CHAPTER 12

3D CEI CONSTRUCTION

TRAINING AND QUALIFICATION PROGRAM

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# 12.1 PURPOSE

The purpose of this section is to describe the ***3D CEI Construction Training and Qualification Program***. This trainingis designed to establish a specific level of knowledge among project personnel responsible for field verification, measurement, and data collection on Florida Department of Transportation (FDOT) highway construction projects, when Global Navigational Satellite System (GNSS) Rovers are used. This procedure will list the details of the qualification program including the associated training course.

This Chapter contains course and qualification requirements for Department and Consultant personnel using GNSS rovers for field verification, measurement, and data collection.

# 12.2 BACKGROUND

FDOT Construction, Engineering, and Inspection (CEI) procedures are evolving to incorporate readily available technology to enhance verification and measurement processes and provide the capability to accurately and efficiently collect digital as-built data. The CEI industry best practice for inspection on projects should include verification of elevation, alignment, and position of construction elements to ensure these items are built in reasonable conformance with the plans and specifications. The use of a GNSS Survey Rover makes this verification possible for many elements (excluding asphalt).

# 12.3 QUALIFICATION REQUIREMENTS BY JOB FUNCTION

The target audience for this course are inspectors and senior inspectors, though other Department and Consultant positions (Senior Project Engineer, Project Administrator and Contract Support Specialist) may also benefit.

All project personnel responsible for verifying, measuring, and documenting pay quantities for progress and final estimates in accordance with the ***Construction Project Administration Manual, Procedure No. 700-000-000 (CPAM)*,** must maintain this qualification if GNSS rover data is used and/or submitted as field record documentation or to establish a basis for payment.

# 12.4 QUALIFICATION AND COURSE

## 12.4.1 3D CEI Qualification Requirements

All applicants seeking the 3D CEI qualification must attend an FDOT accredited 3D CEI Qualification Course by an FDOT approved provider and receive a passing grade on the final examination. Applicants seeking requalification should refer to ***Section 12.5***. A closed book, computer-based examination is administered by an approved CTQP proctor, on the last day of the training course. The maximum examination time allowed is 2 hours. A passing score for this examination is 70%.

All examinations are electronically graded by the CTQP, and the results posted in the Training Qualification Database System. Two weeks should be allowed for grading and posting the examination results.

After obtaining this qualification requirement, the applicant’s Department qualification date will be added to the Training Qualification Database System. Qualification shall be for five (5) years (60 months) from the date the last qualification examination requirement was satisfied.

## 12.4.2 3D CEI Training Course

Trainees taking the 3D CEI Construction qualification course should be familiar with the current specifications and the ***CPAM*.** Highly recommended prerequisites for the 3D CEI qualification course are the following [training courses](https://www.fdot.gov/construction/training):

* ***Construction Math*** (Self-Study)
* ***Contract Plans Reading*** (Self-Study)
* ***Final Estimates Level 1*** (CTQP)
* ***Earthwork Construction Inspection Level 1*** (CTQP)
* ***Earthwork Construction Inspection Level 2*** (CTQP)

The 3D CEI Qualification Course is instructor led and is approximately one and one-half days with a two hour multiple choice examination.

Topics covered in this course are:

1. Basic Surveying
2. Global Navigational Satellite System (GNSS) rover setup and capabilities
   1. Base station
   2. Florida Permanent Reference Network (FPRN)
   3. Calibration and Corrections
   4. Data collection
   5. Data output
   6. Accuracy
3. Overview of ORD model files.

# 12.5 REQUALIFICATION

Due to frequent changes in specifications, methods of documentation, and other processes, requalification requirements are issued as follows:

## 12.5.1 3D CEI Requalification

Applicants for the 3D CEI requalification must pass the written examination for the 3D CEI Training and Qualification Course. After an applicant has successfully met the requalification requirement, the requalification date will be added to the Training Qualification Database System. Requalification shall be for five (5) years (60 months) from the date of expiration.

Any applicant who fails to become requalified by the 60th month shall become disqualified on the last day of the 60th month and must reapply for qualification by attending an FDOT accredited 3D CEI Qualification Course and receive a passing grade on the final examination.

# 12.6 REVOCATION OF QUALIFICATION

See Section 1.14.6 and 1.14.7 of this manual.

# 12.7 DEPARTMENT RESPONSIBILITIES

The following responsibilities are unique to the ***3D CEI Training and Qualification Program*** and are in addition to those listed in ***Chapter 1*** of this manual***.***

## 12.7.1 Technical Review Team Committee

The Technical Review Team (TRT) committee reviews and recommends revisions to the manuals, training aids, examinations, and qualification procedure. The TRT will conduct interviews with each instructor requesting to teach this course.

## 12.7.2 State Construction Training Office

1. Coordinate all CTQP related activities with CTQP Administrator, TRT Chairs and Providers.
2. Ensure representation from the State Construction Office in the 3D CEI Training TRT.

# 12.8 3D CEI TRAINING PROVIDER

## 12.8.1 Responsibilities

Providers requesting approval from the State Construction Office (SCO) must demonstrate they can perform the duties listed in this section. Providers may either be individuals who instruct their own courses or entities with multiple instructors. The Provider shall:

1. Provide the minimum course instruction duration required by this procedure for teaching the specific course subjects covered in the FDOT 3D CEI Facilitator Handbook supplied course manual.
2. Provide a qualified Instructor meeting the minimum qualification requirements outlined in CTQM 1.11.2.
3. Provide a suitable classroom to conduct the course. This shall include, as a minimum, adequate lighting and acoustical properties, adequate writing surface area (a minimum of six square feet per trainee is required), adequate temperature control, suitable ceiling height (so that all trainees can see all audio-visual presentations), and state of the art audio visual equipment such that electronic, computer driven presentation programs can be readily used to enhance classroom instruction.
4. Include their trainee cancellation and refund policy on their application. Each provider may have their own cancellation policy and deadline but in no case will the deadline for the trainee to cancel exceed seven (7) calendar days prior to the start of the session/exam in order to receive a full refund. FDOT personnel are exempt from this requirement.
5. In the case of course or exam cancellation, the Provider is responsible for notifying any Trainees that have already registered for the course or exam.
6. Provide a written policy for Student Identification verification (e.g., check Driver’s License or Identification) with their application.
7. Provide a written policy for Instructor to Student Ratio (e.g., 1:20) with their application.
8. Provide a written Quality Control Policy for your instructors (e.g., complete one formal evaluation for each instructor annually) with their application.
9. Have proven ability to manage training.
10. Store all examination materials for each course, including answer sheets and class rosters for a period of at least four (4) years.

# 12.9 3D CEI TRAINING INSTRUCTOR

## 12.9.1 Responsibilities

Instructors requesting approval from the State Construction Office (SCO) must demonstrate they can perform the duties listed in this section. The Instructor shall:

1. Furnish 3D CEI course material for each student.
   1. The required course content and training materials are developed by the Department and a single electronic file copy is given to the Provider by the CTQP Administrator. The Provider is expected to make the appropriate number of copies of these materials to teach the course. The 3D CEI course materials to be furnished to each student include all necessary copies of the training materials (Participant Handbook, study/reference information, examination, and Standard Course Evaluation Survey).
2. Furnish at least one GNSS rover for in-class demonstration and class exercises in accordance with the FDOT 3D CEI Training Facilitator Handbook.
   1. The GNSS rover equipment must meet the criteria set forth in the 3D CEI Primer included with the course documents.
   2. An independent base station may be needed in areas where connection to the Florida Permanent Reference Network (FPRN) is not available.
3. Instruct all students taking the 3D CEI examination that the Standard Course Evaluation Survey is a required part of their exam and must be completed and turned in with their exam.
4. Produce and maintain a class sign-in sheet which is to be signed by each student at the completion of the training.
   1. This sheet must contain the name of the Provider, the name of the Instructor(s), the name of the class being presented, the date and location of class presentation, the printed names and signatures of all class students, their email address (or other designated email address) and the TIN number of all students. The sign-in sheet must be accompanied with a consent form (provided by the CTQP Administrator) to obtain each student’s TIN number and email address. For any student that declines to sign the consent form will not be eligible to take the course. The Provider must retain the original copy of this record for four years. If the Department has not requested the record the Provider must destroy it by shredding at the conclusion of the four-year period.
      1. The TIN number is the first nine numbers of a valid State-issued Driver's License Number, the first nine numbers of a valid State-issued Identification Card Number or a valid Passport number.
5. Within three business days of the completion of the course test, providers must submit class sign-in sheets.
6. Payment: Submit payment to the CTQP Administrator fee invoices within 15 calendar days.
7. It is the expectation of the Department that any instructor to student commentary on the course materials be in alignment with current Department policy.

## 12.9.2 Requirements

Instructors requesting approval to teach the 3D CEI training course must meet the following criteria:

1. Documentation describing the instructor’s knowledge, skills, and abilities detailing his/her involvement in using the following State of Florida documents: ***Standard Plans****,* ***FDOT Design Manual (FDM), Construction Project Administration Manual (CPAM),*** and ***Standard Specifications***.
2. Four years of verifiable experience occurring within the last 10 years in operating a GNSS rover for verification, measurement, or data collection purposes relating to highway construction projects.
   1. A detailed description of the qualifying experience and employer contact information must be provided as part of the Instructor resume.
3. Knowledge of FDOT Final Estimates processes and procedures relating to design deliverables, final as-built plans, field record submittal requirements, final measured pay items, earthwork, etc.