Elastomeric Bridge Bearings (EBB) Technical Committee Meeting Minutes

Working Session # 6

Tuesday, June 10th, 2025 11:30AM – 12:30PM

1) 11:30AM-11:35AM: Call to Order and Introduction (Dan and Carla)

Name	Representing	Designation	Member Type
Mebrahtu, Michael	American Association of State Highway and Transportation Officials	AASHTO Liaison	Non-Voting
Tobias, Daniel	Illinois Department of Transportation	Technical Committee Chair	Voting
Principe-Martinez, Carla	Wisconsin Department of Transportation	Technical Committee Vice Chair	Voting
Ingram, Steven	Alabama Department of Transportation	Technical Committee Member	Voting
Vang, She	California Department of Transportation	Technical Committee Member	Non-Voting
Parillo, David	Connecticut Department of Transportation	Technical Committee Member	Non-Voting
Sommers, Scott	Iowa Department of Transportation	Technical Committee Member	Voting
De Vries, Jeff	Iowa Department of Transportation	Technical Committee Member	Non-Voting
Antoniadis, Nick	Massachusetts Department of Transportation	Technical Committee Member	Non-Voting

Jasper, Maggie	Massachusetts Department of Transportation	Technical Committee Member	Voting
Patel, Nishita	Massachusetts Department of Transportation	Technical Committee Member	Non-Voting
Stelzer, Michael	New York State Department of Transportation	Technical Committee Member	Voting
Galarza, Patrick	New York State Department of Transportation	Technical Committee Member	Non-Voting
Pulley, Michael	North Carolina Department of Transportation	Technical Committee Member	Voting
Garbee, W.	North Carolina Department of Transportation	Technical Committee Member	Non-Voting
Steele, Adrian	Florida Department of Transportation	Technical Committee Member	Voting
Lewis, Alexander	Florida Department of Transportation	Technical Committee Member	Non-Voting
Albin, Woodrow Ross	Rhode Island Department of Transportation	Technical Committee Member	Voting
Lane, Danny L.	Tennessee Department of Transportation	Technical Committee Member	Non-Voting
Young, David	Tennessee Department of Transportation	Technical Committee Member	Voting
Michalk, Teresa	Texas Department of Transportation	Technical Committee Member	Voting
Sakowicz, Lukasz	Virginia Department of Transportation	Technical Committee Member	Voting
Brayack, Daniel A	West Virginia Department of Transportation	Technical Committee Member	Voting
Hana, George	West Virginia Department of Transportation	Technical Committee Member	Non-Voting
Mana, Michael	West Virginia Department of Transportation	Technical Committee Member	Non-Voting
Ramirez, Tim	Pennsylvania Department of Transportation	Technical Committee Member	Voting
Seward, Kenny	Oklahoma Department of Transportation	Technical Committee Member	Voting
Malburg, David	Maryland Department of Transportation	Technical Committee Member	Voting
Huggins, Daniel	Louisiana Department of Transportation & Development	Technical Committee Member	Voting

Sandoval-Gil, Jesus	Arizona Department of Transportation	Technical Committee Member	Voting
Lancaster, Tracey	American Biltrite	Industry Participant	Non-Voting
Spears, Tyler	Bridge Components, Inc.	Industry Participant	Non-Voting
Palaniappan, Krishnamoorthy	Bridge Rubber Bearing, LLC	Industry Participant	Non-Voting
Wellington, Adam L	D.S. Brown Company	Industry Participant	Non-Voting
Streeter, Brad	Scougal Rubber Corporation	Industry Participant	Non-Voting
Anderson, Robert	Scougal Rubber Corporation	Industry Participant	Non-Voting
Korshak, Kathy	Tobi Engineering, Inc.	Industry Participant	Non-Voting
Chestnut, Brian	BTB Consulting	AASHTO Contractor	Non-Voting
Dupler, Douglas W.	Double D Audit & Consulting Services	AASHTO Contractor	Non-Voting
Sarcinella, Robert L.	Generic Agency	AASHTO Contractor	Non-Voting
Mueller, Matthew	Generic Consulting Company	AASHTO Contractor	Non-Voting
Hughes, Ed	Hughes Contracting & Consulting Services	AASHTO Contractor	Non-Voting
Rowden, Raymond T.	RTR Inspection & Consulting	AASHTO Contractor	Non-Voting

2) 11:35AM-11:40AM: Review of Current Technical Committee Members

- (Chair) mentioned that EBB is a large committee with lots of states included. It is an interesting committee, quasi-bridge and materials, unusual combo. All states use the material. We encourage anyone interested to join.

3) **11:40AM-11:50AM: Brief summary of the Technical Committee Audit Program (for those states not participating in quarterly calls or who are new to AASHTO Product Evaluation and Audit)**

- The **Chair** noted that the EBB program was one of the original AASHTO audit programs and shares similarities with the Reinforcing Steel and Wire (RSW) program. It is based on **AASHTO M251** and has been refined over time. EBBs are engineered bearing pads composed of alternating layers of shims, designed by bridge engineers. The **Illinois Department of Transportation (ILDOT)** conducts bridge bearing testing.

- The **Senior Auditor** added that EBB was approximately the fourth program developed under the AASHTO audit framework.

- The Chair recounted a visit to Minnesota with Sarc, where they discussed refining the sampling process and the need to revise the M251 standard. Sarc had previously marked up the EBB standard, which required significant updates. The Chair reflected on his experience working with the committee chair two decades ago when changes to M251 were first proposed—changes that were only implemented twenty years later. He emphasized the **value of the AASHTO program**, noting that even those not directly involved benefit from its influence. Experienced auditors provide critical feedback from the field, which helps shape and improve standards. This field experience was instrumental in the eventual revision of M251 by COMP, which also led to updates in the bridge design standards.

- The Chair highlighted that standards are often underappreciated, yet they govern much of the work and careers in the field. He encouraged broader adoption of the program, especially among non-users, noting that there are relatively few large-scale manufacturers. For ILDOT, incorporating the program required only a single sentence in their specifications. He described the EBB program as a "belt and suspenders" approach, reinforcing ILDOT's long-standing practice of testing bearings for decades.

- The **Vice Chair** shared that **WisDOT** requires participation in the EBB program.

- A representative from **ALDOT** stated that the program is required for inclusion on their approved list. However, they still test one pad from each lot. The sample is cut into a bowtie shape, which may alter the molecular structure of the material.

- **MaineDOT** reported that while they send inspectors to witness facility testing, they do not conduct their own testing.

- The Chair also mentioned that he frequently receives photos and questions about field conditions, underscoring the ease of implementing the program. Since the revision of M251, the program has operated more smoothly, with manufacturers actively participating in the rewrite process.

4) **11:50AM-12:00PM: Update - Program Status**

a) Audits Status (Ray/Matt/Sarc)

i) Audits completed and planned for this year (see presentation)

b) Program Usage for States (14 total) (Dan/Carla)

i) Current list of states requiring AASHTO Product Eval and Audit participation:

i. Alabama, Florida, Illinois, Iowa, Maine, Massachusetts, North Carolina, Ohio, Tennessee, Texas, Wisconsin, **Maryland (New!), West Virginia (New!)**

(Carla) mentioned WisDOT doesn't perform inspection or testing. There are a lot of contacts here in the session. Ask others how they benefit from this program.

ii. Pennsylvania (allowed in lieu of something else)

- The **Lead Auditor** explained that the Corrective Action Report (CAR) format is the same for both major and minor violations. However, major CARs are escalated to the Technical Committee (TC) for further action.
- **Pads are sampled** from storage and sent to the designated lab. Optional tests may be required depending on project specifications. Lab results are typically returned within 30 to 45 days.
- An **Auditor** reported a facility failure due to low-temperature brittleness in two samples. The facility was not conducting lot-based testing and was certifying pads to various specifications (e.g., LRFD, state requirements) rather than AASHTO M251. Five CARs were issued, including one for a misaligned laminate sample.
- The **Lead Auditor** noted that this number of CARs is unusually high.
- The **Chair** emphasized that while auditors often resolve minor issues internally, critical concerns are escalated to TC leadership. In this case, the decision to reject was made by consensus. He stressed the importance of meeting standards and maintaining consistency across manufacturers, even if it leads to difficult conversations. Such cases are rare, typically occurring once or twice a year.

- (DS Brown) mentioned picking project samples messes up job shipping schedules.

- (Lead Auditor) suggested to pick a few different contracts to make an additional pad for sampling.

- (Chair) said to let the manufacturer know when we're coming.

- (ODOT) said they will be on the notification list.
- (Auditor) discussed the process for notifying states of audit schedules.

5) **12:00PM-12:15PM: AASHTO Ballots (Attachments A and B) and EBB Work Plan (Compression Testing and Sampling)**

- **Dan** noted that only minor changes are currently underway, as a major overhaul was completed several years ago. He provided an update on **Cotton Duct Bearings**, which are rarely used but still relevant for heavy-duty applications like railroads and military structures. While ILDOT does not use them, NDOT does. The existing specs—including a 35-year-old military standard and an outdated bridge code—are being refined to align more closely with EBB options and modern testing standards. A revised specification was recently sent out for ballot.
- The **Lead Auditor** confirmed that **AASHTO M251** is also out for ballot, and any approved changes will be incorporated into the Work Plan.
- **PennDOT** clarified that the ballot had not yet been released at the time of the meeting.

6) **12:15PM-12:25PM: Industry Concerns**

7) **12:25PM-12:30PM: Open Discussion**

****Session will end promptly at 12:30PM to allow for the Regional Meetings and lunch to begin on time****

Attachment A

Standard Specification for

Plain and Laminated Elastomeric Bridge Bearings

AASHTO Designation: M 251M/M 251-25~~2~~

Technical Subcommittee: 4e, Joints and Bearings

Release: Group 2 (June)

9. TESTS

9.1. *Determination of Compression …….*

9.1.1. The bearing to be……

9.1.2. A pair of deflectometers………....

9.1.3. The bearing shall be loaded at a rate of 520 kPa/min ± 35 kPa/min [75 psi/min ± 5 psi/min] to a compression stress equal to 5 percent of the bearing's maximum design dead load plus live service compressive load. The 5 percent load shall be maintained for 2 min. At the end of the 2 min, the deflectometer readings shall be recorded.

Commented [DT1]: Tolerance on loading rate suggested by AASHTO Product Eval and Audit Auditor

9.1.4. The compressive load shall be increased at a rate of 520 kPa/min ± 35 kPa/min [75 psi/min ± 5 psi/min] to a compressive stress equal to the bearing's maximum design dead load plus live service compressive load. The load shall be maintained for a period of 2 min, at the end of which the deflectometer readings shall be recorded.

Commented [DT2]: Ditto

Attachment B

Standard Specification for

Cotton Duck Fabric Bridge Bearings

AASHTO Designation: M 351M/M 351-254[1,2]

AASHTO

Technically Revised: 20254

Technical Subcommittee: 4e, Joints and Bearings

8. TESTING AND ACCEPTANCE CRITERIA

8.9. *CDP criteria shall include the following:*

8.9.1. Each sampled CDP shall be tested in accordance with Section 9.1 of this specification. If the recorded strain for either of the two specimens~~either of two samples~~ from a sampled CDP at a compressive stress of 14000 kPa [2000 psi] is outside the range specified in Table 2, the lot shall be rejected. If fracture or failure of the CDP is observed for either of the two specimens per sampled CDP ~~samples~~ at 70000 kPa [10,000 psi], the lot shall be rejected.

Commented [DT1]: Clarifying "sample" vs. "specimen"

8.10. *Optional test procedures, when required by the purchaser, include:*

8.10.1. *Cotton Duck Fabric:*

8.10.1.1. *Cotton Duck Fabric Thread Count………*

8.10.1.2. *Cotton Duck Fabric Weight……….*

8.10.3.2. *Volume Swell…….*

8.10.3.3. ~~*Set*~~ Each sampled CDP shall be tested for compressive set, in accordance with Section 8.10.3.3.1. Otherwise, each CDP test specimen shall be tested for permanent set, in accordance with Section 8.10.3.3.2.

Commented [DT2]: Compression Set or Permanent Set can now be conducted, but both not required.

8.10.3.3.1. *Compressive Set*-Each CDP test specimen shall be tested for compression set in accordance with ASTM D395 Method B and shall meet the requirements of Table 5. If these requirements are not met, the lot shall be rejected.

Table 5—Compression Set

Material Property	ASTM Standard	Test Requirement	Polyisoprene (Natural Rubber) Durometer Grade 50	60	70	Polychloroprene (Neoprene) Durometer Grade 50	60	70	Units
Compression set	D395	Specific temperature of test		70 [158]			100 [212]		°C [°F]
	Method B at specified temp	Max permissible change (after 22 h)		25			35		%

8.10.3.3.2. *Permanent Set*-Each CDP test specimen shall be tested for permanent set, in accordance with Section 9.2 of this specification, and meet the requirements of Table 6. If these requirements are not met, the lot shall be rejected.

Table 6 5—Permanent Set of CDP

Compressive Stress, kPa [psi]	Maximum Permanent Set, %
3500 [500]	3.0
7000 [1,000]	4.0
21000 [3,000]	7.0
35000 [5,000]	10.0
70000 [10,000]	13.0

9. TESTS

9.1. *Determination of Strain Range and Damage at Elevated Loading:*

9.1.1. Two full thickness CDP test ~~samples~~ specimens cut from each sampled pads shall be 50 mm × 50 mm [2 in. × 2 in.] and cured for 4 h at 23 ± 2° C [73 ± 4° F].

Commented [DT3]: Clarifying samples vs. specimens

9.1.2. The test ~~samples~~specimens shall be placed in a test machine capable of applying a compressive load greater than 70000 kPa [10,000 psi].

9.1.3. Each specimen shall be loaded in compression between two level steel plates perpendicular to the laminations.

9.1.4. The considered undeflected reference thickness (height) shall be taken as the average distance between the two level steel loading plates for each of the four sides of the specimen measured parallel to the direction of loading. This thickness (which is also the origin of deflection measurements) shall be measured when the specimen is subjected to a compressive load of 35 kPa [5 psi] that has been maintained for a minimum of 5 min. Subsequent deflection measurements of the specimen during testing shall be taken as the average change in thickness (height) for each of the four sides of the specimen measured parallel to the direction of loading. ~~The origin of the deflection and compressive strain measurements shall be at a compressive load of 35 kPa [5 psi].~~

Commented [DT4]: Height/Thickness and deflection are now average of 4 measurements.

~~9.1.4.~~9.1.5. The compressive loading shall be increased from 35 kPa [5 psi] at a steadily applied rate of ~~steadily applied at a rate of~~ 2225 N/min ± 45 N/min [500 lb/min ± 10 lb/min].

Commented [DT5]: Clarifying not to release initial loading and giving a tolerance for loading rate.

~~9.1.5.~~9.1.6. The compressive deflection shall be continuously recorded until the loading on the specimen is 70000 kPa [10,000 psi], at which point the specimen ~~sample~~ shall be inspected for any damage or failure.

~~9.1.6.~~9.1.7. The compressive strain in each ~~sample~~ specimen shall be calculated as the compressive deflection divided by the considered undeflected reference thickness (height) of the sample.

Commented [DT6]: Clarifying language

9.2. *Determination of Permanent Set:*

9.2.1. Two full thickness CDP test specimens cut from each sampled pads shall be 50 mm × 50 mm [2 in. × 2 in.] and cured for 4 h at 23 ± 2° C [73 ± 4° F].

9.2.2. The test specimens to be tested shall be placed in a test machine capable of applying a compressive load greater than 70000 kPa [10,000 psi].

9.2.3. Each specimen shall be loaded in compression between two level steel plates perpendicular to the laminations.

9.2.4. The considered undeflected reference thickness (height) shall be taken as the average distance between the two level steel loading plates for each of the four sides of the specimen measured parallel to the direction of loading. This thickness shall be measured when the specimen is subjected to a compressive load of 350 kPa [50 psi] that has been maintained for a minimum of 5 min. Subsequent thickness measurements of the specimen during testing shall be taken as the average distance from the bottom steel plate to the top of the specimen for each of the four sides of the specimen measured parallel to the direction of loading. ~~The considered undeflected reference thickness of a CDP specimen shall be the thickness of the specimen at a compressive load of 350 kPa [50 psi] thathas been maintained for 5 min.~~

Commented [DT7]: Nearly Ditto from 9.1.4 above

Commented [DT8]: I actually don't think it should say "leave in" or "remove" specimen for measuring. Let the lab staff decide.

9.2.5. The compressive loading shall be increased from 350 kPa [50 psi] at a steadily applied rate of ~~be steadily applied at a rate of~~ 2225 N/min ± 45 N/min [500 lb/min ± 10 lb/min] until the loading is 3500 kPa [500 psi] at which point the total loading shall be released. Between 30 s and 1 min after release, the thickness of the CDP specimen shall be measured.

Commented [DT9]: Nearly Ditto from 9.1.5 above

9.2.6. The procedure for the remaining higher loadings provided in Table 5 is as follows:

9.2.6.1. Within 5 min of release of the previous loading, load the specimen to the next higher loading level with no preloading of 350 kPa [50 psi] at a steady rate of 2225 N/min ± 45 N/min [500 lb/min ± 10 lb/min] at which point this load shall be released.

AASHTO Product Evaluation & Audit Solutions

Elastomeric Bridge Bearing (EBB) 2024/2025 Overview

2024 Facilities Audited – 11

(6 States, 1 in Canada)

10 Facilities were found Compliant

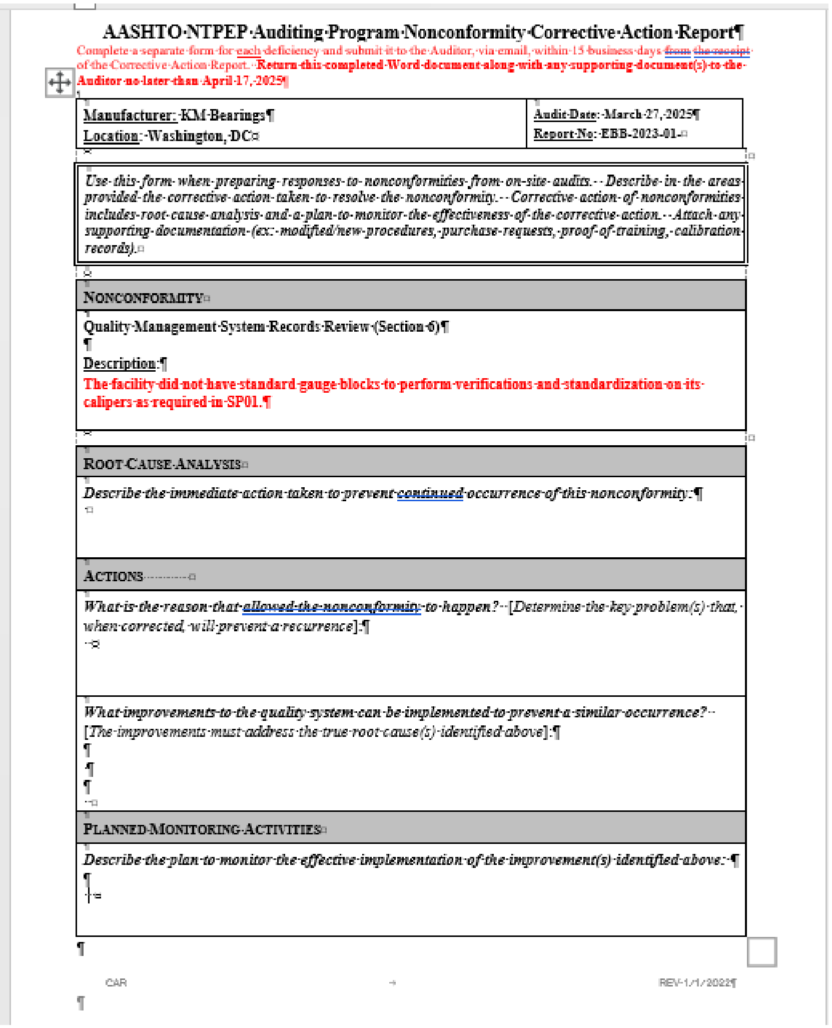
1 Facility was found Non-Compliant

2024 Audit Overview

Corrective Actions (CAR’s) 15 Total

Minor =13 total (Documentation/Calibration)

Major = 2 total Facilities (Test Results)
Resulting in a Non-Conformance



AASHTO NTPEP Auditing Program Nonconformity Corrective Action Report

Complete a separate form for each deficiency and submit it to the Auditor, via email, within 15 business days ~~from the receipt~~ of the Corrective Action Report. **Return this completed Word document along with any supporting document(s) to the Auditor no later than April 17, 2025**

Manufacturer: KM Bearings Location: Washington, DC	Audit Date: March 27, 2025 Report No: EBB-2023-01-

Use this form when preparing responses to nonconformities from on-site audits. Describe in the areas provided the corrective action taken to resolve the nonconformity. Corrective action of nonconformities includes root cause analysis and a plan to monitor the effectiveness of the corrective action. Attach any supporting documentation (ex: modified/new procedures, purchase requests, proof of training, calibration records).

NONCONFORMITY

Quality Management System Records Review (Section 6)

Description:

The facility did not have standard gauge blocks to perform verifications and standardization on its calipers as required in SP01.

ROOT CAUSE ANALYSIS

Describe the immediate action taken to prevent continued occurrence of this nonconformity:

ACTIONS

What is the reason that allowed the nonconformity to happen? [Determine the key problem(s) that, when corrected, will prevent a recurrence]:

What improvements to the quality system can be implemented to prevent a similar occurrence? [The improvements must address the true root cause(s) identified above]:

PLANNED MONITORING ACTIVITIES

Describe the plan to monitor the effective implementation of the improvement(s) identified above:

CAR REV 1/1/2022

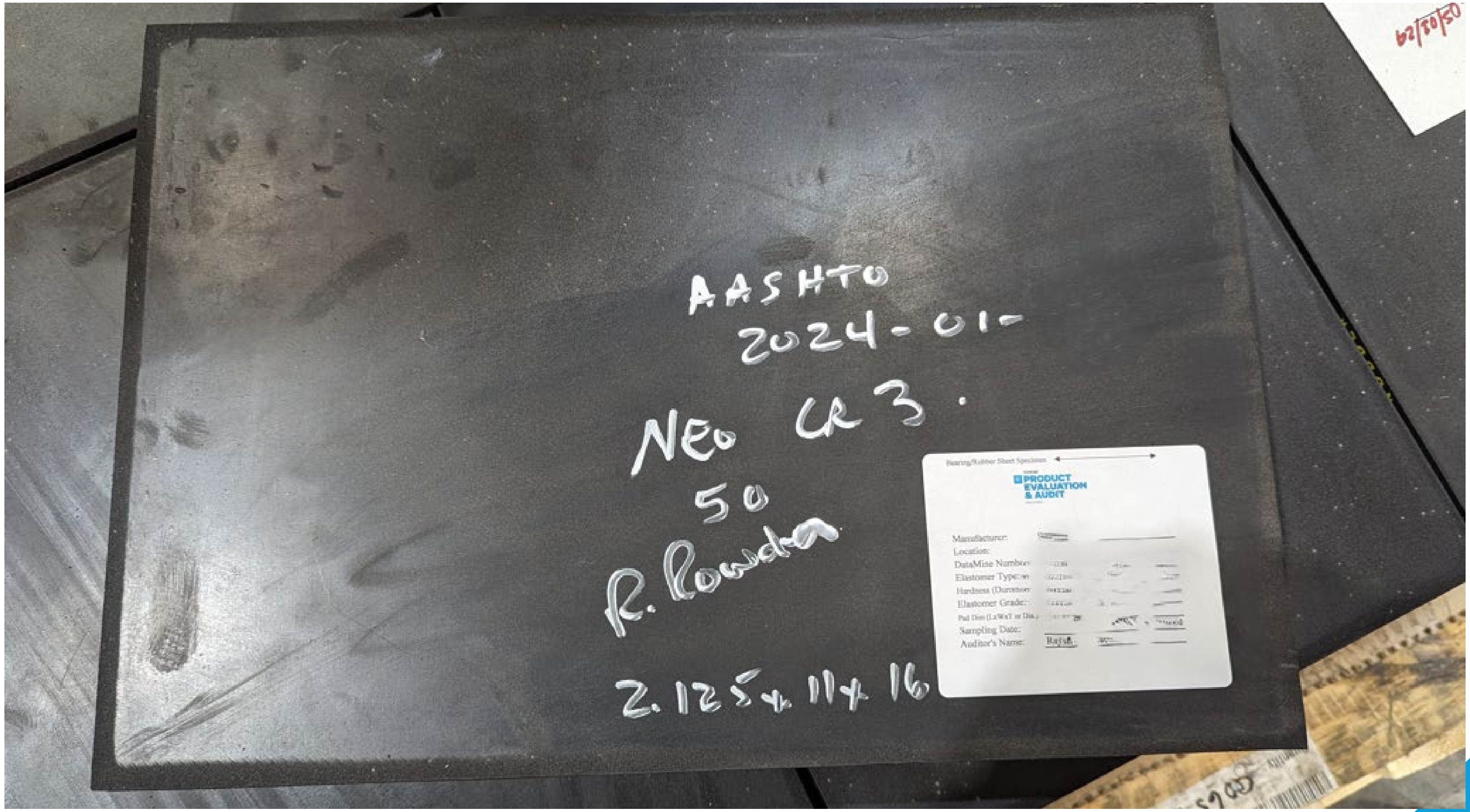
Items not meeting the Work Plan or Specification requirements are issued a Corrective Action Report to complete with 15 days

2024 Type of Bearings Sampled - Plain vs. Laminated

Total Sample Population
12 Total Samples

Laminated Bearings	10	Plain Bearings	2
Polyisoprene (Natural Rubber)	3		
Polychloroprene (Neoprene Rubber)	7		2

2024 Type of Bearings Sampled - Plain vs. Laminated



Testing/specifications (required and optional):

Mandatory Tests	
Test Property	**Test Designation**
Hardness	ASTM D2240
Shear Modulus	ASTM D4014 & AASHTO M 251, Section 8.8.3
Tensile Strength	ASTM D412
Ultimate Elongation	ASTM D412
Low Temperature Brittleness	ASTM D2137, Test Method C, Temperatures - AASHTO M 251, Table 1
Compressive Load	AASHTO M 251, Section 8.8.1.2 @ 1500 psi
Bond Strength	AASHTO M 251, Section 8.8.2.2
Optional Tests [a] ***Only perform when the lot of bearings by contract requires it***	
Shear Modulus Elastomer Grades 2 - 5,	AASHTO M 251, Section 8.9.1
Compression Stiffness	AASHTO M 251, Section 8.9.2
Heat Resistance	AASHTO M 251, Section 8.9.3
Compression Set	AASHTO M 251, Section 8.9.4

[a] *Not required for plain pads.*

2025 Facilities Audited – 11

(6 States, 1 in Canada)

2 Facilities were found Compliant

9 Facilities to be audited

2025 Audit Overview

Corrective Action (CAR's) 1 at this time

Minor = 1 (Calibration)

2025 Type of Bearings Sampled - Plain vs. Laminated

Total Sample Population (6/1/25)
2 Total Samples

Laminated Bearings	2	Plain Bearings	0
Polyisoprene (Natural Rubber)	0		
Polychloroprene (Neoprene)	2		0

Question?

Working Session #6

Elastomeric Bridge Bearings (EBB)

Attendance

June 10, 2025

First Name	Last Name	Employer
Tammy	Jernigan	ARDOT
Carla	Principe	WisDOT
Merrill	Zwanka	SCDOT
Ryan	Buck	FDOT
Jim	Reilman	Indiana DOT
Martin	Dassi	TxDOT
Daniel	Miller	Ohio Department of Transportation
Ray	Rowden	RTR NSPECTION
Matt	Romero	ODOT
Steven	Ingram	ALDOT
Jeff	De Vries	Iowa DOT
Cabell	Garbee	Ncdot
Willie	Johnson	MODOT
Dennis	Warren	Michigan DOT
Shane	Little	Arizona
Troy	DeWitt	Auditor
Jacob	Walker	GDOT
Timothy	Ramirez	Pennsylvania Department of Transportation
David	Young	Tennessee Department of Transportation
Kenny	Seward	OK DOT
Matt	Mueller	MWMueller
Matt	Schulz	Vt Agency of Transportation
Joseph	Stilwell	MaineDOT
Scott	Hughes	SEH
Sam	Frederick	ncdot
Craig	Joss	Applied Infrastructure, LLC
Alex	Lewis	FDOT
Colin	O'Brien	MassDOT

Ashley	Buss	Iowa DOT
Adam	Wellington	D.S. Brown
Bryan	Engstrom	Massdot
Ed	Hughes	Contractor
Doug	Dupler	Contractor
David	Parillo	Connecticut Department of Transportation
Ian	Gow	MassDOT
Christopher	Leibrock	Kansas DOT
Dan	Brayack	WVDOH
Yodd	Whittington	NCDOT
David	Howley	CT DOT
Randy	Boysen	Montana DOT
Kenny	Seward	OK DOT
Jay	Sprague	TRI Environmental
Robert	Sarcinella	Sarc.engineering & Consulting Services
David	Malburg	MDOT-SHA
Brian	Hunter	NCDOT
David	Kuniega	AASHTO
Mario	Paredes	TRI Environmental Inc
Joshua	Harding	Scougal Rubber Corp
Shahid	Jenkins	Gsdot
Paul	Bushnell	MDT
Brad	Streeter	Scougal Rubber Corporation
Jesus	Sandoval-Gil	ADOT
Hemantkumar	Shah	New Jersey Department of Transportation
Yong	Zeng	NJDOT
Hector	Anaya	WMC
Allen	Gallistel	MnDOT
Charles	Smith	Indiana DOT
Emiliano	Hernandez	WMC
Jonathan	Boardman	CTDOT
Drew	Waldrop	ALDOT