

# 2007 SEAUPG CONFERENCE – SAN ANTONIO, TEXAS

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## Development and Implementation of a National Binder Technician Certification (NBTC) Program

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**Southeast Asphalt User Producer Group**  
San Antonio, TX  
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## Background

- NETTCP
  - New England Transportation Technician Certification Program
  - More than just asphalt (concrete, soils, aggr.)
  - Asphalt program started in 1999
    - Resolution by NEAUPG to develop and adopt
  - Penn State developed manual and course as part of pooled fund study

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## Background

- NETTCP Certification
  - Must have one certified tech in lab to perform testing
    - Technician “oversight” allowed
  - Certification and Re-certification courses conducted annually
    - Re-certification required on 5-year cycle
    - Written and lab practical (hands-on) examination

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## Background

- Why Certification?
  - Code of Federal Regulations
    - 23 CFR, Part 637, Quality Assurance (QA) Procedures for Construction
      - Issued 29 June 1995
      - “After June 29, 2000, all sampling and testing data to be used in the acceptance decision or independent assurance program will be executed by qualified sampling and testing personnel.”
    - What does “qualified” mean?
      - Experience? Course? Certification?

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## Background

- Why Certification?
  - Continuous supply of new technicians for both users and producers
  - Variability in testing
    - Recent study indicated ~25% of real world comparisons of BBR creep stiffness between agency and industry lab exceeded the multi-laboratory d2s  
Anderson, R.M. and M.S. Huner, “Evaluation of the Direct Tension Test and Critical Cracking Temperatures for Asphalt Binders in Kentucky”, AAPT 2006
    - By definition, should be only 5%
    - Testing variability established from AMRL proficiency program

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## AASHTO T315 – DSR

NCHRP Web Document 71 (2005)

Condition	Coefficient of Variation (s%)	Acceptable Range of Two Results (d2s%)
<b>Single Operator Precision:</b>		
Original G*/sin δ (kPa)	2.3%	6.4%
RTFO G*/sin δ (kPa)	3.2%	9.0%
PAV G*/sin δ (kPa)	4.9%	13.8%
<b>Multilaboratory Precision:</b>		
Original G*/sin δ (kPa)	6.0%	17.0%
<b>RTFO G*/sin δ (kPa)</b>	<b>7.8%</b>	<b>22.2%</b>
PAV G*/sin δ (kPa)	14.2%	40.2%

Note – The precision estimates given in Table X are based on the analysis of test results from eight pairs of AMRL proficiency samples. The data analyzed consisted of results from 185 to 208 laboratories for each of the eight pairs of samples. The analysis included five binder grades: PG 13-34, PG 44-16, PG 64-22, PG 70-22 and PG 76-22 (SBS modified). Average original binder results for G\*<sub>ini</sub> ranged from 1,067 kPa to 2,342 kPa. Average RTFO residue results for G\*<sub>ini</sub> ranged from 2,274 kPa to 7,733 kPa. Average PAV residue results for G\*<sub>ini</sub> averaged from 1100 kPa to 4557 kPa. The details of this analysis are in NCHRP Final Report, NCHRP Project No. 6-28, Phase 3.

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## Determining Acceptability of Two Test Results

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- Example
 

Given a split sample of asphalt binder, RTFO DSR testing is conducted at 64°C by the Producer and the User Agency with the following data:

Producer	G*/sin δ = 2.70 kPa	PASS
User Agency	G*/sin δ = 2.18 kPa	FAIL

  - Normal variability?
  - Is the reproducibility of the results acceptable?
  - Are these values considered statistically the same?

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## Determining Acceptability of Test Results

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- Example
 

d2s% for RTFO G\*/sin δ is 22.2%

$$\text{Average} = \frac{2.70 + 2.18}{2} = 2.44 \text{ kPa}$$

$$d2s = 2.44 \times 22.2\% = 0.54 \text{ kPa}$$

$$d2s \text{ Range} = 2.70 - 2.18 = 0.52 \text{ kPa} < 0.54 \text{ kPa}$$

*Results do have acceptable reproducibility for RTFO DSR*  
*We need to do better!*

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## National Binder Technician Certification (NBTC) Program

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- AI Certification Vision
  - To provide a consistent nationwide means of ensuring that asphalt binder technicians are knowledgeable and fully qualified to produce valid specification compliance and quality assurance data.
  - By product: reduced variability

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## NBTC Program

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- Certification Program
  - Refinement of...
    - Industry Experience
      - NEAUPG and NETTCP
    - Asphalt Institute Experience
      - Asphalt Binder Technology Courses
        - » Last decade: 100's of courses, 1000's of students

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## NBTC Program

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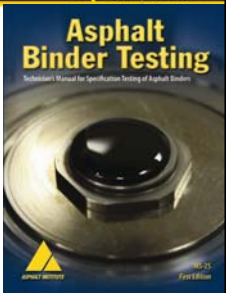
- Key Steps for development and implementation
  - Publish Manual
  - Develop Informational Brochure
  - Discuss with Interested Parties
  - Certification Review Course
  - Certification Examination
  - Finalize Program Details

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## NBTC Program

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- Key Steps
  - Publish Manual
    - MS-25, *Technician's Manual for Specification Testing of Asphalt Binders*
      - Dr. David Anderson – author
      - Completed February 2007
    - Textbook reference for course
    - Not intended to replace testing standard (AASHTO-M-320)
    - Supplement to standard
      - photos, terminology, material handling, sample prep, etc.



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**AASHTO and ASTM References**

**Informational Call-Out Boxes**

**New Figures**

**- Provides essential info to run PG tests**

**- New techs should have both M-320 and MS-25**

The screenshot shows a technical document with several call-out boxes and new figures. Red arrows point from the call-out boxes to the text in the document. The call-out boxes contain additional information related to the main text. The new figures are images showing laboratory equipment and procedures.

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- **Key Steps**
  - Develop 2-page brochure to describe the scope and operation of the NBTC program
    - 1<sup>st</sup> page: Why needed?
    - 2<sup>nd</sup> page: How will it work?
  - Distribute to UPGs
    - User agencies
    - Asphalt binder producers/suppliers
    - Testing labs
  - Available Now
    - On APA table in Exhibit Hall

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- **Key Steps – Program Marketing**
  - Informational Package
    - Informational NBTC Brochure
    - Cover Letter
    - MS-25
  - Sent to Key Contacts in Each State Highway Agency
    - Introduce the Proposed Certification Program
    - Provide for Discussion Items at Upcoming Industry Meetings

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- **Key Steps**
  - Discuss with Interested Parties
    - Present/discuss program at UPG Meetings
      - PCCAS: Asphalt Paving Committee in Sept
      - RMAUPG in Oct
      - NEAUPG in Oct
      - SEAUPG in Nov
      - NCAUPG in Jan
    - Good interest
    - Started discussions with some on how to implement

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- **Key Steps**
  - Certification Review Course
    - 2-days
    - One of several ways to prepare for exam
    - Slides and instructor notes
      - Developed with Dr. David Anderson
      - Will partner with “authorized” instructors/organizations nationally
    - Availability: Winter 2007-08
      - First Course to be held at AI in March 2008
      - Will be taught at other locations as need arises

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- **Key Steps**
  - Certification Examination
    - Written Examination
      - Approximately 50 multiple form questions (e.g., open response, multiple choice) based on knowledge areas
      - Selected number of questions from each knowledge area
        - » Database of questions for multiple versions of the test
    - Laboratory Performance Examination
      - Itemized performance criteria sheets
      - Demonstrate M-320 test procedures
      - “Authorized” examiners must have AASHTO accredited lab
    - Availability: Winter 2007-08
      - First exams to be conducted at AI in March 2008

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## NBTC Program

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- Key Steps
  - Finalize Program Details
    - Formation of Certification Advisory Board
      - Representation by users and producers in each UPG
      - Provides direction and guidance
      - Ensures exams are comprehensive and fair
  - Suggest Implementation by UPGs
    - Need to work thru program details
      - Prefer to minimize any regional differences
    - Based on successful NEAUPG program since 1998
  - Availability: March 2008 +

## Will it Work?

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“While getting everyone through the (NETTCP) course successfully was not easy, in the end the benefit was worth the effort. Through this improved understanding of the test methods and performance of the tests we greatly reduced our variability between the technicians and between our lab and third party labs. This resulted in fewer discrepancies with the state agencies and a greater confidence in the results so that we could tighten up the manufacturing specifications.”

Doug Brown, Citgo Refining

## Will it Work?

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“A certification program administered by the Asphalt Institute, incorporating the new manual, MS-25 Asphalt Binder Testing, is an excellent idea... We have sent several Laboratory Assessors to the Asphalt Institute’s Asphalt Binder Technology Course in the past and had great responses from our attendees. I have no doubt that the new certification will be a success as well.”

Brian Johnson  
AASHTO Accreditation Program Supervisor, AMRL

## Asphalt Institute NBTC Program Summary

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- Asphalt Institute Vision
  - To provide a consistent nationwide means of ensuring that asphalt binder technicians are knowledgeable and fully qualified to produce valid specification compliance and quality assurance data.
- Key Steps towards Program Implementation
 

– Publish Manual	February 2007
– Develop Informational Brochure	September 2007
– Discuss with Interested Parties	September 2007
– Certification Review Course	January 2008
– Certification Examination	January 2008
– Conduct First Course/Exams	March 2008
– Work Thru Program Details	March 2008

## Asphalt Institute NBTC Program Summary

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- Replicated a very successful program from NE into a much needed national program
- More details in the brochure (on APA table)
- Decision to commit needs to come from UPGs or states
- Questions or Comments?
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## Thanks!

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