

## CHAPTER 6

### GEOTECHNICAL TRAINING PROGRAM

|         |  |      |
|---------|--|------|
| 6.1     | PURPOSE.....   | 6-1  |
| 6.2     | BACKGROUND.....  | 6-1  |
| 6.3     | QUALIFICATION REQUIREMENTS BY JOB FUNCTION.....  | 6-1  |
| 6.3.1   | Pile Driving Inspector Qualification.....  | 6-1  |
| 6.3.2   | Drilled Shaft Inspector Qualification.....   | 6-1  |
| 6.3.3   | MSE Wall Inspection.....   | 6-1  |
| 6.3.4   | Auger Cast Pile Inspector Qualification.....   | 6-2  |
| 6.3.5   | Auger Cast Pile Inspection for non-Bridge Structures.....  | 6-2  |
| 6.4     | GEOTECHNICAL QUALIFICATIONS AND COURSES.....   | 6-2  |
| 6.4.1   | Pile Driving Inspector Qualification Requirements.....   | 6-2  |
| 6.4.1.1 | CTQP Pile Driving Inspection Course Details.....   | 6-3  |
| 6.4.2   | Drilled Shaft Inspector Qualification Requirements.....  | 6-4  |
| 6.4.2.1 | Drilled Shaft Inspection Training Course.....  | 6-5  |
| 6.4.3   | MSE Wall Training Course Requirements.....   | 6-6  |
| 6.4.4   | Auger Cast Pile Inspector Qualification Requirements.....  | 6-7  |
| 6.4.5   | Auger Cast Pile for non-Bridge Structures Course Requirements.....                                     | 6-8  |
| 6.5     | REQUALIFICATION PDI/DSI TRAINING COURSES.....  | 6-8  |
| 6.6     | PILE DRIVING AND DRILLED SHAFT INSPECTOR QUALIFICATION<br>REVOCATION BASED ON LACK OF PROFICIENCY..... | 6-8  |
| 6.6.1   | Qualification Revocation Based on Falsification of Records.....  | 6-10 |
| 6.7     | RESPONSIBILITIES.....  | 6-11 |

## **6.1 PURPOSE**

The purpose of this chapter is to codify all geotechnical-related training and qualification programs that pertain to the construction of driven piles, drilled shafts, retaining walls and auger cast piles.

The purpose of the Construction Training Qualification Program (CTQP) for Pile Driving Inspection, Drilled Shaft Inspection, Mechanically Stabilized Earth (MSE) Wall and Auger Cast Piles is to set a specific level of knowledge and hands-on capability for the persons responsible for the inspection of deep foundations and retaining wall installation in Florida Department of Transportation (Department) construction projects.

## **6.2 BACKGROUND**

Since July 1995, the Department's Qualification Program for Pile Inspectors and Drilled Shaft Inspectors has been in effect, and the State Construction Office (SCO) administered the course. In June 2001 these courses were turned over to the Department's Construction Training Qualification Program (CTQP). This procedure describes the process of administration and explains the requirements necessary to be qualified as a CTQP Pile Driving Inspector (PDI), Drilled Shaft Inspector (DSI), MSE wall inspector and Auger Cast Pile Inspector (ACPI), and how previously qualified inspectors can renew their qualification.

## **6.3 QUALIFICATIONS REQUIREMENTS BY JOB FUNCTION**

### **6.3.1 Pile Driving Inspector Qualification**

Any person involved in the acceptance process during driven pile operations shall be CTQP Pile Driving Inspector qualified.

### **6.3.2 Drilled Shaft Inspector Qualification**

Any person involved in the inspection and acceptance process during Drilled Shaft operations shall be CTQP Drilled Shaft Inspector qualified.

### **6.3.3 MSE Wall Inspection (not a CTQP qualification)**

Any person involved in the acceptance process during MSE wall construction shall have CTQP Earthwork Construction Inspector (ECI) Levels 1 and 2 qualifications and complete and pass the FDOT MSE Wall Inspection course.

### **6.3.4 Auger Cast Pile Inspector Qualification**

Any person involved in the inspection and acceptance process during Auger Cast Pile operations for Bridge Structures shall be CTQP Auger Cast Pile Inspector qualified.

### **6.3.5 Auger Cast Pile Inspection for non-Bridge Structures (not a CTQP qualification)**

Any person involved in the inspection and acceptance process during auger cast pile operations for non-Bridge Structures shall complete and pass the FDOT computer based training (CBT) Auger Cast Pile Inspection course.

## **6.4 GEOTECHNICAL QUALIFICATIONS AND COURSES**

There are three geotechnical qualifications and two “stand-alone” geotechnical training courses:

- (1) Pile Driving Inspector Qualification (PDI)
- (2) Drilled Shaft Inspector Qualification (DSI)
- (3) Auger Cast Pile Inspection Qualification for bridge structures (ACPI)
- (4) MSE Wall Inspection (not a CTQP qualification)
- (5) Auger Cast Pile Inspection for non-bridge structures (not a CTQP qualification)

### **6.4.1 Pile Driving Inspector (PDI) Qualification Requirements**

All trainees seeking Pile Driving Inspection qualification must:

- (1) Obtain on-site experience in which he/she has directly observed, inspected, and recorded the full installation of at least fifteen (15) driven piles under the supervision of a CTQP qualified Pile Driving Inspector (PDI). At least ten (10) of the piles inspected shall be driven with an open-ended Diesel Hammer on FDOT projects. The supervising CTQP qualified PDI shall include a note in the first page of the Pile Installation log as evidence for the

required experience, indicating the name of the trainee and stating the trainee has inspected the full installation of the pile. Trainees must also complete and submit (to the CTQP administrator) the signed Work Experience Certification available online at the CTQP's website: <http://www.ctqpflorida.com>, Pile Driving Inspector – Work Experience Affidavit. Trainees must certify they have met the required experiential criteria above when submitting the application for PDI. The Department may request randomly or as needed, evidence of experience after qualification is granted.

- (2) Pass the PDI training course written examination. The passing score is 70%.

After the trainee meets all the qualification requirements, the trainee's FDOT qualification date will be added to the training database. PDI Qualification shall last for 60 months.

### **6.4.1.1 CTQP Pile Driving Inspection Course**

#### **Details**

The Construction Training Qualification Program (CTQP) shall offer the Pile Driving Inspection class as a single course.

The course will be two (2) days followed by a multiple-choice exam on the second day that covers the principles and practices, materials and equipment used for pile installation. This course shall be offered to classes of up to 30 trainees.

Information about course provider contacts may be obtained by accessing the CTQP web site. Scheduling and cost information is available from the individual providers.

#### **Prerequisites**

The following prerequisites are mandatory for FDOT employees only and recommended to all other applicants.

- (1) Review:

- (a) **Section 455, FDOT Standard Specifications for Road and Bridge Construction and amendments**
- (b) An FDOT project plan set in which driven piles are included
- (2) Pass the following FDOT Construction Self-Study Courses (available from your District Construction Training Administrator):
  - (a) Construction Math
  - (b) Contract Plans Reading
- (3) Pass the electronic Pile Driving Inspection Self-Study tutorial for the written examination prior to attending the written examination.

### **Written Examination**

An open book, written examination (limited to 2.5 hours, multiple-choice) is administered on the last day. The passing score for the written examination is 70%.

The written examinations will be electronically graded by the CTQP Administrator and posted in the Training and Qualification Data Base System (TQDBS).

Applicants will be allowed to challenge the PDI examination without attending the class presentations for qualification.

### **6.4.2 Drilled Shaft Inspector (DSI) Qualification Requirements**

All trainees seeking Drilled Shaft Inspector qualification must:

- (1) Obtain on-site experience in which at least he/she has directly observed, inspected, and recorded the full installation of at least ten (10) shafts under the supervision of a CTQP qualified Drilled Shaft Inspector (DSI). At least five (5) of the drilled shafts inspected shall be on shafts constructed using the wet method. The CTQP qualified DSI shall include a note in the "Additional Excavation Comments" page of the Drilled Shaft Excavation log as evidence for the required experience, indicating the name of the trainee and stating the trainee has inspected the full installation of the shaft. Trainees must also complete and submit (to the CTQP administrator) the

signed Work Experience Certification available online at the CTQP's website: <http://www.ctqpflorida.com>, Drilled Shaft Inspector – Work Experience Affidavit. Trainees must certify they have met the required experiential criteria above when submitting the application for DSI. The Department may request randomly or as needed, evidence of experience after qualification is granted.

- (2) Pass the Drilled Shaft Inspection course written and proficiency examinations. The passing score of the written examination is 70%. The passing score of the proficiency exam is 100%.

After the trainee meets all the 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 last for 60 months.

### 6.4.2.1 Drilled Shaft Inspection Training Course

#### Details

The Construction Training Qualification Program (CTQP) shall offer the Drilled Shaft Inspection class a single course.

The course will be two (2) days followed by a multiple-choice exam on the third day that covers the principles and practices, materials and equipment used for drilled shaft installation. This course shall be offered to classes of up to 30 trainees.

Information about course provider contacts may be obtained by accessing the CTQP web site. Scheduling and cost information is available from the individual providers.

#### Prerequisites

These prerequisites are mandatory for FDOT employees only, and recommended to all other applicants.

- (1) Review:
  - (a) ***Section 455, FDOT Standard Specifications for Road and Bridge Construction and amendments***

- (b) A Department project plan set in which drilled shafts are included
- (2) Pass the following FDOT Construction Self-Study Courses:  
(available through your District Construction Training Administrator):
  - (a) Construction Math
  - (b) Contract Plans Reading
  - (c) Portland Cement Concrete Testing
  - (e) Pass Drilled Shaft Inspection Self Study tutorial

### **Written Examination**

An open book, written examination and a proficiency test are administered on the last day. The passing score for the written examination is 70%. The proficiency test will take about 15 minutes per participant and may be performed in separate sessions or simultaneously with the written examination. All items requested in the proficiency test must be performed correctly. When performed in separate sessions the provider will allow for the written examination a maximum of 2-1/4 hours. When performed simultaneously the provider will allow a maximum of 2-1/2 hours to complete both examinations.

The written examinations will be electronically graded by the CTQP Administrator and posted in the Training and Qualification Data Base System (TQDBS).

Applicants will be allowed to challenge the DSI written examination without attending the class presentations for qualification.

### **6.4.3 MSE Wall Training Course Requirements**

Personnel inspecting Mechanically Stabilized Earth (MSE) Walls construction are required to have passed the following courses:

- (1) CTQP Earthwork Construction Inspection Level 1
- (2) CTQP Earthwork Construction Inspection Level 2

### (3) MSE Wall Inspection Course

The MSE Wall Inspection course is available on-line at the State Construction Office (SCO) web site. All technicians should take this course and the quiz at the end of each chapter and pass the final examination to inspect MSE Wall installation in the field.

Project Administrators shall verify if the inspectors satisfy these requirements before assigning them to an MSE wall inspection. The date of certification shall be the date the last course examination was completed and satisfied. Certification shall last for 60 months.

## 6.4.4 Auger Cast Pile Inspection Qualification Requirements

All trainees seeking Auger Cast Pile Inspector for Bridge Structures qualification must:

- (1) Obtain on-site experience in which they have directly observed, inspected, and recorded the full installation of at least thirty (30) piles for bridges utilizing the FDOT forms.
- (2) Pass the Auger Cast Pile Inspection for Bridge Structures course written examination. The passing score of the written examination is 70%.

After the trainee meets all the qualification requirements, the trainee's CTQP qualification date will be added to the training database. The date of the qualification shall be the date the last Qualification Requirement was satisfied. Qualifications shall last for 60 months from the date of the exam. The Department may request randomly or as needed, evidence of experience after qualification is granted.

Project Administrators shall verify if the inspectors satisfy these requirements before assigning them to auger cast pile inspection. The date of qualification shall be the date the last course examination was completed and satisfied. Qualification shall last for 60 months.

## Written Examination

An open book, written examination (limited to 2.0 hours, multiple-choice) is administered on the last day. The passing score for the written examination is 70%.

The written examinations will be electronically graded by the CTQP Administrator and posted in the Training and Qualification Data Base System (TQDBS).



Applicants will be allowed to challenge the ACPI examination without attending the class presentations for qualification.

#### **6.4.5 Auger Cast Pile for non-Bridge Structure Course Requirements**

Personnel inspecting auger cast piles for non-bridge structures must complete the Auger Cast Pile Inspection CBT Course. Personnel meeting the requirements for Auger Cast Pile for Bridge Structures are also qualified to inspect auger cast piles for non-bridge structures.

The Auger Cast Pile Inspection CBT course is available on-line at the SCO website. All technicians must take this course and the quiz at the end of each chapter and pass the final examination to be qualified to inspect auger cast pile installation for non-bridge structures in the field.

### **6.5 REQUALIFICATION PDI/DSI/ACPI TRAINING COURSES**

Due to frequent changes in specifications, materials, and processes, Certificates of Qualification are issued for 60 months.

Applicants for requalification will be required to reapply and take the examination. Drilled Shaft Proficiency test will not be required for applicants currently qualified as Drilled Shaft Inspectors.

### **6.6 PILE DRIVING, DRILLED SHAFT, AND AUGER CAST PILE INSPECTOR QUALIFICATION REVOCATION BASED ON LACK OF PROFICIENCY**

To maintain qualification status, pile driving, auger cast pile, and drilled shaft inspectors will be evaluated by the District Geotechnical Engineers (DGEs) or their designees during the test or production pile/shaft installation. If the DGE or designees witness a qualified inspector making an error (omission or mistake that impacts acceptability of foundations) without adequate knowledge of specifications, **CPAM** procedures or erroneous reporting techniques, the DGE shall file a report stating the inspector shall be subject to the process indicated below. Erroneous reporting techniques include but are not limited to improper filling of the construction forms, inaccurate data input and failure to record information,

notes, events or any action that may affect the acceptability of the foundation. One copy of the report and documentation supporting each warning shall be given to the inspector, one copy to the inspector's supervisor, one copy (to be retained) in the Project records, one copy each sent to the CTQP Administrator, the State Construction Geotechnical Engineer (SCGE) and the original sent to the State Construction Training Administrator (SCTA). Inspection results from a suspended inspector will not be allowed for decisions. Inspector's employers shall provide engineering analysis report to ensure that foundations meet contract requirements.

1<sup>st</sup> Error- Verbal (documented) warning from the DGE.

A copy of the documentation of the verbal warning shall be sent to the SCTA and SCGE. The DGE or designee will schedule a follow up review during the duration of the project. If no other errors are witnessed during the subsequent review, then the record of the 1st error shall not be the basis for further Department action.

2<sup>nd</sup> Error- Written warning from the DGE.

A copy of the documentation of the written warning shall be sent to the SCTA and SCGE. If no other errors are witnessed within one year (365 days) of second error, the record of the errors shall not be the basis for further Department action.

3<sup>rd</sup> Error- Revocation of qualification the by the SCTA.

Should the 3<sup>rd</sup> error be determined valid, the District Materials and Research Engineer (DMRE) will discuss the matter with the District Construction Engineer (DCE), and recommend action in writing to the Director, Office of Construction (Director), SCGE and the SCTA. The Director may revoke the inspector's qualification for up to one year. The SCTA will notify the inspector via a "return receipt requested" revocation notification letter mailed to the inspector and their employer (or DCE if a Department employee). The CTQP Administrator will be notified by the SCTA that the inspector's qualification will be removed from the database and the inspector shall not be allowed to reinstate the subject qualification for the period specified in the Director's revocation notification letter.

The inspector has 90 days from receipt of notice to appeal this decision. This decision may be appealed to the Department's Chief Engineer, whose decision is final.

Prior to having any revoked qualification reinstated, the inspector must complete all requirements for that qualification again. This includes meeting all initial requirements, any conditional requirements set in the revocation notification letter, as well as passing the written examination and any applicable proficiency examination.

### 6.6.1 Qualification Revocation Based on Falsification of Records

Active, qualified inspectors must conform to the Department's practices regarding testing, acceptance, and quality control activities. Should any qualified inspector falsify Department records, his/her qualifications will be subject to possible revocation for up to two years by the Director. Falsification of project related documentation may be subject to further investigation and penalty under State Statutes and Federal Law. If a DCE or DMRE becomes aware of such activity they shall forward a written account of the details including their recommendation to the Director and the SCTA. Some of the CTQP qualifications list "a certain number of days work experience" as a qualification requirement. The applicant shall certify as meeting/not meeting any work experience requirements on the signed certification page of the **CTQP Exam Booklet**. Should the District Geotechnical Engineer or designee question inspector's required work experience, proof of required work experience will be requested. Failure to furnish proof of required work experience could result in revocation. If the District Geotechnical Engineer or designee becomes aware of such failure to furnish proof of required work experience, then he/she shall forward the details in writing to the DMRE, the DCE, and the SCTA. When the DCE or DMRE becomes aware of such activity they shall forward their recommendation in writing to the Director and the SCTA.

The Director shall have the authority to revoke an inspector's qualification or qualifications for the falsification of any Department records. The inspector will be notified via a "return receipt requested" revocation notification letter mailed to the inspector and their employer (or DCE if a Department employee). The SCTA shall receive a copy of this revocation notification letter and the SCTA shall also notify the CTQP Administrator that the inspector's qualification shall be removed from the TQDBS and that the inspector shall not be allowed to reinstate that qualification for the period specified in the Director's revocation notification letter.

The inspector has 90 days from receipt of notice to appeal this decision. This decision may be appealed to the Department's Chief Engineer, whose decision is final.

Prior to reinstating qualification, the inspector must complete all requirements for that qualification again. This includes meeting all initial requirements, any conditional requirements set in the revocation notification letter, passing the written examination and any applicable proficiency examination.

## **6.7 RESPONSIBILITIES**

See **CTQM Sections 1.10, 1.11, 1.12, and 1.13.**