

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 persons 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 AUTHORITY

Part 23, Section 637, Code of Federal Regulations, Quality Assurance Procedures for Construction

Part 150, Section 10, Code of Federal Regulations, Exemptions and Continued Regulatory Authority in Agreement States (Promulgated under authority of United States Nuclear Regulatory Commission)

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

Section 6, FDOT Standard Specifications for Road and Bridge Construction

5.3 QUALIFICATIONS

There are two levels of Earthwork Qualifications: Level I and Level II.

5.3.1 Earthwork Level I Qualification Requirements

A qualified Earthwork Level I Technician will 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 I is designed to be completed by a newly hired employee with minimal guidance.

There are three (3) requirements for Earthwork Level I 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. Applicant must certify that they meet/don't meet this requirement on the application.
- (2) Pass the Earthwork Level I written examination.
- (3) Pass the Earthwork Level I proficiency examination.

After a trainee meets all of these qualification requirements, the trainee's FDOT qualification date will be added to the training database. The date of qualification shall be the date the last qualification requirement was satisfied. Qualification shall be for five (5) years (60 months).

5.3.1.1 Earthwork Level I Training Course

A one and one half day training course is offered for Level I. Topics covered in this course are included in **Attachment 5-1**.

At the beginning of the second day, a written examination (usually multiple choice) is administered. The proficiency examination is administered on the second day.

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>. Persons 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).

5.3.1.1.1 Earthwork Level I Written Examination

A written examination (usually 1 hour, multiple choice) is administered at the beginning of the second day of the Earthwork Level I 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 (TQDB). Two weeks should be allowed for grading and posting of the examination results.

5.3.1.1.2 Earthwork Level I Proficiency Examination

A trainee must demonstrate proficiency in **Florida Methods (FM)**. Specifically 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 report the test results on the density data forms. A checklist is used for each of these areas. The trainee will have two opportunities to successfully demonstrate all items on the checklist for each area. Failure to demonstrate any item on the checklist will fail the student for that try in that area. 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.

5.3.2 Earthwork Level II Qualification Requirements

The qualification requirements for an Earthwork Level II Technician include knowledge of earthwork specification requirements, **Standard Indexes** and procedures related to earthwork construction.

There are three (3) requirements for Earthwork Level II Qualification:

- (1) Pass the Earthwork Level I written examination and proficiency.
- (2) Pass the Earthwork Level II written examination.
- (3) Must have 30 days work experience on a construction project involving

earthwork operations.

5.3.2.1 Earthwork Level II Training Course

A two-day training course is offered for Earthwork Level II. Topics covered in this course are included in ***Attachment 5-2***.

At the end of the second day, a written examination (usually 2 hours, multiple choice) is administered.

Information about course schedules and costs can be obtained by accessing the CTQP website. Persons not having access to the CTQP website may access course schedules by contacting the DCTA, SCTA or the CTQP Administrator.

5.3.2.1.1 Earthwork Level II Course Prerequisites

Prior to attending the Earthwork Level II 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

It is highly recommended that a person study the ***FDOT Pipe Placement Inspection (BT-06-0014) Self-Study*** and take the examination.

Self-study course manuals are available on-line on Construction website and also available from the Department's Maps and Publications Office.

5.3.2.1.2 Earthwork Level II Written Examination

A closed book, written examination (usually 2 hours, multiple choice) is administered on the last day of the Earthwork Level II 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.

5.4 QUALIFICATION REQUIREMENTS BY JOB FUNCTION AND IMPLEMENTATION SCHEDULE

Job functions for each Earthwork Qualification with the scheduled implementation date are contained in ***Attachment 5-3***.

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 I

Applicants with an active Earthwork Level 1 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.

5.5.2 ECI Level II

Applicants for Earthwork Level II must pass a written examination for requalification

When an inspector's Earthwork Level I qualification expires before Earthwork Level II qualifications, the Earthwork Level II inspector cannot perform the duties of Earthwork Level I. After the expiration of Earthwork Level II qualifications, the inspector will have to successfully complete all the requirements for Level I (**5.3.1**) and Level II (**5.3.2**).

After a trainee has successfully met all of these qualification requirements, the trainee's FDOT qualification date will be added to the training database.

5.6 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:

5.6.1 TRT Committee

Review and recommend revisions to the manuals, training aids, examinations and qualification procedure.

5.6.2 State Construction Training Office

Earthwork

- (1) Coordinate all CTQP related activities with CTQP Administrator, Technical Review Teams (TRT) Chairs and Providers.
- (2) Make sure the State Construction Office has representation when requested by the Earthwork TRT.

5.6.3 State Materials Office

Coordinate the Earthwork Course with the ***Safety and Control of Equipment With Radioactive Materials (ST-06-0001)*** and the ***Earthwork Density Record System Course (BT-17-0024)***. The goal for this coordination shall be to ensure that there is a logical and systematic progression of a construction technician's knowledge and development in the density field. This coordination shall also ensure that there is minimal overlap of the courses.

Attachment 5-1

Earthwork Level I Training Course

Topics covered in this course include:

- (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) FM 5-504 Reporting Test Results on the Density Data Forms, Sampling Soils, Limerock, Cemented Coquina, Bank Run Shell, and Stabilizing Materials from the Roadway
- (4) Nuclear gauge maintenance

Attachment 5-2

Earthwork Level II Training Course

Topics covered in this course include but are not limited to:

- (1) Density theory
- (2) Density Data Forms
- (3) Standard Specifications and Design Standards

Attachment 5-3

CTQP Qualification by Job Function

Earthwork

Earthwork - Level I:

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

Any person who tests earthwork to verify material quality, resolves disputes or performs Independent Assurance (IA) must also possess this qualification.

Earthwork - Level II:

This is the QC Technician, private lab or contractor employee who must be qualified to perform acceptance tests (if Level I qualified), has knowledge of Density Theory, preparation, completion, Certification of the Earthwork Record Systems, Florida Specifications and Design Standards. This individual will also perform base acceptance tests and inspection.

Any person who verifies earthwork specification compliance of material quality or performs Independent Assurance (IA) must also possess this qualification.