

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 Record Systems.

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 employee who has the ability to prepare and complete the Certification of the Earthwork Record System with knowledge of the *Standard Specifications, Design Standards*, and Density Theory. Personnel who verify earthwork specification compliance of material quality or perform Independent Assurance (IA) must also possess this qualification.

This individual will also perform base acceptance tests and inspection. If an inspector's Earthwork Level 1 qualification expires before Earthwork Level 2

qualification expires, he/she cannot perform the duties of Earthwork Level 1.

5.4 ECI QUALIFICATIONS AND COURSES

There are two levels of Earthwork 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 those findings on the **Density Data Forms**. The qualification requirements for Earthwork 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 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 Level 1. Topics covered in this course are listed below:

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

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.ctqpflorida.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 written examination (usually 1 hour, multiple choice) is administered at the beginning of 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 Data Base 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 in reporting the test results on the Earthwork Record System (ERS) Forms [675-020-27](#) and [675-020-28](#). 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 earthwork specification requirements, [Standard Indexes](#) 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) Earthwork Record System (ERS) Forms [675-020-27](#) and [675-020-28](#)
- (3) [Standard Specifications](#) and [Design Standards](#)

A written examination (usually 2 hours, multiple choice) 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, written examination (usually 2 hours, multiple choice) 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 specifications, materials, and processes, Certificates of Qualification are issued for 60 months. In order to maintain qualification, 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 Earthwork Level I qualification are required to pass the written examination. Applicants who let their qualification expire will be required to pass the Earthwork Level I proficiency demonstration and written examination.

If a trainee's nuclear safety certificate expires, then his/her ECI Level 1 qualification will be considered inactive until the trainee provides a valid certificate. Ensuring whether the trainee is an active or inactive ECI Level 1 Technician is the employer's responsibility. In the event that a trainee becomes inactive in this area, the trainee's ECI Level 1 qualification expiration date will not be affected.

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, the ECI Level 2 inspector cannot perform the duties of Earthwork Level I.

After a trainee has successfully met all of these requalification requirements, 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 TRT Committee

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

5.7.3 State Materials Office

Develop the prerequisite courses of *Safety and Control of Equipment with Radioactive Materials (ST-06-0001)* and the *Earthwork Density Record System Course (BT-17-0024)* to ensure a minimal overlap with the Earthwork courses. FDOT employees will coordinate with the DCTA to obtain these courses.