

CHAPTER 5

EARTHWORK TRAINING AND QUALIFICATION PROGRAM

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CHAPTER 5

EARTHWORK TRAINING AND QUALIFICATION PROGRAM

5.1 PURPOSE

The purpose of the *Earthwork Training and Qualification Program* is to set a specific level of knowledge and physical skills for the personnel responsible for the inspection of embankment, subgrade, backfill, and granular base material on Florida Department of Transportation (FDOT) highway and bridge construction projects.

5.2 BACKGROUND

Earthwork inspectors performing tests on Department roadway projects are required to be formally qualified. The Department's Earthwork Training and Qualification Program provides the instruction and skills required to ensure a strong Quality Assurance program.

5.3 QUALIFICATION REQUIREMENTS BY JOB FUNCTION

Job functions for each Earthwork Qualification are as follows:

Earthwork Construction Inspector (ECI) Level 1

This is the QC technician who must be qualified to perform acceptance tests such as nuclear density tests, Speedy moisture, sampling soils and reporting results in the Earthwork Records System (ERS).

Personnel who test earthwork to verify material quality, resolve disputes or perform Independent Assurance (IA) must also possess this qualification.

Earthwork Construction Inspector (ECI) Level 2

This is the QC technician, private lab, or contractor's employee who can prepare and complete the certification of the ERS with knowledge of the [Standard Specifications](#), [Standard Plans](#), and density theory. Personnel who verify earthwork specification compliance of material quality or perform IA must also possess this qualification.

This individual will also perform base acceptance tests and inspection. If an

inspector's ECI Level 1 qualification expires before ECI Level 2 qualification expires, then the individual cannot perform the duties of ECI Level 1.

5.4 ECI QUALIFICATIONS AND COURSES

There are two levels of Earthwork Construction Inspection Qualifications: Level 1 and Level 2.

5.4.1 ECI Level 1

A qualified ECI Level 1 technician should safely and effectively sample soil materials from the roadway, take earthwork density readings and record-and-store data into the Department's ERS database. The qualification requirements for ECI Level 1 are designed to be completed by a newly hired employee with minimal guidance.

There are three (3) requirements for Earthwork Level 1 qualification:

- (1) Hold a valid nuclear radiation safety certificate. Department employees who have completed the ***Safety and Control Equipment with Radioactive Materials Course (ST-06-0001)*** satisfy this requirement. Applicants must certify that they meet/don't meet this requirement on the application.
- (2) Pass the Earthwork Level 1 written examination.
- (3) Pass the Earthwork Level 1 proficiency examination.

After a trainee meets these qualification requirements, the trainee's FDOT qualification date will be added to the training database. The date of qualification shall be the date both the proficiency and written examination are passed. Qualification shall be effective for five (5) years (60 months).

5.4.1.1 ECI Level 1 Training Course

A one and one-half day training course is offered for ECI Level 1. Topics covered in this course are listed below:

- (1) FM 1-R 090 Sampling Aggregates
- (2) FM 1-T 238 Density of Soils and Bituminous Concrete Mixtures in Place by the Nuclear Method.
- (3) FM 5-507 Determination of Moisture Content by Means of a Calcium Carbide Gas Pressure Moisture Tester.

(4) Overview of Earthwork Records System

On the second day, a written examination (usually multiple choice) and the proficiency examination are administered.

Training course attendance is encouraged but is not required for qualification.

Information about course schedules and costs may be obtained by accessing the Construction Training Qualification Program (CTQP) website: <http://www.ctqpfloida.com>. Trainees not having access to the CTQP website may obtain course schedules by contacting the CTQP Administrator, the District Construction Training Administrator (DCTA), or the State Construction Training Administrator (SCTA).

5.4.1.1.1 ECI Level 1 Written Examination

A 2-hour multiple choice written examination is administered on the second day of the ECI Level 1 qualification course. The passing score for this examination is 70%.

The written examinations are electronically graded by the CTQP Administrator and posted in the Training Qualification Database System (TQDBS). Two weeks should be allowed for grading and posting of the examination results. Trainees can access these results through the [CTQP](#) website.

5.4.1.1.2 ECI Level 1 Proficiency Examination

A trainee must demonstrate proficiency in **Florida Methods (FM)**, specifically in the **Density of Soils and Bituminous Concrete Mixtures in Place by Nuclear Method (FM 1-T 238)**, the Determination of Moisture Content by Means of a **Calcium Carbide Gas Pressure Moisture Tester (FM 5-507)** (also known as the "**Speedy Moisture Test**"), and reporting the test results in to the ERS Forms [675-020-27](#) and [675-020-28](#). Technicians using Electronic ERS is still required to demonstrate the proficiency in filling out the forms. A checklist is used for each of these areas. The trainee will have up to two opportunities on the same day to successfully demonstrate all items on the checklist for each area. If the trainee fails to properly demonstrate any item on a checklist the instructor will allow up to one additional proficiency evaluation on the same day. Two failures in one area will constitute failure of the proficiency examination. Anyone failing the proficiency examination may apply for a future proficiency examination. The application must be completed, and appropriate fee

paid to the provider.

5.4.2 ECI Level 2 Requirements

The qualification requirements for an ECI Level 2 technician include knowledge of the earthwork specification requirements, [Standard Plans](#), and procedures related to earthwork construction.

There are three (3) requirements for ECI Level 2 Qualification:

- (1) Pass the ECI Level 1 written examination and proficiency.
- (2) Pass the ECI Level 2 written examination.
- (3) Must have 30 days work experience on a construction project involving earthwork operations. The trainee shall complete an **Application for Qualification**, available on the **CTQP** website.

A [Qualification Table Quick Reference Guide](#) is available on the [CTQP Course Catalog](#) website.

5.4.2.1 ECI Level 2 Training Course

A two-day training course is offered for ECI Level 2. Topics covered in this course are listed below:

- (1) Density theory
- (2) ERS Forms [675-020-27](#) and [675-020-28](#)
- (3) [Standard Specifications](#) and [Standard Plans](#)

A 2-hour multiple choice written examination is administered at the end of the second day.

Information about course schedules and costs can be obtained by accessing the [CTQP](#) website. Trainees not having access to the **CTQP** website may access course schedules by contacting the DCTA, SCTA or the CTQP Administrator.

5.4.2.1.1 ECI Level 2 Course Prerequisites

Prior to attending the ECI Level 2 course, the trainee shall have passed the following FDOT self-study examinations:

- (1) BT-06-0007 Construction Math

- (2) BT-06-0008 Contract Plans Reading
- (3) BT-06-0009 Earthwork Inspection
- (4) BT-06-0020 Subgrade and Base Inspection

Self-study examinations will only be given to Department employees. These examinations will be proctored by the SCTA or DCTA. (See [CTQM Section 1.15.11.](#))

It is highly recommended that a trainee studies the ***FDOT Pipe Placement Inspection (BT-06-0014) Self-Study*** and takes the corresponding examination.

Self-study course manuals are available on the [Office of Construction Training](#) website and also available from the Department's [Maps and Publications Office](#). A [Qualification Table Quick Reference Guide](#) is available on the [CTQP Course Catalog](#) website.

5.4.2.1.2 ECI Level 2 Written Examination

A closed book, 2-hour multiple choice written examination is administered on the last day of the ECI Level 2 qualification course. The passing score for this examination is 70%.

All examinations are electronically graded by the CTQP and the results posted in the TQDBS. Two weeks should be allowed for grading and posting the examination results. Trainees can access these results through the [CTQP](#) website.

5.5 REQUALIFICATION

Due to frequent changes in the specifications, materials, and processes, Certificates of Qualification are issued for 60 months. In order to maintain qualification, the technicians' qualifications must be renewed. An application for requalification should begin after 54 months. Extensions past the 60-month qualification expiration date will not be granted. Consult the CTQP website for the requalification fee schedule.

5.5.1 ECI Level 1 Requalification

Applicants with an active ECI Level 1 qualification are required to pass the written examination. Applicants who let their qualification expire will be required to pass the ECI Level 1 proficiency demonstration and written examination.

5.5.2 ECI Level 2 Requalification

Applicants for ECI Level 2 are required to pass a written examination for requalification. Applicants who let their qualification expire will be required to pass the ECI Level 2 written examination.

When an inspector's ECI Level 1 qualification expires before ECI Level 2 qualifications, then the ECI Level 2 inspector cannot perform the duties of ECI Level 1.

After a trainee has successfully met all these requalification requirements, then the trainee's FDOT requalification date will be added to the TQDBS. Trainees can access these results through the [CTQP](#) website.

5.6 REVOCATION OF QUALIFICATION

See Section 1.14.7 and 1.14.8.

5.7 DEPARTMENT RESPONSIBILITIES

The following responsibilities are unique to the earthwork qualification program and are in addition to those found at the end of **Chapter 1** of this **Manual**. Responsibilities for these qualification programs are distributed among the State Construction Office, State Materials Office, and Districts. Responsibilities are as follows:

5.7.1 Technical Review Team Committee

Technical Review Team (TRT) committee reviews and recommends revisions to the manuals, training aids, examinations, and qualification procedure.

5.7.2 State Construction Training Office

Earthwork

- (1) Coordinate all CTQP related activities with CTQP Administrator, TRT Chairs and Providers.

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- (2) Ensure representation from the State Construction Office in the Earthwork TRT.

5.7.3 State Materials Office

Develop and maintain Computer-Based-Training (CBT) course, ***Safety and Control of Equipment with Radioactive Materials***, for Department employees. The CBT course for Department employees may be obtained from the Department's training portal.

Provide ERS training to the District Materials Offices for both electronic and non-electronic components. The ERS training includes information concerning the ERS assembly, computer coding to generate earthwork graphs, and the proper use of the completed ERS. Requests for training should be processed through the District Construction Training Administrator. Additional information is available from the State Construction Training Manager. The documentation for electronic ERS can be found on the SMO MAC website (<https://www.fdot.gov/materials/mac>).