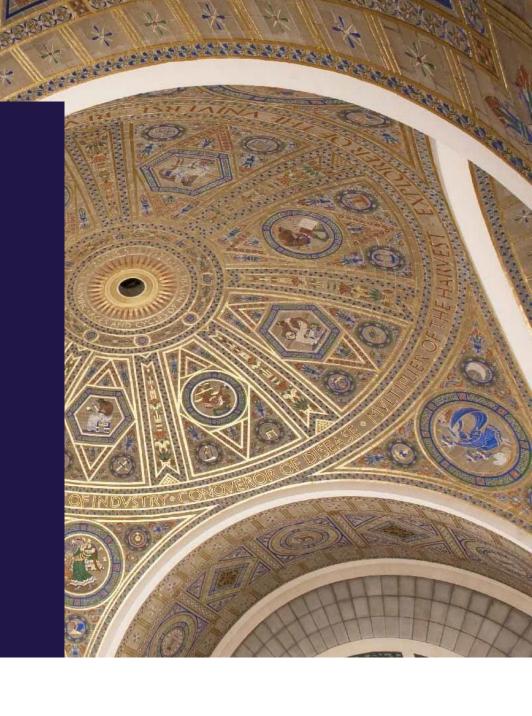
TREE TRANSPORTATION RESEARCH BOARD

TRB Webinar: Quality Construction Begins with Certified Sampling and Testing Personnel

October 2, 2025

3:00PM - 4:00 PM



PDH Certification Information

1 Professional Development Hours (PDH) – see follow-up email

You must attend the entire webinar.

Questions? Contact Andie Pitchford at TRBwebinar@nas.edu

The Transportation Research Board has met the standards and requirements of the Registered Continuing Education Program. Credit earned on completion of this program will be reported to RCEP at RCEP.net. A certificate of completion will be issued to each participant. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the RCEP.



Purpose Statement

This webinar will cover the different certification processes used throughout state DOTs in NCHRP Synthesis 638: State DOT Certification Programs for Materials Sampling and Testing Personnel. Presenters will share cooperative efforts used to develop certification programs and explore elements of individual programs, including their history, training and certification methods, reciprocity agreements, and program management practices.

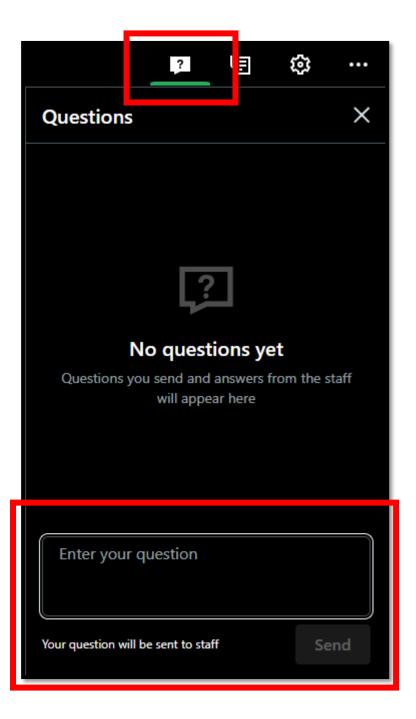
Learning Objectives

At the end of this webinar, you will be able to:

- 1. Apply guidance for field-testing personnel certification and qualification programs
- 2. Identify methods to address QA personnel certification and qualification programs and potential ways to improve them

Questions and Answers

- Please type your questions into your webinar control panel
- We will read your questions out loud, and answer as many as time allows



Today's presenters



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Quality Construction Begins with Certified Sampling and Testing Personnel

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Georgene Geary, GGfGA Engineering, LLC

Desna Bergold, DB Consulting & Associates, LLC







Webinar Overview

- Guidance for and a short history of sampling and testing personnel certification and qualification programs
- Description of the major cooperative efforts related to certification and qualification programs and future research needs in quality assurance (QA)
- Q and A

NCHRP Synthesis 638

State DOT Certification Programs for Materials Sampling and Testing Personnel

Sampling and testing personnel certification and qualification programs Short history and guidance

Long-lasting roads and bridges require:

- Quality workmanship
 - Verified through inspection
- Quality materials
 - Must be tested to verify they meet specifications

Title 23 of the Code of Federal Regulations (CFR)

- 1938: 'materials for the construction of any project shall be tested, prior to use, for conformity with the specifications '
 - Test results must be reliable and consistent
 - Different technicians and laboratories can provide comparable results
 - Acceptance program: determination of the quality of the product

Title 23 of the Code of Federal Regulations (CFR)

- 1975: 'Sampling and Testing of Materials and Construction' discussed
 - Acceptance Testing
 - Independent Assurance (IA) an unbiased and independent evaluation of the sampling and testing procedures
 - Project materials certification

Title 23 of the Code of Federal Regulations (CFR)

1995: 'Sampling and testing personnel. After June 29, 2000, all sampling and testing data to be used in the acceptance decision or the IA program shall be executed by qualified sampling and testing personnel.'

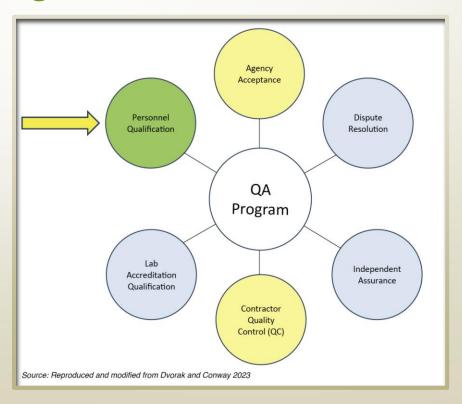
Qualification/Certification Predates CFR

- Certifying testing personnel predates the CFR requirements
 - Many agencies verified that their technicians were capable
 - As early as 1965, one agency had a certification program for bituminous concrete technicians
- Currently
 - All DOTs have developed programs to ensure their technicians are qualified
 - Due to the flexibility in the CFR and FHWA guidance, these programs vary.

23 CFR 637B Quality Assurance Procedures for Construction

The six core elements of a QA program:

- Agency acceptance program
- Dispute resolution system
- Independent assurance (IA) program
- Contractor quality control processes
- Qualified/accredited laboratories
- Qualified sampling and testing personnel



23 CFR 637B Guidance

NCHRP 638 Appendix D

FHWA guidance related to sampling and testing personnel qualification programs.



Who must be certified:

Sampling and testing technicians involved in:

- Acceptance testing
 - Agency personnel
 - Consultant testing personnel
 - Supplier and contractor quality control personnel (if results used in the acceptance decision)
- Independent assurance program

23 CFR 637B Guidance Materials Notebook

Regulations cover:

'Project produced materials':

- Soils
- Aggregates
- Asphalt materials
- Concrete

Not meant to cover

Manufactured material:

- Precast concrete
- Reinforcing Steel
- Paint
- □ Etc.

Included in personnel certification:

DOT Standards used for acceptance:

- Practices: sampling and test specimen preparation required to provide a representative test sample
- Test Methods
 - Tests provide results that are compared to DOT requirements for acceptance
- Practices and Methods may include:
 - AASHTO Standards
 - ASTM Standards
 - DOT specific standards

23 CFR 637B Guidance

Directive supplement for technician qualification programs

Qualification programs should include:

Formal training – include all sampling and testing procedures

Hands-on training – demonstrate ability to perform procedures correctly

On-the-job training – ensure familiarity with DOT procedures

Written exams

Performance exams

Requalification procedures – 3 to 5 years

A process for retraining or removing personnel

Guidelines in AASHTO Standards

AASHTO COMPTS 5c Standard Practices

AASHTO R 18, Quality
Management System for
Construction Materials Testing
Laboratories

Laboratory Accreditation

AASHTO R 25, Technician Training and Certification Programs

Relevant to Sampling and Testing Personnel

AASHTO Standards

AASHTO R 18 Quality Management System for Construction Materials Testing Laboratories



Requirements to ensure technicians are trained



Requirements for proficiency (performance) evaluation for each method performed



Recommendations for training

Guidelines in AASHTO Standards

AASHTO R 25

Technician Training and Certification Programs

- Organization and management of the certification program
- Training and certification policies
- Training programs
- **<u>5</u>** Examination methods
- Certification

AASHTO R 25 Technician Training and Certification Programs Appendixes

Recommended Test and Corresponding AASHTO or Other Test:

- Soils and Aggregates
- Portland Cement Concrete
- Asphalt Mixtures

Summary of Certification Information Gathered from State Websites

NCHRP Synthesis Report 638 Appendix F

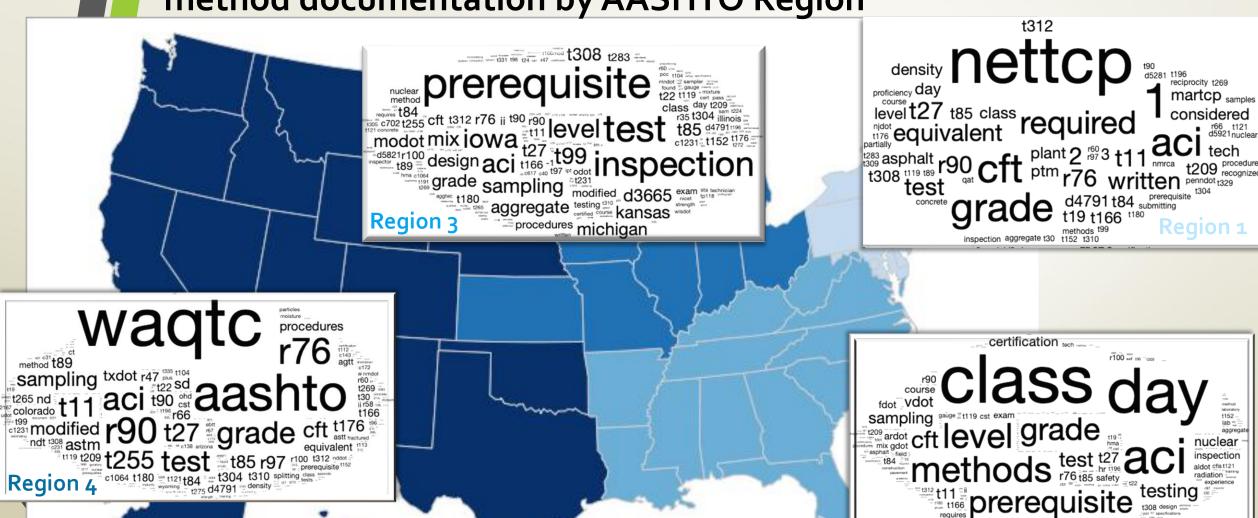
- List all the certifications found on the DOTs' website
- Specific practices and methods found
- Analysis of the common methods is included in Chapter 6

Appendix F Certification information from DOT Websites

Table F1. Certification information.

DOT	Name of Certification	Practices and methods or details about certification T22, R100, T24, T97, T119, T131, T141, T152, T2231, T309, M201, C192, C1231			
Alabama	Concrete standard test methods for concrete mix design labs				
Alabama	ACI Concrete Strength Testing Technician	ACI-CST Grade 1 or ACI-CFT Grade 1			
Alabama	ALDOT Concrete Technician	ACI-CFT Grade 1 certification required			
Alabama	Precast Quality Control Technician or Precast Quality Assurance Inspector	ALDOT Concrete Technician certification -and- PCI Level II or NPCA Level I certification			
Alabama	Prestressed Quality Control Technician or Prestressed Quality Assurance Inspector	ALDOT Concrete Technician certification -and- PCI Level II certification			
Alabama	Radiation Safety Technician	Nuclear gauge operation			
Alabama	Roadway HMA Pavement Technician	3 day class on asphalt pavement construction, placement and compaction, the use of nuclear gauges to determine densities, and random sampling			
Alabama	Asphalt Level 1 Laboratory Technician	4 day class on HMA testing			
Alabama	Asphalt Level II Quality Manager Technician	4 day class on improving HMA mix quality, prerequisite of Radiation Safety, Roadway HMA Pavement and Asphalt Level 1 Laboratory			
Alabama	Asphalt Level III Mix Design Technician	5 day class on HMA mix design, prerequisite of Radiation Safety, Roadway HMA Pavement and Asphalt Level 1 Laboratory			

Word clouds developed from mining certification program test method documentation by AASHTO Region



Region 2 concrete technician density density of the state of the state

Major cooperative efforts related to certification and qualification programs

WAQTC

Western Alliance for Quality Transportation Construction

M-TRAC

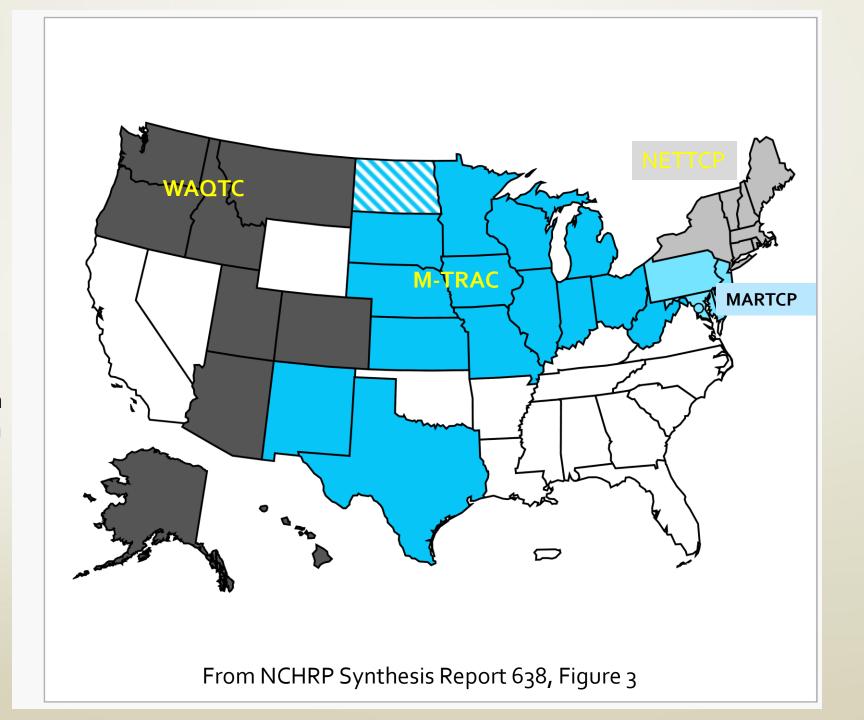
Multi-Regional Training and Certification

NETTCP

Northeast Transportation Training and Certification Program

MARTCP

Mid-Atlantic Region
Technician Certification
Program



M-TRAC Multi-Regional Training and Certification

https://engineering.purdue.edu/M-TRAC/index.htm

- Informal Partnership of DOTs
- Coordinates with AASHTO Technical Training Solutions (TTS)
- Do not provide Training or Certification separately
- 'Certification Book' certifications and associated tests

WAQTC Western Alliance for Quality Transportation Construction

https://www.waqtc.org

- Pooled-fund effort
- Managed by Executive Board
 - DOT Leadership
 - Advisory members from industry and academia
 - Approve training and certification materials
- Qualification Advisory Committee develops materials
- Each DOT responsible for Training and Certification



NETTCP

Northeast Transportation Training and Certification Program

https://www.nettcp.com

- Nonprofit entity
- Managed by Board of Directors and Executive Committee
 - DOT President
 - DOT and Industry Vice-Presidents
 - Approve content of training and certifications
- Certification Committees DOT and industry
- Training and Certifications run by private Exec. Director



Certification Programs

WAQTC - 7 Technician

Testing Technician Modules:

- Embankment and Base
- In-Place Density (soils, agg. and asphalt)
- Aggregate
- Asphalt I
- Asphalt II
- Concrete
- Self-Consolidating Concrete

NETTCP - 5 Technician /12 total

4 Technician Certifications, 1 Technologist:

- Soils and Aggregate Laboratory
- Asphalt Plant
- PG Asphalt Binder Laboratory
- Concrete
- Quality Assurance Technologist

+ 7 Inspector Certifications

PREREQS: Set by each DOT

PREREQS: HS Diploma or GED and 6 months experience

Comparison of a certification class

WAQTC

Asphalt II Testing Technician

- State sets prerequisites
- 10 practices and test methods, including QA concepts
- Performance exams in 8 methods:
 R 47, R 97, T 30, T 166, T 209, T 308,
 T 312, T 329

NETTCP

Asphalt Plant Technician

- 6 months experience, diploma or GED
- 18 practices and test methods referenced, including plant inspection
- Performance exams in 3 methods:
 T 166, T 209, and T 312

Closed-book written exam (90 min) >70% overall/60%/section to pass

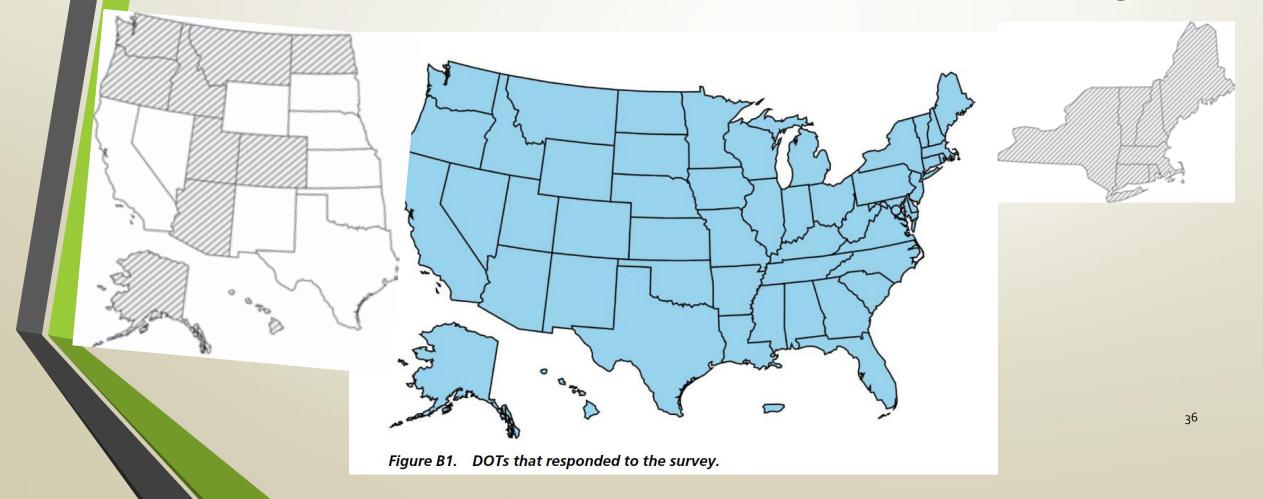
Closed-book written exam (90 min) >70% overall/60%/section to pass

Asphalt Mixture AASHTO Standards		R25	NETTCP	WAQTC
R 47, Reducing Samples of Asphalt Mixtures to Testing Size		Χ		X
R 66, Sampling of Asphalt Materials (liquid asphalt)		Χ	X	X
R 76, Reducing Samples of Aggregate to Testing Size		**	**	**
R 90, Sampling Aggregate Products		X	X	**
R 97, Sampling Asphalt Mixtures		X	•	Х
T 11, Material Finer than 0.075-mm (No. 200) Sieve in Mineral		Х	Х	**
Aggregates by Washing		^	^	
T 27, Sieve Analysis for Fine and Coarse Aggregate		X	Х	**
T 30, Mechanical Analysis of Extracted Aggregate		X	Х	Х
T 84, Specific Gravity and Absorption of Fine Aggregate	•	X	X	•
T 85, Specific Gravity and Absorption of Coarse Aggregate		X	**	**
T 166, Bulk Specific Gravity (G _{mb}) of Compacted Asphalt		Х	X	X
Mixtures Using Saturated Surface-Dry Specimens	X			
T 176, Plastic Fines in Graded Aggregates and Soils by the Use of the Sand Equivalent Test	Χ	Χ	X	**
T 209, Theoretical Maximum Specific Gravity (G _{mm}) and Density		X	X	X
of Asphalt Mixtures	Χ	•		^
T 269, Percent Air Voids in Compacted Dense and Open			•	•
Asphalt mixtures		Χ		
T 275, Bulk Specific Gravity (G _{mb}) of Asphalt Mixtures Using				
Paraffin-Coated Specimens				
T 283, Resistance of Compacted Asphalt Mixtures to Moisture-		Х		
Induced Damage	Χ	^		
T 304, Uncompacted Void Content of Fine Aggregate	Χ	Х	Х	
T308, Determining the Asphalt Binder Content of Asphalt		Х	V	Х
Mixtures by the Ignition Method	Χ	^	X	^
T 312, Determining the Density of Asphalt Mixture Specimens by Means of the Superpave Gyratory Compactor		Х	Х	Х

NCHRP Synthesis Report 638, Table 27

Most common Asphalt Standards found in DOT Certifications

WAQTC and NETTCP 2 very different models to accomplish the same goal



Individual DOTs Certification Programs

DOTs identifying outside entities involved in their programs Example based on Asphalt certifications:

Program Management

- □ 15% Contractors or consultants
- 27% College or university
- ☐ 31% Outside Association
- ☐ 4% LTAP

□ 37% identified DOT only

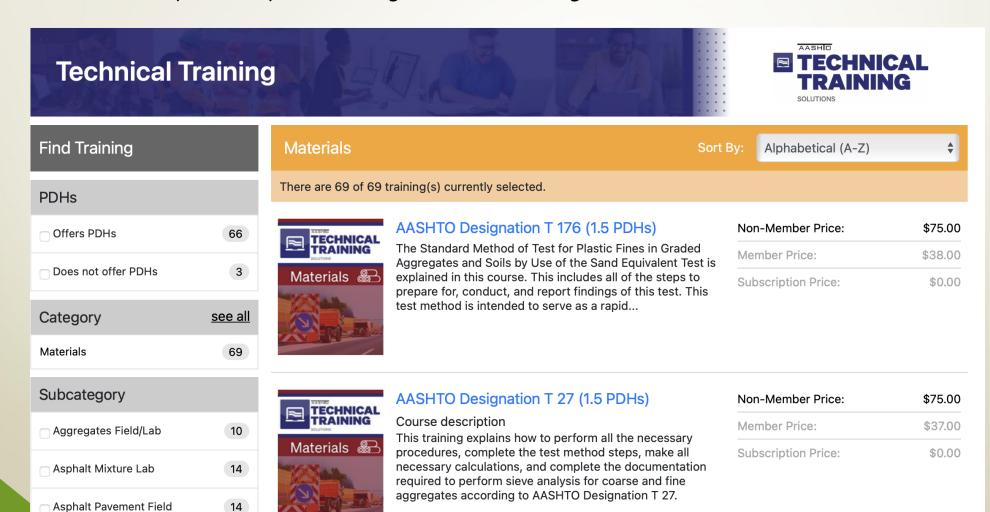
Training

- 10% Contractor or consultant
- 23% College or university
- 27% Outside Association
- ☐ 4% LTAP

□ 38% identified DOT only

AASHTO Technical Training Solutions (TTS)

https://transportation.org/technical-training-solutions/resources/course-list/



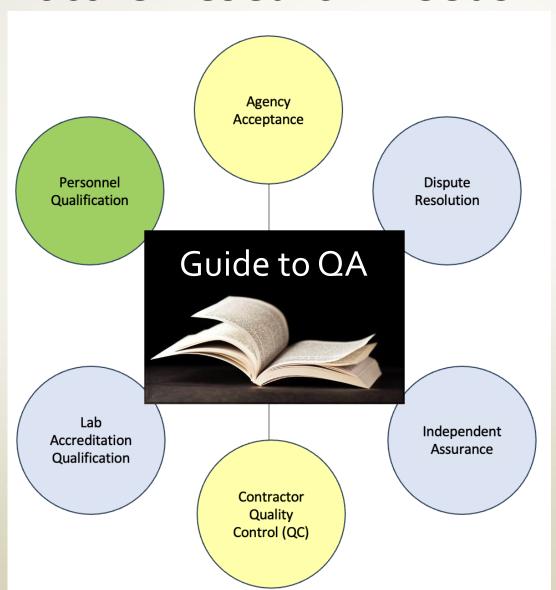
Asphalt Pavement Field

Individual DOTs Certification Programs

Reciprocity

- Other DOTs or outside certifications are considered based on:
 - Case-by-case basis of acceptance
 - DOT-specific exam and other certification information required
 - Specific certifications identified as reciprocal
- 94% of DOTs accept or require ACI certification

Future Research Needs



Future Research Needs (cont.)

Share information on Cooperative Models — this Webinar! Encourage coordination — M-TRAC and M-TRAC Certification Book

Future Research Needs (cont.)

Workforce Issues:

- Experience requirements in certifications
- Best way to recertify technicians



Thanks to the NCHRP Synthesis 55-06 Panel members:
Patrick Allen, Georgia DOT
Rachel Brown, Minnesota DOT
Christopher Euler, New York State DOT
Amy Melton, Texas DOT
Brian Squier, Iowa DOT
Xiaoyan Zheng, Florida DOT
Jeffrey N. Withee, FHWA

Thanks for your time!

TRB Staff: Sandra Larson

Robert J. Shea, TRB Liaison

Georgene Geary, GGfGA Engineering, LLC





QR code

Link to NCHRP Synthesis 638 report on TRB website:



Report link:

https://nap.nationalacademies.org/catalog/28849/state-dot-certification-programs-for-materials-sampling-and-testing-personnel

Today's presenters



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https://www.nationalacademies.org/trb/events

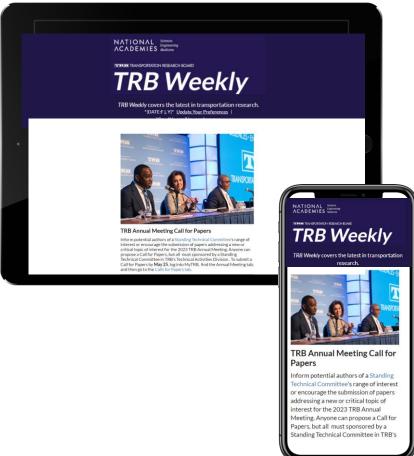


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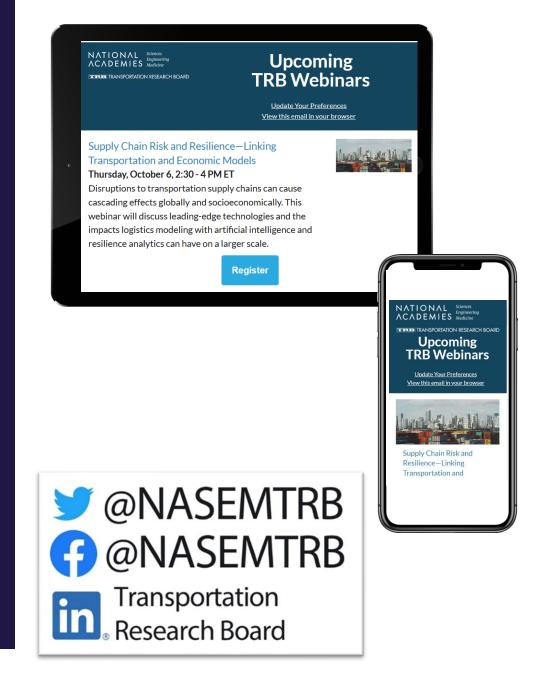
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