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NCC
NATIONAL
CONCRETE
CONSORTIUM


About the Presenter


- **Katheryn Malusky** is the Senior Program Manager for AASHTO's National Transportation Product Evaluation Program (NTPEP).
- Katheryn graduated with a Bachelor of Science degree in Chemistry from Mansfield University of Pennsylvania.
- She began working for AASHTO in 2006 and has been involved with the NTPEP Program since 2008.
- Katheryn manages and oversees the operations of the NTPEP program and also works closely with several of the NTPEP technical committees and the NTPEP Steering Committee.
- Katheryn's presentation will include an Overview of the NTPEP product evaluation programs that include concrete materials.



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What is NTPEP?

- NTPEP stands for the **National Transportation Product Evaluation Program**
- Established within AASHTO in 1994, as a technical service program, who reports to the Council on Highways and Streets
- A partnership between the AASHTO member agencies and industry participants
- Combines the professional and physical resources of the AASHTO member departments in order to evaluate materials, products and devices of common interest for use in highway and bridge construction
- Primary Goal- provide cost-effective evaluations for the AASHTO members (state DOTs)

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Testing Programs for Concrete Materials/ Overview of Concrete Materials

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NTPEP's Mission

- **Simplify** the product evaluation process
- Make it more **cost-effective** for both the manufacturer and state end user
- **Reduce duplication** of efforts by State DOTs
- Serve as a “**One Stop Shop**” for Manufacturers of engineered products

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What NTPEP is **NOT**

- NTPEP does **NOT evaluate “New Products”** being introduced by industry for the first time
- NTPEP does **NOT pass or fail products** (ultimately up to the state to develop and determine pass/fail criteria)
- NTPEP does **NOT replace the Quality Assurance activities** of state DOTs or manufacturers
- NTPEP does **NOT supersede State Requirements** for product approval. Any state can require additional testing of the product prior to approval.
 - If such additional testing is required, the state can appeal to NTPEP for inclusion into the Work Plan.



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NTPEP & Industry Partners

- Transportation products & materials manufacturers submit their products to be “evaluated”
- Evaluation results become available to registered DOT members on DataMine (data.ntpep.org)
- Industry representatives invited to submit ideas, suggestions for improvement, and general feedback to each program



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NTPEP & State DOT Members

- Voting member from each state to guide NTPEP’s mission
- Product-specific technical committees within NTPEP include interested state DOT members and industry representatives
- The NTPEP audits and evaluations reports serve as tools available free of charge to every state’s transportation agency.
 - **AASHTO/NTPEP does NOT dictate** how and what data to use or set as specifications for product approval or qualification. This is a decision and choice within each agency.



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How NTPEP Works

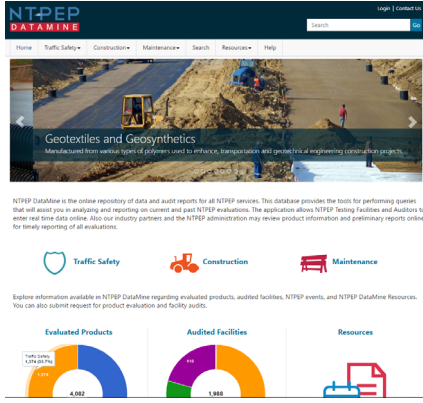
- Products are evaluated according to nationally recognized test methods (e.g. AASHTO, ASTM) specified by the members of that Technical Committee in the Work Plan
- When standards do not exist, the NTPEP Technical Committee convenes and establishes test protocols through ballot consensus process
- Testing Service Fees assessed to industry cover actual costs for field and lab testing of products
- Contributions from AASHTO members and apportionment of industry fees sustain NTPEP



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DataMine

- <http://data.ntpep.org>
- The “nucleus” of NTPEP
- Data Repository for evaluation results
- Accessible to all individuals with a valid state transportation agency email**



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Concrete Admixtures (CADD)

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CADD - Overview

This evaluation provides:

- Testing of Air Entraining Admixtures provides results that can be used to verify compliance with AASHTO M 154 (ASTM C260), “Standard Specification for Air-Entraining Admixtures for Concrete.”
- Testing of “Concrete Admixtures” provides results that can be used to verify compliance with AASHTO M 194 (ASTM C494), “Standard Specification for Chemical Admixtures for Concrete.”

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CADD - Overview

- CADD evaluations consist of:
 - Level 1 - Testing needed to verify compliance with AASHTO M 194 or M 154.
 - Level 2 – Uniformity and equivalence testing is an option for products that are not required to undergo Level 1 testing. This evaluation is also required within the 5-year time frame if the manufacturer requests a name change for the product. The chemical evaluation must indicate the product is the same product.
 - Products are again submitted for full Level 1 testing within 5 years of the initial Level 1 testing.
 - Dry Cast Admixtures and Corrosion inhibitors will be accepted by the technical committee for Level 2 testing only.
 - Specialty Admixtures (Type S) will be tested using the standard evaluation protocol without evaluating special properties.

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CCC - Overview

This evaluation consists of laboratory testing.

- Provided testing can be used to verify compliance with:
 - ASTM C309, “Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.”
- Products should be submitted for retesting every 3 years.

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Concrete Curing Compounds (CCC)

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CCC - Overview

The evaluation consists of laboratory testing which includes:

- AASHTO T 155, “Standard Method of Test for Water Retention by Liquid Membrane-Forming Curing Compounds for Concrete.”
- Minnesota DOT “Three-Day Settlement Test.”
- ASTM D93, “Standard Test Method for Flash Point by Pensky-Martens Closed Cup Tester.”
- Fourier Transform Infrared Spectroscopy (FTIR) Scan

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PRODUCT EVALUATION PROGRAM

Rapid Set Concrete Patching Materials (RSCP)

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RSCP - Overview

Products may be tested as “neat” and/or “extended.”

- “Neat” - a product which has less than 5% aggregate retained on the 3/8” sieve with only water or liquid added
- “Extended” - a product which has at least 5% aggregate retained on the 3/8” sieve which is included in the package or as an addition by the user along with water or liquid.

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RSCP - Overview

- The evaluation protocol has been developed to meet the specific needs of State DOTs and includes most aspects of:

ASTM C928, “Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs.”
- Products evaluated by this program are:
 - Cementitious, polymer modified, and polymer repair materials.
- Products evaluated are intended for:
 - horizontal use,
 - vertical/overhead use, or
 - both horizontal and vertical/overhead use.

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RSCP - Overview

The evaluation includes:

- Lab testing of all product types.
- Initial field trial of products intended for horizontal and both horizontal and vertical/overhead use.
- No field trial for products intended for vertical/overhead use only.
- Retesting – Lab testing every 5 years.



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Lab testing – Cementitious Products

- Bond strength by direct tension and by slant shear
- Chloride ion penetration and content
- Surface Resistivity
- Compressive strength, neat and extended
- Length change
- Tensile strength
- Time of setting by Vicat Needle and by penetration resistance.
- *Resistance to Freeze/Thaw

* Manufacturers may choose to have products tested as per AASHTO T 161 Procedure A, Procedure B, or both.

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Lab testing – Polymer products

- Bond strength by direct tension and by slant shear
- Chloride ion penetration
- Compressive strength
- Time of setting by penetration resistance.
- Gel time (pot life)
- Thermal compatibility
- Linear shrinkage & coefficient of thermal expansion

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Lab testing – Polymer modified products:

- Bond strength by direct tension and by slant shear
- Chloride ion penetration and content
- Surface Resistivity
- Compressive strength neat and extended
- Length change
- Thermal Compatibility
- Time of setting by penetration resistance
- *Resistance to freeze/thaw

* Manufacturers may choose to have products tested as per AASHTO T 161 Procedure A, Procedure B, or both.

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Lab testing – Extender aggregate

If the product is submitted for evaluation with extender aggregate, the aggregate is tested using the following methods:

- AASHTO T 27, “Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates.”
- AASHTO T 103, “Standard Method of Test for Soundness of Aggregates by Freezing and Thawing.”
- AASHTO T 84 and/or T 85, “Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate” and/or AASHTO T 85, “Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate.”

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The RSCP test deck is in Ohio

- A test patch with typical size of 9 feet long, 3 feet wide, and 4 inches deep is prepared by Ohio DOT.
- Manufacturers provide labor and equipment needed to install patching material.
- Field observations are made at the time of installation and at 12 and 24 months intervals.
- The field trial provides for evaluation of:
 - Edge debonding
 - Percent of total area that becomes delaminated
 - Mid panel cracking
 - Photos are taken at the time of installation and at each evaluation.



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PCC Joint Sealants

- PCC joint sealant types evaluated include hot-poured, cold-applied, and preformed elastomeric products.
- Hot-poured products are those that meet the requirements of ASTM D6690, "Standard Specification for Joint and Crack Sealants, Hot Applied for Concrete and Asphalt Pavements."
- Cold-applied products are those that meet the requirements of ASTM D5893, "Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements."
 - Types SL (Self-leveling) and NS (Non-sag) are evaluated.
- Preformed elastomeric products are those that meet the requirements of ASTM D2628, "Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements."

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Portland Cement Concrete Joint Sealant (JS) & Hot Mix Asphalt Crack Sealant (CS)

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HMA Crack Sealers

- HMA crack sealer types evaluated include products meeting one of the following specifications:
 - ASTM D6690, "Standard Specification for Joint and Crack Sealants."
 - ASTM D5078, "Standard Specification for Crack Filler, Hot-Applied, for Asphalt Concrete and Portland cement Concrete Pavements."



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JS/CS - Overview

- The evaluation includes lab testing and a field trial for both JS and CS products.
- After the initial evaluation, products are retested (lab only) every 3 years.
 - If the product formulation has changed, then retesting will include both lab testing and a field trial.
- Lab samples must be from the same lot or batch as material used in the field trial.



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Lab testing - Cold Applied Sealers

- Samples are evaluated in accordance with ASTM D5893.
- Lab testing includes:
 - Tack Free Time
 - Effects of Heat Aging
 - Bond to Concrete
 - Ultimate Elongation and Tensile Stress at 150% Elongation
 - Effects of Accelerated Weathering
 - Slump Test (NS products)
 - Fingerprinting
 - Resilience
 - Hardness
 - Flow

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Lab testing - Hot-Poured Sealers

- Samples are prepared as per ASTM D5167, "Standard Practice for Melting of Hot-Applied Joint and Crack Sealant and Filler for Evaluation."
- Samples are evaluated in accordance with ASTM D6690.
- Lab testing includes:
 - Bond to Concrete
 - Resilience
 - Cone penetration
 - Asphalt Compatibility
 - Apparent Viscosity
 - Fingerprinting
 - Softening Point



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Lab testing - Preformed Elastomeric Seals

- Samples are evaluated in accordance with ASTM D2628.
- Lab testing includes:
 - Tensile Strength and Elongation
 - Type A Hardness
 - Oven Aging
 - Oil Swell
 - Low Temperature Stiffening
 - Low Temperature Recovery
 - High Temperature Recovery
 - Compression-Deflection

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JS/CS – Field Trial

- The intent is to alternate test deck locations so as to represent all climatic regions.
- A pavement condition survey is performed prior to the field trial.
- Roadway information such as pavement slope, joint spacing, joint width and the condition of joints is documented.
- The test deck consists of at least 10 joints per sealant material.
- Test deck information gathered includes:
 - Annual average daily traffic
 - Monthly weather conditions
 - Deicing salt used per lane mile through the test deck



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JS/CS – Field Trial

The field evaluation consists of:

- A Sealant Condition Number (SCN) is determined using evaluations of water infiltration and stone retention.
 - Water infiltration is measured as a percentage of joint length where water can leak past the sealant.
 - Stone retention is evaluated as the amount of debris and stones that become embedded or stuck to the surface of the sealant.
- Adhesion and cohesion failures are measured as a percentage of the joint length.
- Photographs of each joint are taken for each test cycle.

