Composite Concrete Reinforcements (CCR) Technical Committee Meeting Minutes

Working Session # 12

Thursday, June 12th, 2025 8:00AM – 9:30AM

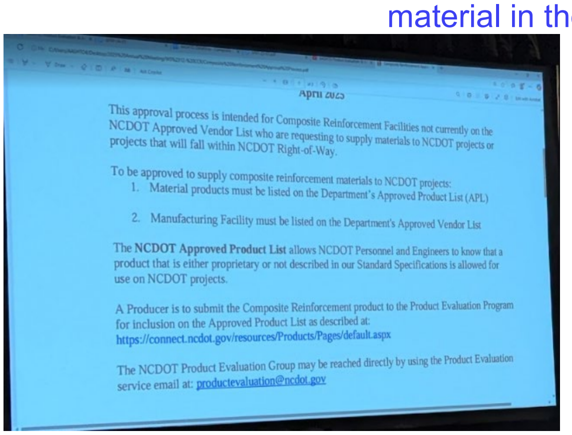
1. **8:00 – 8:05 AM: Call to Order and Introduction**
    - The meeting was called to order at 7:58am by Michael M. (AASHTO)
2. **8:05 – 8:15 AM: Review of Current Technical Committee Purpose and Scope – *Cabell***
    - The chair Cabell gave a brief overview of the CCR committee and members.
3. **8:15 – 8:30 AM: Update on Audits – *Ed, Sarc, Michael***
    - Items of interest from 2024 audits
        - SARC (AASHTO) provided an overview of the 2024 audit cycle. The presentation included a discussion on specification requirements related to diameter and area, and how these measurements apply to product evaluation.
    - Schedule for 2025
    - Cycle/Deadline/Procedure for a plant to request an audit
        - Michael M. September 2025 the registration cycle will open up for the 2026 audit cycle. Slides were shown as to how to register.
    - Review Audit Documents for consensus
        - Availability of documents
        - Michael M. showed how to get to the audit documents from the AASHTO website and their use.

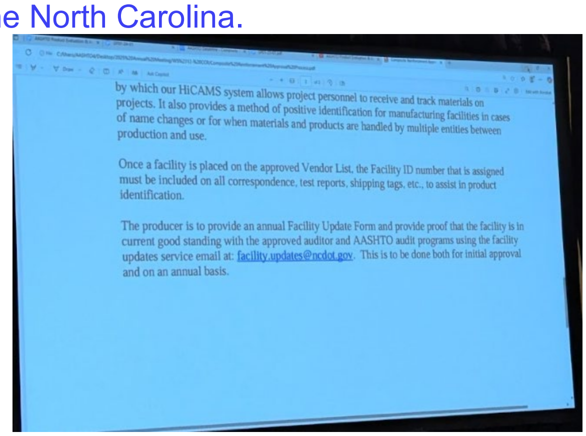
4. **8:30 – 8:40 AM: Update to Workplan**
   - Recent Addition of Basalt – *Steve*
     - Cabell discussed the inclusion of Basalt FRP bars in Section 1.2 of CCR-25-01. The specification ASTM D8505 (which references both BFRP and GFRP straight rebars for higher performance properties) was added to the list of referenced standards in the Work Plan. All bent bars default to standard grade ASTM D7957 for minimum properties.
     - A question was raised about the timing of this addition. It was explained that any producer can manufacture Basalt FRP bars, and they offer certain performance advantages. However, current specifications only acknowledge equivalent performance to GFRP bars.
     - Sarc initiated a discussion on annual product testing for Basalt bars, as outlined in Section 6 of the Work Plan.
     - When asked if a design code exists for Basalt FRP bars, the response was yes, followed by a discussion on their application.
   - Discussion on adding carbon fiber strand – *Steve*
     - The discussion on carbon FRP fiber strand has been ongoing for about a year. Currently, only one manufacturer produces the material, which serves a unique niche in the market. There is potential for additional manufacturers to enter this space. Once the proposed ASTM material specification for CFRP strand is balloted by committee D30.10 (expected in July, 2025), Steve will then harmonize the proposed CFRP Work Plan requirements with the new ASTM and distribute to the committee for discussion

- Discussion on adding dowel bars – *Rachel*
  - Regarding dowel bars, although Rachel was unable to attend, Cabell provided an overview of her intended additions to the Work Plan. He asked if any other states were interested in including dowel bars to the GFRP Workplan or make it a stand alone.

5. 8:40 – 8:50 AM: Information Exchange

- Resilient Bridge Conference in Raleigh – *Steve*
  - Steve talked about the Resilient and sustainable Bridge Conference (**EPxRBS-2025**) scheduled for August 4-5 at NCSU and what came out of previous peer exchanges held in Mobile, AL (**SPxRSB-2023**) and Buffalo, NY (**NPxRSB-2024**).State DOT info sharing
  - Acceptance Policy and Procedures Example – *Cabell*
    1. Cabell talked about how to become an approved supplier of material in the North Carolina.



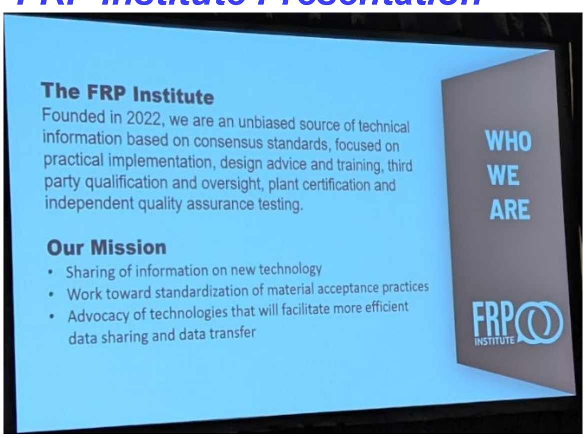


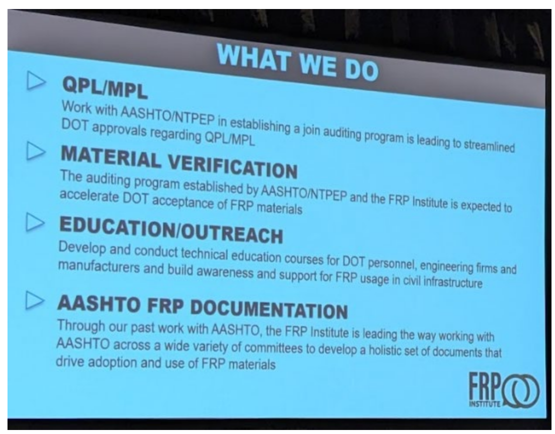
  - UV Exposure Concerns – *Dan Miller*
    - Dan Miller talked about some UV issues he recently had on a jobsite of CCR bars, and how they developed an

acceptance process. Cabell mentioned what to look for when the bars begin to have UV issues.

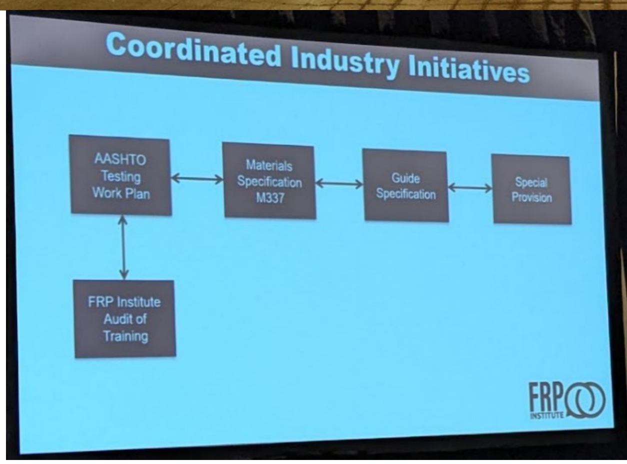
6. **8:50 – 9:05 AM: Presentations**
    - Audit vs Product Evaluation – *Ed and Sarc*
        - SARC started a discussion on Audit vs Product Evaluation
        - The CCR work plan falls under the audit side
    - Proposed Externally Bonded Program –

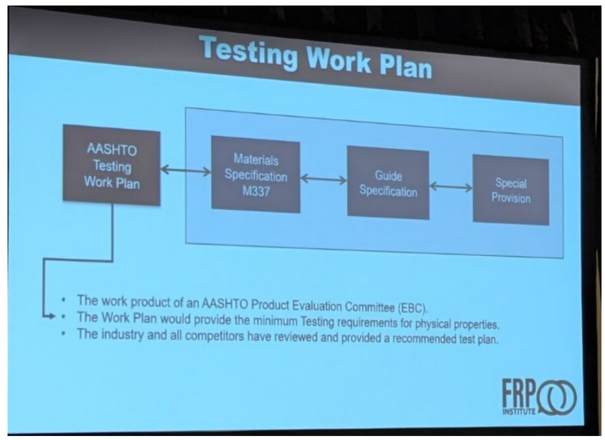
FRP Institute Presentation






June 8th–12th
in Hartford, CT
Connecticut
Convention
Center
AASHTO
PRODUCT
EVALUATION
& AUDIT
SOLUTIONS
2025 Annual Meeting


Coordinated Industry Initiatives
AASHTO Testing Work Plan
Materials Specification M337
Guide Specification
Special Provision
FRP Institute Audit of Training
FRP INSTITUTE


Testing Work Plan
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Materials Specification M337
Guide Specification
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The work product of an AASHTO Product Evaluation Committee (EBC).
The Work Plan would provide the minimum Testing requirements for physical properties.
The industry and all competitors have reviewed and provided a recommended test plan.
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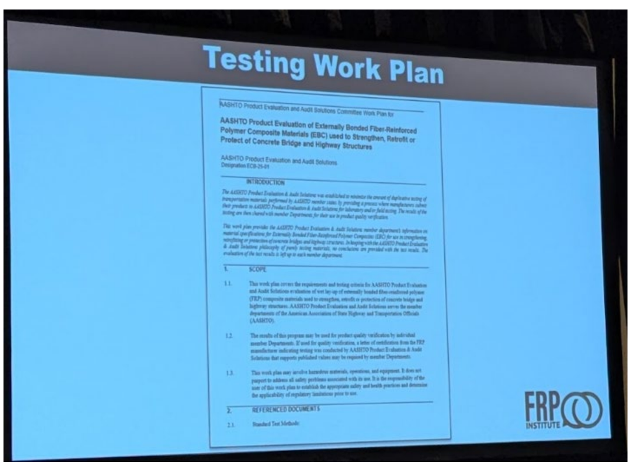
Testing Work Plan
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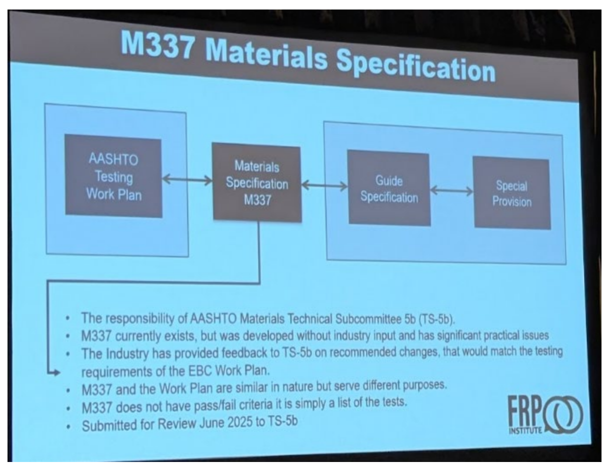
INTRODUCTION
SCOPE
REFERENCED DOCUMENTS
FRP INSTITUTE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The responsibility of AASHTO Materials Technical Subcommittee 5b (TS-5b).
M337 currently exists, but was developed without industry input and has significant practical issues
The Industry has provided feedback to TS-5b on recommended changes, that would match the testing requirements of the EBC Work Plan.
M337 and the Work Plan are similar in nature but serve different purposes.
M337 does not have pass/fail criteria it is simply a list of the tests.
Submitted for Review June 2025 to TS-5b
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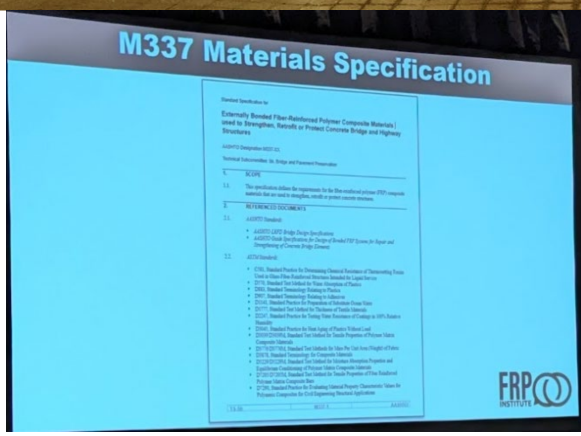
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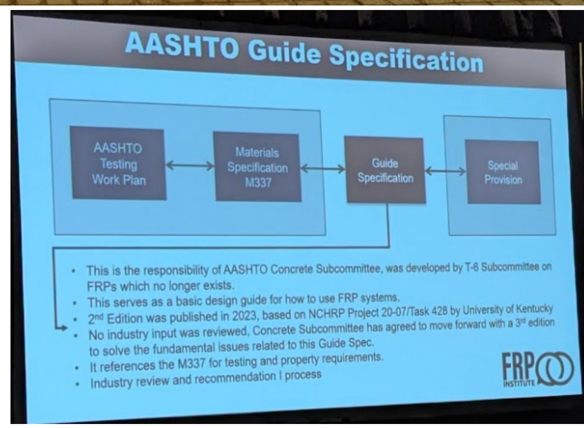
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This serves as a basic design guide for how to use FRP systems.
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No industry input was reviewed, Concrete Subcommittee has agreed to move forward with a 3rd edition to solve the fundamental issues related to this Guide Spec.
It references the M337 for testing and property requirements.
Industry review and recommendation I process
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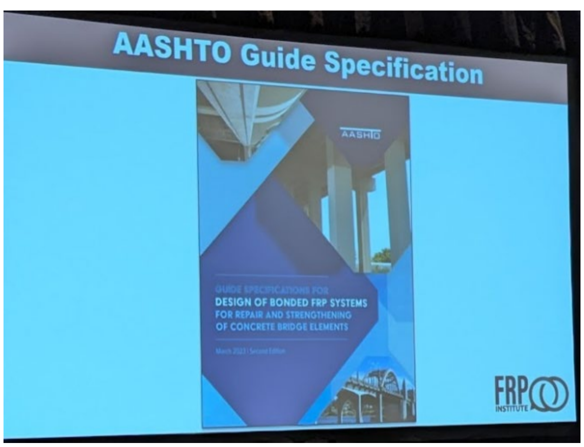
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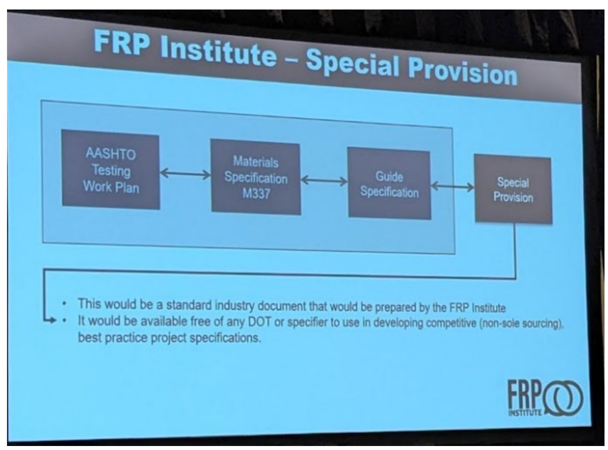
FRP INSTITUTE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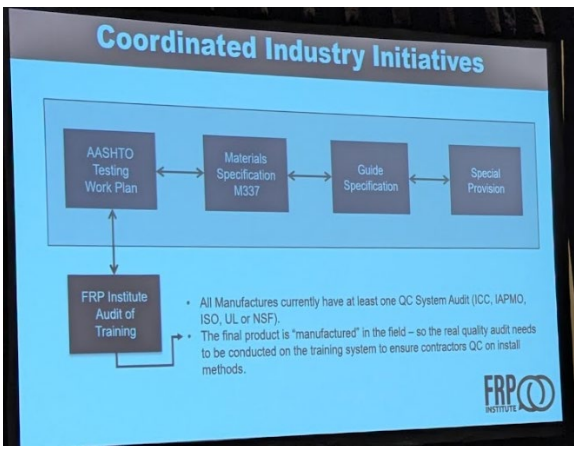

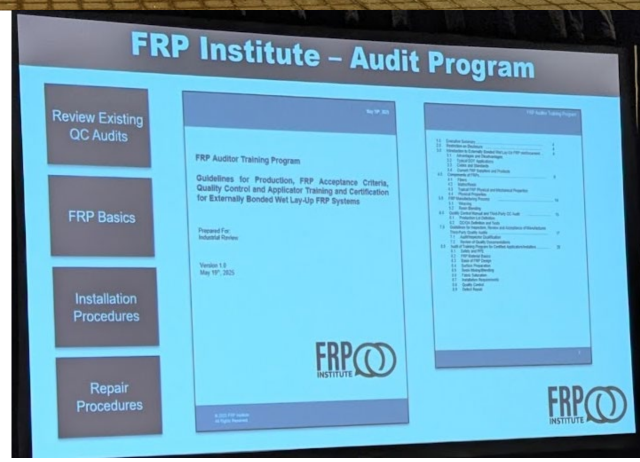

7. **9:05 – 9:20 AM: Open Discussion**

   Dr. Seracino of NC State is hosting CCR peer exchange where delegates can register. Deadline for registration is about a month away, and there is no registration fee
   https://ccee.ncsu.edu/cfl/epxrbs-2025/

   - Alex from Florida raised the question that many of these materials are coming from overseas, A discussion ensued.

8. **9:20 – 9:30 AM: Final Comments and Wrap-Up**
   - A call out for nominations for a Vice Chair.
   - The New chair wished Cabell a happy Retirement.
   - The session will end promptly at 9:30 AM

FRP Institute:

AASHTO Committee & Technical Document Unification

AASHTO Product Evaluation & Audit Solutions (CCR Committee)

June 12th, 2025

The FRP Institute

Founded in 2022, we are an unbiased source of technical information based on consensus standards, focused on practical implementation, design advice and training, third party qualification and oversight, plant certification and independent quality assurance testing.

Our Mission

- Sharing of information on new technology
- Work toward standardization of material acceptance practices
- Advocacy of technologies that will facilitate more efficient data sharing and data transfer

WHO WE ARE

FRP INSTITUTE

WHO WE ARE

FRP Institute Leadership Team

CEO
Richard Krolewski
Founder, Regulatory Resources

Chairman, Board of Directors
Cabell Garbee, P.E.
Manufactured Products Engineer
Materials and Tests Unit
North Carolina Department of Transportation

Lead Auditor
Rudi Seracino, Ph.D., F.ACI, F.IIFC
Professor of Structural Engineering
North Carolina State University College of Engineering

Chairman, QC Chair
Joseph Stilwell, P.E.
FRP/Composites Subject Matter Expert
U.S. Army Corps of Engineers Inland
Navigation Design Center

Codes and Standards
Matt Chynoweth, P.E.
Vice President/National Bridge Discipline Lead
er RS&H

FRP Strengthening Systems
Joe Royer, Ph.D.
Director of Innovation & Technology
Henkel Corporation (GeoTree/Fyfe)

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WHAT WE DO

- ## QPL/MPL
  Work with AASHTO/NTPEP in establishing a join auditing program is leading to streamlined DOT approvals regarding QPL/MPL

- ## MATERIAL VERIFICATION
  The auditing program established by AASHTO/NTPEP and the FRP Institute is expected to accelerate DOT acceptance of FRP materials

- ## EDUCATION/OUTREACH
  Develop and conduct technical education courses for DOT personnel, engineering firms and manufacturers and build awareness and support for FRP usage in civil infrastructure

- ## AASHTO FRP DOCUMENTATION
  Through our past work with AASHTO, the FRP Institute is leading the way working with AASHTO across a wide variety of committees to develop a holistic set of documents that drive adoption and use of FRP materials

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Coordinated Industry Initiatives

AASHTO Testing Work Plan ↔ Materials Specification M337 ↔ Guide Specification ↔ Special Provision

AASHTO Testing Work Plan ↔ FRP Institute Audit of Training

Testing Work Plan

AASHTO Product Evaluation and Audit Solutions Committee Work Plan for

AASHTO Product Evaluation of Externally Bonded Fiber-Reinforced Polymer Composite Materials (EBC) used to Strengthen, Retrofit or Protect of Concrete Bridge and Highway Structures

AASHTO Product Evaluation and Audit Solutions
Designation ECB-25-01

INTRODUCTION

The AASHTO Product Evaluation & Audit Solutions was established to minimize the amount of duplicative testing of transportation materials performed by AASHTO member states by providing a process where manufacturers submit their products to AASHTO Product Evaluation & Audit Solutions for laboratory and/or field testing. The results of the testing are then shared with member Departments for their use in product quality verification.

This work plan provides the AASHTO Product Evaluation & Audit Solutions member department's information on material specifications for Externally Bonded Fiber-Reinforced Polymer Composites (EBC) for use in strengthening, retrofitting or protection of concrete bridges and highway structures. In keeping with the AASHTO Product Evaluation & Audit Solutions philosophy of purely testing materials, no conclusions are provided with the test results. The evaluation of the test results is left up to each member department.

1. SCOPE

1.1. This work plan covers the requirements and testing criteria for AASHTO Product Evaluation and Audit Solutions evaluation of wet lay-up of externally bonded fiber-reinforced polymer (FRP) composite materials used to strengthen, retrofit or protection of concrete bridge and highway structures. AASHTO Product Evaluation and Audit Solutions serves the member departments of the American Association of State Highway and Transportation Officials (AASHTO).

1.2. The results of this program may be used for product quality verification by individual member Departments. If used for quality verification, a letter of certification from the FRP manufacturer indicating testing was conducted by AASHTO Product Evaluation & Audit Solutions that supports published values may be required by member Departments.

1.3. This work plan may involve hazardous materials, operations, and equipment. It does not purport to address all safety problems associated with its use. It is the responsibility of the user of this work plan to establish the appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. REFERENCED DOCUMENTS

2.1. Standard Test Methods:

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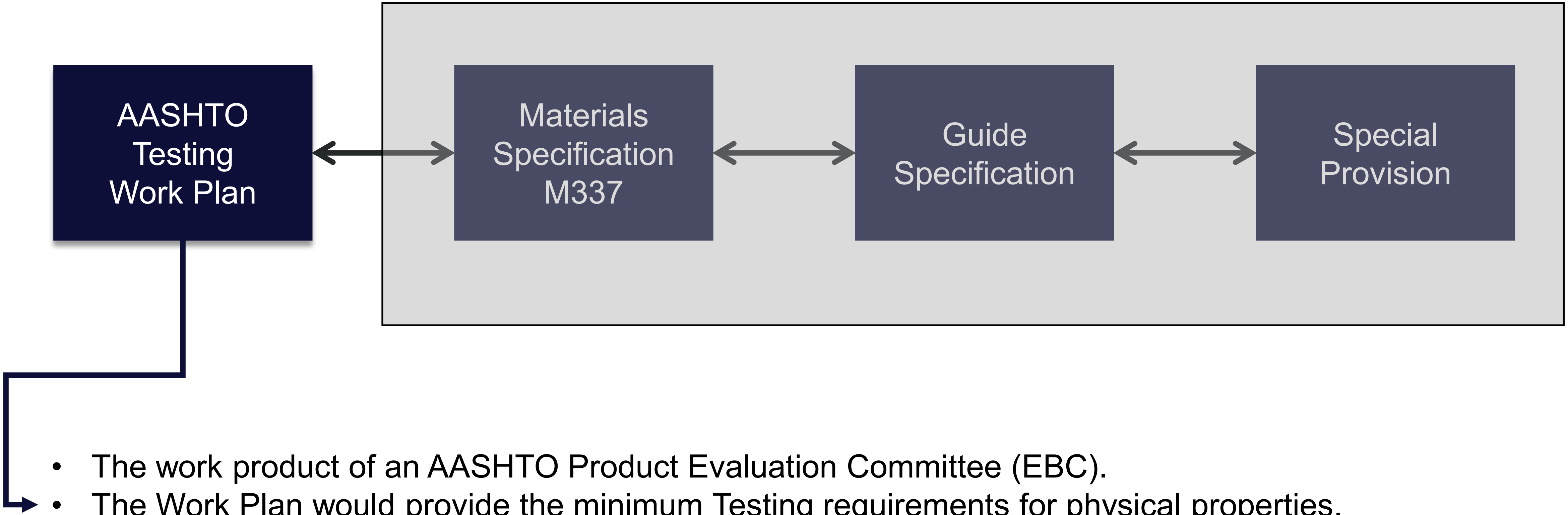
Testing Work Plan



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M337 Materials Specification

Standard Specification for

Externally Bonded Fiber-Reinforced Polymer Composite Materials used to Strengthen, Retrofit or Protect Concrete Bridge and Highway Structures

AASHTO Designation M337-XX

Technical Subcommittee: 5b, Bridge and Pavement Preservation

1. SCOPE

1.1. This specification defines the requirements for the fiber-reinforced polymer (FRP) composite materials that are used to strengthen, retrofit or protect concrete structures.

2. REFERENCED DOCUMENTS

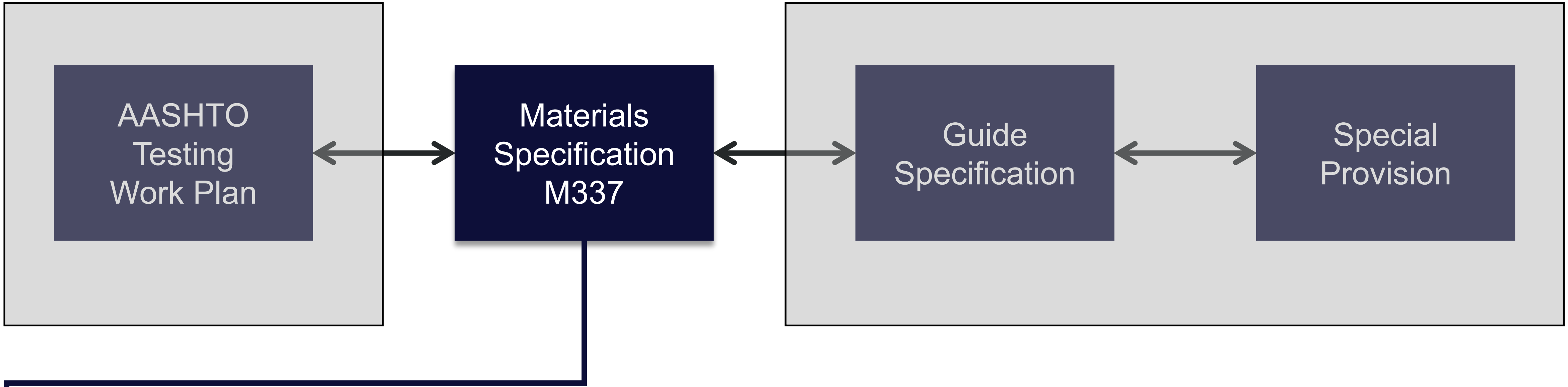
2.1. *AASHTO Standards*:

- *AASHTO LRFD Bridge Design Specifications*
- *AASHTO Guide Specifications for Design of Bonded FRP Systems for Repair and Strengthening of Concrete Bridge Elements*

2.2. *ASTM Standards*:

- C581, Standard Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass-Fiber-Reinforced Structures Intended for Liquid Service
- D570, Standard Test Method for Water Absorption of Plastics
- D883, Standard Terminology Relating to Plastics
- D907, Standard Terminology Relating to Adhesives
- D1141, Standard Practice for Preparation of Substitute Ocean Water
- D1777, Standard Test Method for Thickness of Textile Materials
- D2247, Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
- D3045, Standard Practice for Heat Aging of Plastics Without Load
- D3039/D3039M, Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials
- D3776/D3776M, Standard Test Methods for Mass Per Unit Area (Weight) of Fabric
- D3878, Standard Terminology for Composite Materials
- D5229/D5229M, Standard Test Method for Moisture Absorption Properties and Equilibrium Conditioning of Polymer Matrix Composite Materials
- D7205/D7205M, Standard Test Method for Tensile Properties of Fiber Reinforced Polymer Matrix Composite Bars
- D7290, Standard Practice for Evaluating Material Property Characteristic Values for Polymeric Composites for Civil Engineering Structural Applications

M337 Materials Specification



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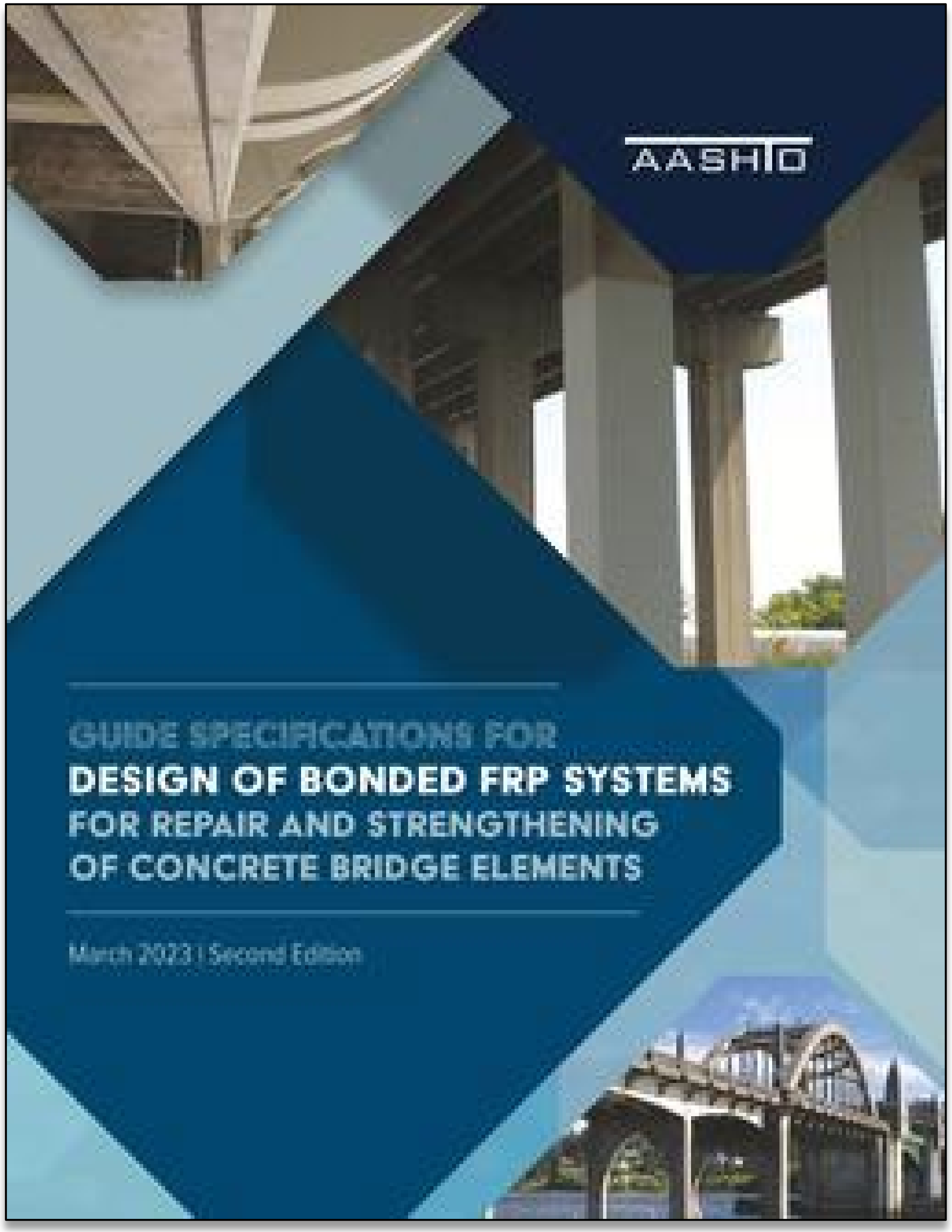

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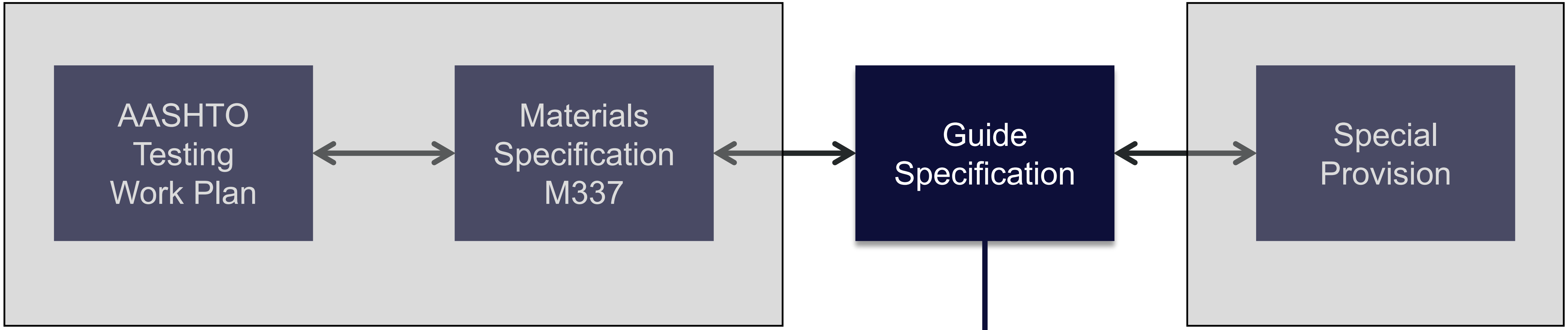

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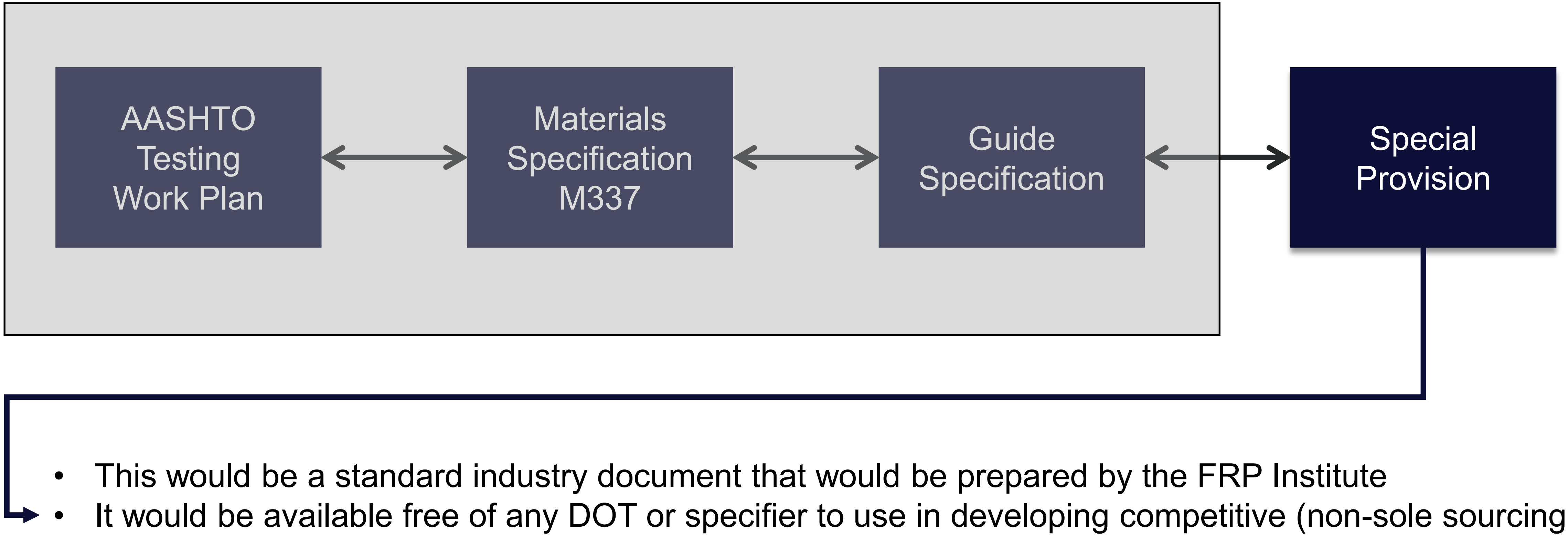
FRP Institute – Special Provision



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Coordinated Industry Initiatives

AASHTO Testing Work Plan ↔ Materials Specification M337 ↔ Guide Specification ↔ Special Provision

↕

FRP Institute Audit of Training

- All Manufactures currently have at least one QC System Audit (ICC, IAPMO, ISO, UL or NSF).
- The final product is “manufactured” in the field – so the real quality audit needs to be conducted on the training system to ensure contractors QC on install methods.

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FRP Institute – Audit Program

Review Existing QC Audits

FRP Basics

Installation Procedures

Repair Procedures

May 19th, 2025

FRP Auditor Training Program

Guidelines for Production, FRP Acceptance Criteria, Quality Control and Applicator Training and Certification for Externally Bonded Wet Lay-Up FRP Systems

Prepared For:
Industrial Review

Version 1.0
May 19th, 2025

JOSH STEIN
GOVERNOR

J. R. "JOEY" HOPKINS
SECRETARY

Approval Process for Composite Reinforcement Materials & Manufacturing Facilities
April 2025

This approval process is intended for Composite Reinforcement Facilities not currently on the NCDOT Approved Vendor List who are requesting to supply materials to NCDOT projects or projects that will fall within NCDOT Right-of-Way.

To be approved to supply composite reinforcement materials to NCDOT projects:

1. Material products must be listed on the Department's Approved Product List (APL)

2. Manufacturing Facility must be listed on the Department's Approved Vendor List

The **NCDOT Approved Product List** allows NCDOT Personnel and Engineers to know that a product that is either proprietary or not described in our Standard Specifications is allowed for use on NCDOT projects.

A Producer is to submit the Composite Reinforcement product to the Product Evaluation Program for inclusion on the Approved Product List as described at:
https://connect.ncdot.gov/resources/Products/Pages/default.aspx

The NCDOT Product Evaluation Group may be reached directly by using the Product Evaluation service email at: productevaluation@ncdot.gov

The NCDOT Product Evaluation Group and the related service email allows for the Producer to have a single point of contact with the Department to ensure that all interested parties are involved in the decision-making process and that there is no confusion due to competing/overlapping correspondence that may occur through the use of multiple contacts.

Products are assigned a tracking number in the format NPYY-XXXX corresponding to the year of submittal, YY, and the order received, XXXX. This number should be referenced in all correspondence to the NCDOT Product Evaluation Group or when directing individuals to the product listing.

For a product that has an Approved Product List status of "Trial Use" or "Provisional Use", the NP number must also be included on all correspondence, test reports, shipping tags, etc., to assist in product identification.

The **NCDOT Approved Vendor List** is used to verify production means and methods, and that items and materials meet our Project requirements.

For a composite reinforcement facility to be placed on the approved Vendor List, it must participate in an approved audit program and the AASHTO Product Evaluation and Audit Solutions audit programs as available. This approval process requires a completed Facility Update Form.

The Facility ID that is assigned upon placement on the approved vendor list also provides a link by which our HiCAMS system allows project personnel to receive and track materials on projects. It also provides a method of positive identification for manufacturing facilities in cases of name changes or for when materials and products are handled by multiple entities between production and use.

Once a facility is placed on the approved Vendor List, the Facility ID number that is assigned must be included on all correspondence, test reports, shipping tags, etc., to assist in product identification.

The producer is to provide an annual Facility Update Form and provide proof that the facility is in current good standing with the approved auditor and AASHTO audit programs using the facility updates service email at: facility.updates@ncdot.gov. This is to be done both for initial approval and on an annual basis.

Working Session #12

Composite Concrete Reinforcements (CCR)

Attendance

June 12, 2025

First Name	Last Name	Employer
Kelly	Senger	ILDOT
Dan	Brayack	WVDOH
Sam	Frederick	ncdot
Kenny	Seward	OK DOT
Cassady	Allen	FDOT
Brian	Hunter	NCDOT
Rosa	Bravo	Ncdot
Ray	Rowden	RTR NSPECTION
Scott	Hughes	SEH
Joseph	Stilwell	MaineDOT
Jason	Robertson	Massdot
Susan	Mendola	CTDOT
Dorian	Brawner	KYTC
Doug	Dupler	Contractor
Allen	Gallistel	MnDOT
Matt	Schulz	Vt Agency of Transportation
Jerry	McMahan	Vermont AOT
Michael	Mellons	Tennessee DOT
Dennis	Warren	Michigan DOT
Tim	Stallard	Michigan DOT
Troy	DeWitt	Auditor
Margarita	Takou	Acpa
Joe	Royer	Henkel
Rudi	Seracino	NC State University
Douglas	Miller	MS DOT
Jim	Reilman	Indiana DOT
Jesus	Sandoval-Gil	ADOT
Barry	Paye	Wisconsin DOT
Ed	Hughes	Contractor

Robert	Sarcinella	Sarc.engineering & Consulting Services
Daniel	Miller	Ohio Department of Transportation
Tammy	Jernigan	ARDOT
Kelly	Montoya	NMDOT
Christopher	Leibrock	Kansas DOT
Dan	Wadley	KDOT
Dawn	Bickford	MaineDOT
Ashley	Yunkun	Txdot
Jim	Wild	State of Vermont Agency of Transportation
Ian	Gow	Massdot
Alex	Lewis	FDOT
Shahid	Jenkins	Ddot
Connie	Coleman	GDOT
Lukasz	Sakowicz	Vdot
Guangming	Wang	FDOT
Ryan	Buck	FDOT
Leonard	Vader	MoDOT
Eli	Ulmer	NDDOT
Philip	Peloquin	Vermont Agency of Transportation
Matt	Mueller	MWMueller
David	Malburg	MDOT-SHA
Robert	Conway	FHWA
Merrill	Zwanka	SCDOT
Oak	Metcalfe	National Precast Concrete Association
Temple	Short	SCDOT
Rodney	Klopp	PennDOT
Esayas	Butta	Colorado DOT
Michael	Mellons	Tennessee DOT
Amber	Landrith	Nevada Dept of Transportation
Jim	Wild	State of Vermont Agency of Transportation
Randy	Boysen	Montana DOT
Richard	Mulcahy	MassDOT
Matt	Romero	ODOT
Thomas	Murphy	NDDOT
Joe	Barreres	Nevada DOT
Bryan	Engstrom	MassDOT
Drew	Waldrop	ALDOT
Colin	O’Brien	MassDOT

Cabell	Garbee	Ncdot
Jonathan	Boardman	CTDOT
Charles	Smith	Indiana DOT
Timothy	Ramirez	Pennsylvania Department of Transportation
Ashley	BUss	Iowa DOT