Transportation Technician Qualification Program

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Introduction

Transportation agencies throughout the United States face several challenges related to developing and maintaining a qualified pool of technicians involved in quality control/quality assurance (QC/QA) testing of highway materials.

- New federal regulations requiring that all personnel involved in the acceptance of federally funded highway work be 'qualified' by 29 June 2000
- Increased outsourcing of work, including materials testing functions, to constructors, design professionals, and testing firms
- Loss of experienced testing technicians to retirement and the private sector

To meet these challenges, transportation agencies in the Northwest joined together to develop a common training program for transportation technicians.

The Northwest Alliance for Quality Transportation Construction (NAQTC) is comprised of the Departments of Transportation in Alaska, Idaho, Oregon, and Washington, along with the Federal Highway Administration (FHWA) and the Western Federal Lands Highway Division of FHWA. NAQTC's mission is to provide continuously improving quality in transportation construction. NAQTC's first major undertaking was the development of training documents for quality control (QC) personnel under its Transportation Technician Qualification Program (TTQP).

Scope of Program

Under the TTQP, technicians are qualified to provide QC testing on up to 35 field operating procedures (FOPs) relating to transportation materials. (See Appendix A for a complete listing.) The FOPs are based on standard laboratory test methods developed by the American Association of State Highway and Transportation Officials (AASHTO) or NAQTC. The materials are separated into four modules.

- Aggregate
- Concrete
- Asphalt
- Embankment and Base/In-Place Density

A major advance realized by this interstate cooperative effort is that state-by-state qualification is no longer required. Technicians trained, tested, and qualified in one state can provide services in other northwest states without requalification. The ability to cross state borders without the need

to retrain and requalify is a major benefit to testing technicians in the private sector. Not only are time and money conserved, but the chance of mistakes is reduced as the number of state-specific procedures is reduced.

Training Products

A multimedia approach was taken in developing training materials for NAQTC. There are four primary products of the TTQP.

- Introductory Video
- Instructor Guides and Participant Workbooks
- Computer-Based Training for Participants
- Computer Presentations for Instructors

The Introductory Video introduces the training program while emphasizing the importance and cost effectiveness of QC testing. Approximately 11 minutes long, the video is designed to instill a sense of pride and purpose among new and experienced technicians alike, as well as their managers.

The Guides and Workbooks are companion notebooks that cover the various FOPs. The two documents are identical except the Guides include directions to the Instructor for making important points or reviewing certain material. Review Questions are included at the end of each FOP, as are Performance Examination checklists. The checklists cover all the procedural steps that a technician must demonstrate in a laboratory setting in order to qualify. Written Exams were also prepared for each module. (An example of an FOP along with accompanying Review Questions and Performance Exam checklist will be found at the end of this paper.)

The Computer-Based Training is an interactive tool based on the Participant Workbooks. All the material from an entire module is available on a compact disk and is viewed using the Adobe Acrobat Reader. All of the graphics and pictures included in the Guides and Workbooks are include in the Computer-Based Training – with one important distinction. Many of the pictures transform into video clips lasting 5 to 15 seconds. Participants can, therefor, observe technique associated with each FOP. Links are included to allow users to move through or between FOPs and other documents in a module.

The Computer Presentations, which utilize PowerPoint, lead Instructors through their classroom work and are closely tied to the Instructor Guides. Many of the graphics and pictures included in the Guides and Workbooks are include in the Computer Presentations. As with the Computer-Based Training, many of the pictures transform into video clips.

Summary

The NAQTC project is a leading example of several regional quality assurance programs undertaken by state transportation agencies in the United States. The synergy created by the alliance has resulted in a higher quality and more cost-effective program than the agencies could

have developed individually. With more than 2,000 people to be trained annually in the region, the materials will have a positive impact on a transportation construction for years to come.

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Appendix A, Field Operating Procedures

Aggregate:

AASHTO T 2, Sampling of Aggregates
AASHTO T 248, Reducing Samples of Aggregate to Testing Size
AASHTO T 255, Total Moisture Content of Aggregate by Drying
AASHTO T 27, Sieve Analysis of Fine and Coarse Aggregates, &
AASHTO T 11, Materials Finer Than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing
NAQTC TM 1, Determining the Percentage of Fracture in Coarse Aggregate
AASHTO T 176, Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test

Concrete:

NAQTC TM 2, Sampling Freshly Mixed Concrete
NAQTC TM 10, Test Method for Temperature of Freshly Mixed Portland Cement Concrete
AASHTO T 119, Slump of Hydraulic Cement Concrete
AASHTO T 121, Mass per Cubic Meter (Cubic Foot), Yield, and Air Content (Gravimetric) of Concrete
AASHTO T 152, Air Content of Freshly Mixed Concrete by the Pressure Method
AASHTO T 23, Making and Curing Concrete Test Specimens in the Field

Asphalt:

AASHTO T 168, Sampling Bituminous Paving Mixtures
AASHTO T 248, Reducing Samples of Aggregate to Testing Size
NAQTC TM 3, Sample Preparation for and Calibration of Nuclear Asphalt Content Gauges
NAQTC TM 4, Asphalt Content of Bituminous Mixtures by the Nuclear Method
AASHTO TP 53, Determining the Asphalt Content of Hot Mix Asphalt (HMA) by the Ignition Method
NAQTC TM 6, Determining the Moisture Content of Bituminous Mixes
AASHTO T 209, Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
AASHTO T 166, Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens, &
AASHTO T 275, Bulk Specific Gravity of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens
AASHTO T 40, Sampling Bituminous Materials
AASHTO T 30, Mechanical Analysis of Extracted Aggregate

Embankment and Base/In-Place Density:

AASHTO T 255, Total Moisture Content of Aggregate by Drying, &
AASHTO T 265, Laboratory Determination of Moisture Content of Soils
AASHTO T 217, Determination of Moisture in Soils by Means for Calcium Chloride Gas Pressure Moisture Tester
AASHTO T 99, Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and 305-mm (12-in.) Drop, &
AASHTO T 180, Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and 457- mm (18-

in.) Drop, &
NAQTC TM 9, Moisture-Density Relations Using the Harvard Miniature Compaction Apparatus
AASHTO 272, Family of Curves -- One-Point Method
AASHTO T 85, Specific Gravity and Absorption of Coarse Aggregate
AASHTO T 224, Correction for Coarse Particles in the Soil Compaction Test
AASHTO T 89, Determining the Liquid Limit of Soils
AASHTO T 90, Determining the Plastic Limit and Plasticity Index of Soils
Instruction on Use of WSDOT 606, ITD T 74, AKDOT&PF A 12, or WFLHD Humphreys Curves
NAQTC TM 7, In-Place Density Testing of Embankment and Base Using the Nuclear Moisture-Density Gauge
AASHTO T 209, Maximum Specific Gravity of Bituminous Paving Mixtures
AASHTO T 166, Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens, &
AASHTO T 275, Bulk Specific Gravity of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens
NAQTC TM 8, In-Place Density of Bituminous Mixes Using the Nuclear Moisture-Density Gauge