered professional engineer with three years of bridge construction experience. Ensure that a minimum of two years of experience is in Segmental Box Girder construction operations and includes a minimum of one year experience performing post-tensioning and grouting of longitudinal tendons and a minimum of one year as the Project Superintendent/Manager in responsible charge of Segmental Box Girder rehabilitation operations

or Segmental Box Girder new construction operations.

105-8.8.4.5 Foreman-New Construction: Ensure that the Foreman has a minimum of five years of bridge construction experience with two years of experience in Segmental Box Girder Operations and a minimum of one year as the foreman in responsible charge of Segmental Box Girder new construction Operations.

105-8.8.4.6 Foreman-Repair and Rehabilitation: Ensure the Foreman has a minimum of five years of bridge construction experience with two years of experience in Segmental Box Girder Operations and a minimum of one year as the foreman in responsible charge of Segmental Box Girder rehabilitation operations or Segmental Box Girder new construction operations.

105-8.8.4.7 Geometry Control Engineer/Manager: Ensure that the Geometry Control Engineer/Manager for construction of cast-in-place box segments is a Registered Professional Engineer with one year of experience, a non-registered Engineer with three years of experience or a Registered Professional Land Surveyor with three years of experience in geometry control for casting and erection of cast-in-place box segments. Credit for experience in cast-in-place box girder geometry control will be given for experience in precast box girder geometry control but not vice versa.

Ensure that the Geometry Control Engineer/Manager for precast box segments is a Registered Professional Engineer with one year of experience or non-registered with three years of experience in casting yard geometry control of concrete box segments.

The Geometry Control Engineer/Manager must be responsible for and experienced at implementing the method for establishing and maintaining geometry control for segment casting yard operations and segment erection operations and must be experienced with the use of computer programs for monitoring and adjusting theoretical segment casting curves and geometry. This individual must be experienced at establishing procedures for assuring accurate segment form setup, post-tensioning duct and rebar alignment and effective concrete placement and curing operations as well as for verifying that casting and erection field survey data has been properly gathered and recorded.

105-8.8.4.8 Surveyor: Ensure that the Surveyor in charge of geometry control surveying for box segment casting and/or box segment erection has a minimum of one year of bridge construction surveying experience.

105-8.8.5 Movable Bridge Construction: Ensure the individual filling the following positions meet the minimum requirements as follows:

105-8.8.5.1 Electrical Journeyman: Ensure the Electrical Journeyman holds, an active journeyman electrician's license and has at least five years experience in industrial electrical work, or is a Certified Control Systems Technician. A Certified Control Systems Technician will not be permitted to perform electrical power work including, but not limited to, conduit and wire-way installation or power conductor connection. Ensure the electrical journeyman has successfully completed the installation of one similar movable bridge electrical system during the last three years.

105-8.8.5.2 Control Systems Engineer and Mechanical Systems Engineer: Ensure the Control Systems Engineer and Mechanical Systems Engineer are both registered Professional Engineers with a minimum of 10 years supervisory experience each in movable bridge construction. Ensure the Engineers have working knowledge of the movable bridge leaf motion control techniques, mechanical equipment and arrangements specified for this

project. Ensure that each Engineer has been in responsible control of the design and implementation of at least three movable bridge electrical control and machinery systems within the past 10 years of which, at least one of the three bridges was within the last three years. Ensure that a minimum of one of the three bridge designs incorporated the same type of leaf motion control and machinery systems specified for this project.

105-8.8.6 Concrete Post-Tensioned Other Than Segmental Box Girder

Construction: Ensure the individual filling the following positions meet the minimum requirements as follows:

105-8.8.6.1 Project Engineer: Ensure the Project Engineer is a registered Professional Engineer with five years of bridge construction experience. Ensure that a minimum of three years of experience is in concrete post-tensioned construction. Ensure that the three years of experience includes experience in girder erection, safe use of cranes, stabilization of girders; design of false work for temporary girder support, post-tensioning and grouting operations, and a minimum of one year as the Project Engineer in responsible charge of post-tensioning related engineering responsibilities.

105-8.8.6.2 Project Superintendent/Manager: Ensure the Project Superintendent/Manager has a minimum of ten years of bridge construction experience or is a registered Professional Engineer with five years of bridge construction experience and has a minimum of three years of supervisory experience in girder erection, safe use of cranes, stabilization of girders; design of falsework for temporary girder support post-tensioning, grouting operations and a minimum of one year as the Project Superintendent/Manager in responsible charge of post-tensioning related operations.

105-8.8.6.3 Foreman: Ensure the Foreman has a minimum of five years of bridge construction experience with two years of experience in post-tensioning related operations and a minimum of one year as the foreman in responsible charge of post-tensioning related operations.

105-8.8.7 Post Tensioning: Perform all post-tensioning field operations under the direct supervision of a Level II Qualified Post-Tensioning and Grouting Technician qualified through the Department's Construction Training Qualification Program (CTQP). In addition, provide a minimum of two crewmembers that are CTQP Level I Qualified Post-Tensioning and Grouting Technicians. All personnel involved in grouting must attend a grouting training session provided by the Department not less than seven days prior to the start of the first stressing or grouting operation of the project.

Perform all vacuum grouting operations under the direct supervision of a crew foreman who has been trained and has experience in the use of vacuum grouting equipment and procedures. Submit the crew foreman's credentials to the Engineer prior to performing any vacuum grouting operations.

Conduct all stressing and grouting operations in the presence of the Engineer. Coordinate and schedule all post-tensioning activities to facilitate inspection by the Engineer.

105-8.8.8 Failure to Comply with Bridge Qualification Requirements: Make an immediate effort to reestablish compliance. If an immediate effort is not put forth as determined by the Engineer, payment for the bridge construction operations requiring supervisors to be qualified under this Specification will be withheld up to 60 days. Cease all bridge construction and related activities (casting yard, etc.) if compliance is not met within

60 days, regardless of how much effort is put forth. Resume bridge construction operations only after written approval from the Engineer stating that compliance is reestablished.

105-8.9 Prestressed Concrete Plant Quality Control Personnel: Ensure each prestressed concrete plant has an onsite production manager, an onsite Plant Quality Control Manager, a Plant engineer, and adequate onsite QC inspectors/technicians to provide complete QC inspections and testing.

Ensure the Plant Manager for QC has at least five years of related experience and a current PCI QC personnel Level III certification and a certificate of completion of Section 450 Specification examination. Ensure that the QC inspector/technician has current PCI QC Technician/Inspector Level II certification and a certificate of completion of Section 450 Specification examination.

Ensure that the batch plant operators of the ready mixed concrete batch plants meet the requirements of Section 9.2 of the Materials Manual. Ensure that the batch plant operators of the onsite centrally mixed concrete plants meet the requirements of 105-8.11.1.4.2.

105-8.10 Signal Installation Inspector: Provide an inspector trained and certified by the International Municipal Signal Association (IMSA) as a Traffic Signal Inspector to perform all signal installation inspections. Use only Department approved signal inspection report forms during the signal inspection activities. Ensure all equipment, materials, and hardware is in compliance with Department Specifications and verify that all equipment requiring certification is listed on the Department's Approved Product List (APL). Provide the completed signal inspection report form(s), certified by the IMSA Traffic Signal Inspector to the Engineer.

The Department's approved inspection report forms are available at the following URL: www.dot.state.fl.us/trafficoperations/.

105-8.11 Pipe and Precast Concrete Products Manufacturing Facilities Quality Control Personnel:

105-8.11.1 Precast Concrete Drainage Structures, Precast Concrete Box Culvert, Precast Concrete Pipe, and Flexible Pipe Manufacturing Facilities Quality Control Personnel:

105-8.11.1.1 Level I Quality Control Inspectors: Ensure that the Level I Inspectors have completed a minimum of a 12-hour, Department approved, Level I QC Inspector training course in the respective work area. As an exception to this, ensure Flexible Pipe Level I QC Inspectors have completed a minimum of an 8-hour, Department approved, Level I QC Flexible Pipe Inspector training course.

105-8.11.1.2 Level II Quality Control Inspectors: Ensure that Level II Inspectors have completed Department approved Level I QC Inspector training and a minimum of a 5-hour, Department approved, Level II QC Inspector training course in the respective work areas.

105-8.11.1.3 Plant Quality Control Manager: Ensure that QC Manager has completed Department approved Level II QC Inspector training and has a minimum of 2 years construction related experience in the specific work area.

105-8.11.1.4 Additional Requirements for Quality Control Personnel of Precast Concrete Drainage and Precast Concrete Box Culvert Manufacturing Facilities:

105-8.11.1.4.1 Testing Personnel: Ensure the personnel performing plastic property tests have ACI Concrete Field Testing Technician-Grade I certification. Ensure the personnel performing laboratory compressive strength testing have ACI

Concrete Laboratory Testing Technician-Grade 1 certification or ACI Concrete Strength Testing Technician certification.

105-8.11.1.4.2: Batch Plant Operator: Ensure the concrete batch plant operator is qualified as a CTQP Concrete Batch Plant Operator. As an alternative to CTQP qualification, the Department will accept the completion of a minimum of a 6-hour, Department approved, Batch Plant Operator training course.

105-8.11.2 Quality Control Personnel of Incidental Precast Manufacturing Facilities:

105-8.11.2.1: Incidental Precast Concrete Plant Quality Control Inspectors: Ensure the QC Inspectors meet the requirements of 105-8.11.1.4.1 and are qualified as CTQP Concrete Field Technician Level I.

105-8.11.2.2: Incidental Precast Concrete Plant Quality Control Manager: Ensure the QC Manager meets the requirements of 105-8.11.2.1 and has at least two years of QC experience, directly related to cement concrete production.

105-8.11.2.3: Alternative Incidental Precast Concrete Personnel Qualification: As an alternative to CTQP qualifications and CTQP Batch Plant Operator, the Department will accept QC personnel meeting the qualification requirements of 105-8.11.1.

105-8.12 Structural Steel and Miscellaneous Metals Fabrication Facility Quality Control Personnel: Ensure each fabrication facility has an onsite production manager, an onsite facility manager for QC, a plant engineer, and on site QC inspectors/technicians to provide complete QC inspections and testing.

Ensure that the Facility Manager for QC and QC inspectors/technicians meet the certification requirements set forth in the latest version of AASHTO/NSBA Steel Bridge Collaboration S 4.1, Steel Bridge Fabrication QC/QA Guide Specification, including the years of experience required in Table 105-5 below. The Facility Manager for QC must meet the requirements of Table 105-5 for every Structural Steel Member Type produced by a plant with QC being managed by the Facility Manager for QC. The Facility Manager for QC will report directly to the plant manager or plant engineer and must not be the plant production manager nor report to or be the subordinate of the plant production manager. QC inspectors/technicians must be the employees of, and must report directly to the Facility Manager for QC.

TABLE 105-5 Experience Requirements for QC Inspectors/Technicians And Facility Manager for Quality Control		
Structural Steel Member Type	Minimum Years of Experience Required	
	QC Inspector/Technician	Facility Manager for QC
Rolled beam bridges	1 year	3 years
Welded plate girders (I sections, box sections, etc.)	2 years	4 years
Complex structures, such as trusses, arches, cable stayed bridges, and moveable bridges	3 years	5 years
Fracture critical (FC) members	3 years	5 years