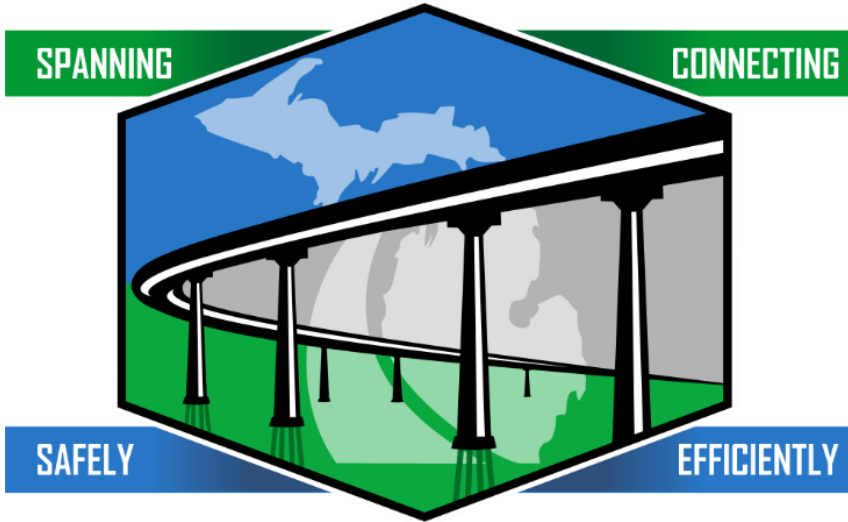


BUREAU of BRIDGES

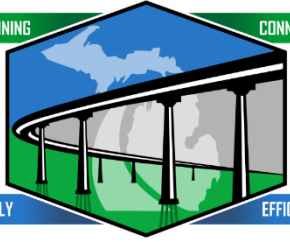


and **STRUCTURES**

MDOT Training and Sharing of Best Practices

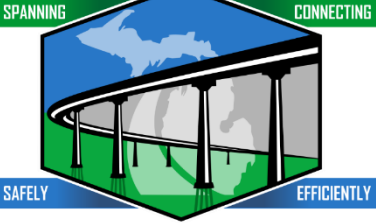


2018 NBPPC



MDOT Structure Maintenance Support Unit

- Maintenance Resource
 - Develop Standards and Specifications
 - Provide Technical Support
 - Investigate New Materials and Methods
 - Design and Detail Complex Repairs
 - Liaisons with Industry Partners
 - Develop Training
 - Support Local Agencies
-



MDOT Structure Maintenance Support Unit

- WIGS!!

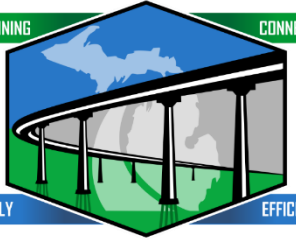
Wildly Important Goal for 2017

MDOT will build upon our innovative culture by measuring, promoting and celebrating innovations

Department-wide Measure

Highlight five to 10 MDOT innovations that can yield measurable results and/or can be effectively communicated to the public

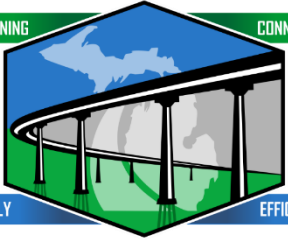
How will this happen?



MDOT Structure Maintenance Support Unit

- **WIGS!!**
 - Partner with Local Agencies
 - Train Local Agencies
 - Conferences and Classes
 - Employee Swaps
 - Utilize communication and photo department to develop public outreach videos

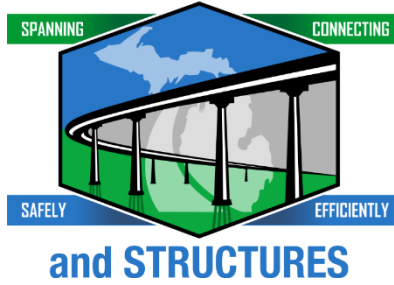




Local Agency Support

- 83 County Local Agency Bridge Owners
- 261 Village / City / Township Bridge Owners

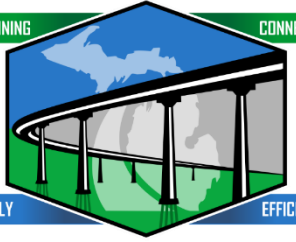




Local Agency Support

- Local Agency Owned Structures
 - ❑ 6590 - Highway Bridges (>20 ft. NBI)
 - ❑ 69 - Small highway structures (<=20 ft.)
 - ❑ 4 - Highway Tunnels
 - ❑ 64 - Pedestrian Bridges

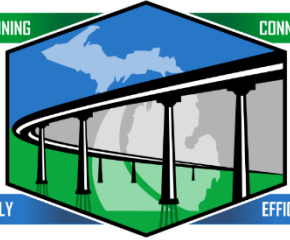




Local Agency Support

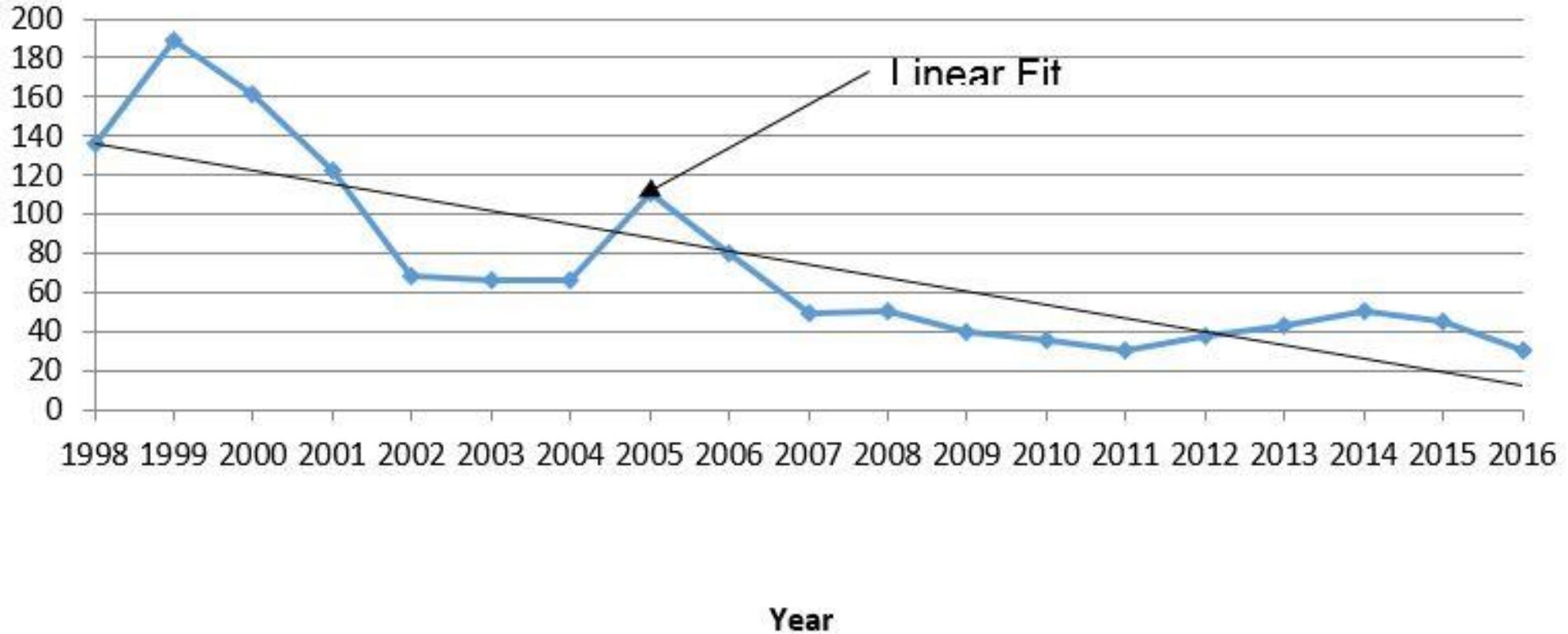
- Local Agency Owned Structures
 - ❑ 977 Structurally Deficient
 - ❑ 1761 Decks Rated Fair
 - ❑ 1789 Superstructures Rated Fair
 - ❑ 1745 Substructures Rated Fair

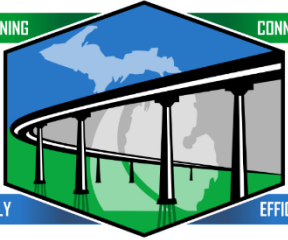




Local Agency Support

Deterioration Rate Statewide Trunkline Bridges

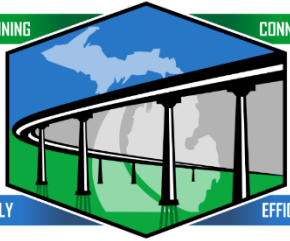




Local Agency Support

- Underbridge Inspection Aerial Unit
- Emergency Response
- Support Bridge Inspection





Local Agency Training

- Annual LTAP Bridge Conference

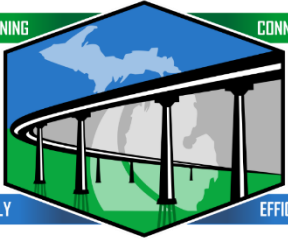
Michigan
Bridge
Conference

2017
Lansing, MI

Center for
Technology & Training

Day 1
Michigan Bridge Workshop
Inspection • Maintenance Recommendations • Projects
March 21, 2017
8:00 AM - 5:00 PM

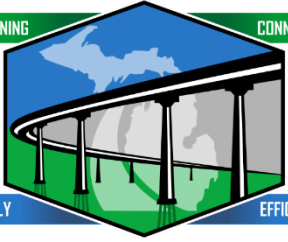
Day 2
Michigan Bridge Conference
March 22, 2017
8:00 AM - 5:00 PM



Local Agency – Scoping

- Missaukee County Road Commission
 - 13 Mile Rd over Butterfield Creek
 - Bridge Deck Rating lowered from 6 to 4
 - 62 feet long x 31 feet wide
 - Adjacent Box Beam Bridge

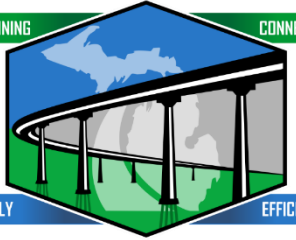




Local Agency – Scoping

- Inspector Comments
 - Concrete Overlay – Severe Map Cracking
 - Heavy Spalls Patched with HMA Cold Patch at Joints

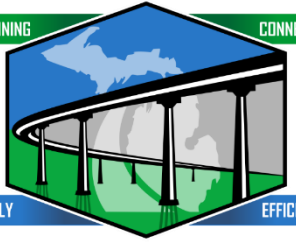




Local Agency – Scoping

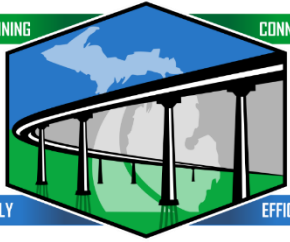
- Field Meeting 9/26/2016 – Recommendations
 - Sound Bridge Deck
 - Replace Delaminations
 - Replace End Joints
 - Apply Thin Epoxy Overlay





Local Agency Trial Projects – Methods and Products

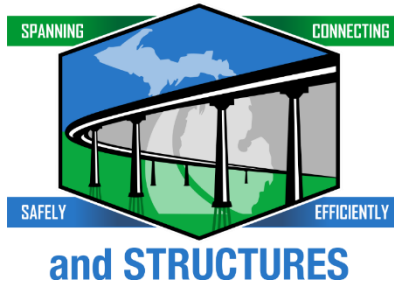
- MDOT – Challenge with UHPC
- First Trial in Michigan Specified Lafarge
- General Contractor submitted a Value Engineering Change Proposal that MDOT accepted, so UHPC was not used.
- Second trial in Michigan, MDOT tried to use a non-proprietary mix University of Michigan was developing.
- UofM was unable to bring the UHPC from lab to field and we hired Lafarge midstream



Local Agency Trial Projects – Methods and Products

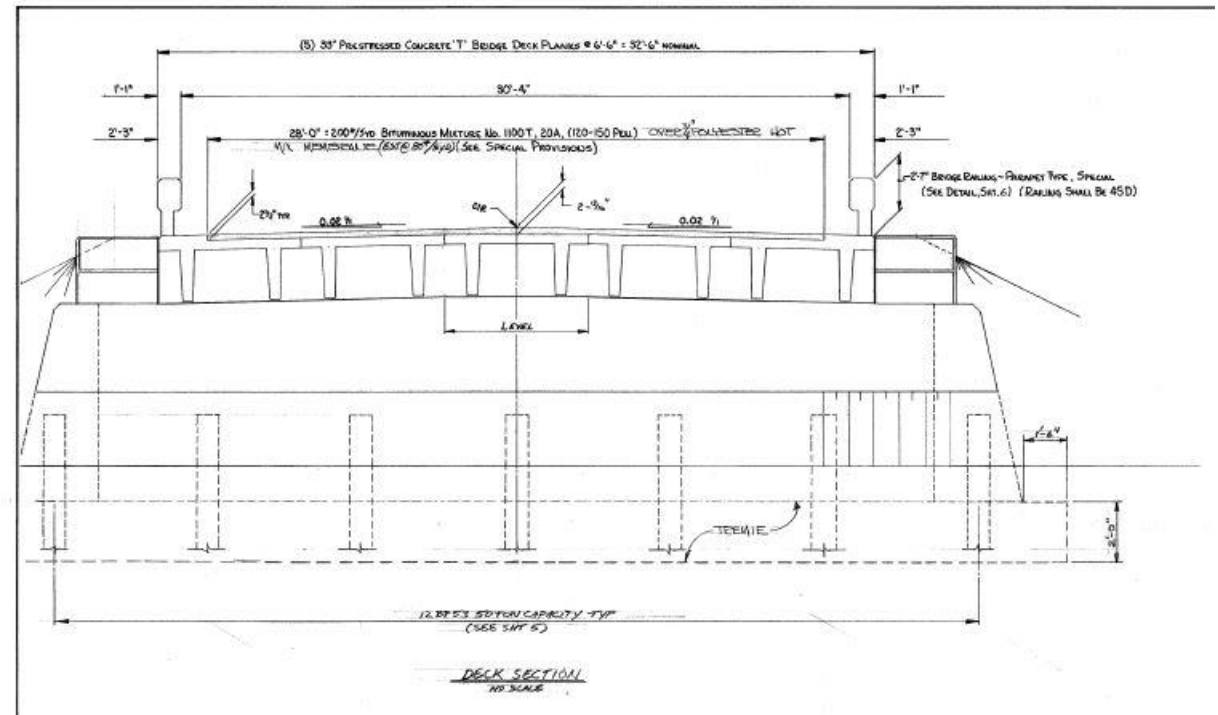
- UHPC Mix Design that goes from lab to field

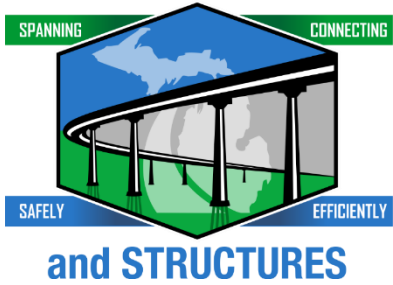
	cement	GGBS*	silica fume	F75 sand	F12 sand	water	SP**	steel fiber
Weight ratio	0.5	0.5	0.25	0.302	1.208	0.22	0.03	0.203
Quantity, lbs	193.5	193.5	96.7	116.8	467.3	78.2	11.6	78.4



Local Agency Trial Projects – Methods and Products

- St Clair County Road Commission
- Kilgore Rd over the Pine River
- Adjacent Double T Superstructure – Deteriorated and Leaking Joints
- Built in 1989 – Comprised of 5 Double T's
- HMA Overlay

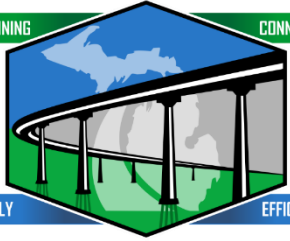




Local Agency Trial Projects – Methods and Products

- St Clair County Road Commission
- Traditional Repair – Latex Modified Concrete
- Experimental Repair – Ultra High Performance Concrete (UHPC)

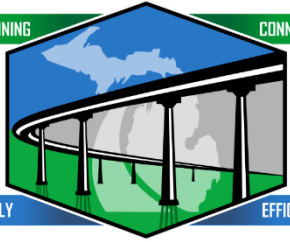




Local Agency Trial Projects – Methods and Products

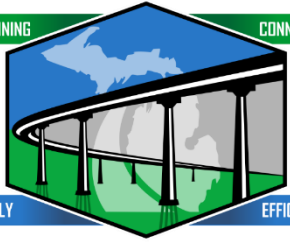
- St Clair County Road Commission
- University of Michigan
- MDOT – Maintenance – Concrete – Construction
- Anlaan Construction





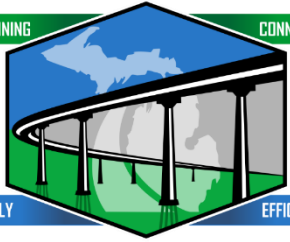
Local Agency Trial Projects – Methods and Products





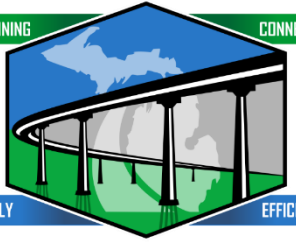
Local Agency Trial Projects – Methods and Products





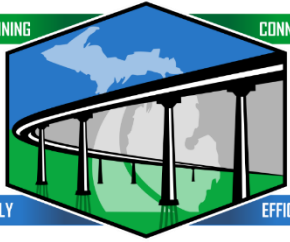
Local Agency Trial Projects – Methods and Products





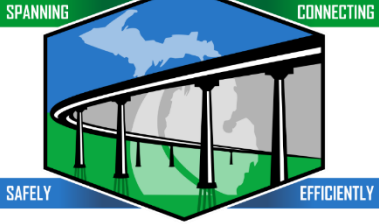
Local Agency Trial Projects – Methods and Products

- MDOT – Experience with UHPC
- SPR-1637 - Development, Characterization and Applications of a Non-Proprietary Ultra High Performance Concrete for Highway Bridges
- January 2018 Concrete International Article – Field Application of Non-Proprietary Ultra High Performance Concrete



Local Agency Trial Projects – Methods and Products



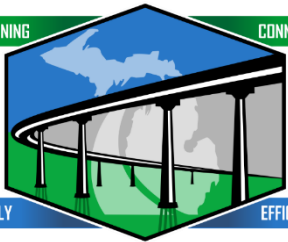


US-2 Roadside Park in Naubinway

B05 of 49022

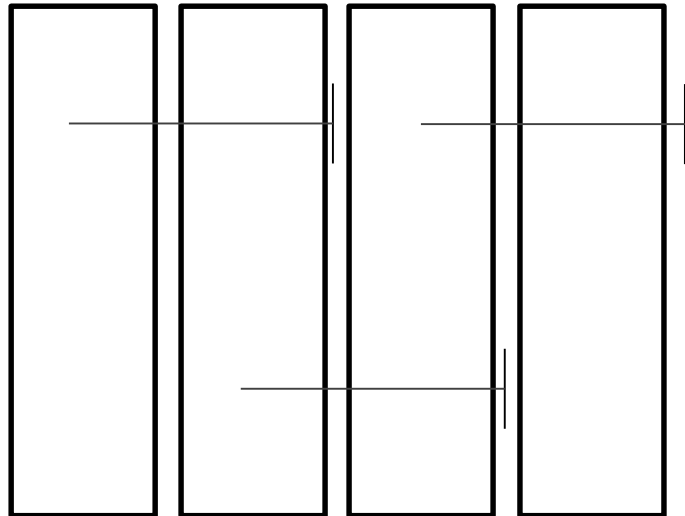
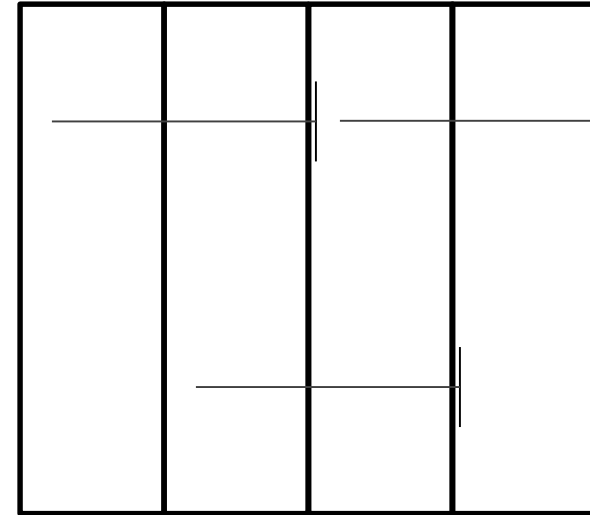
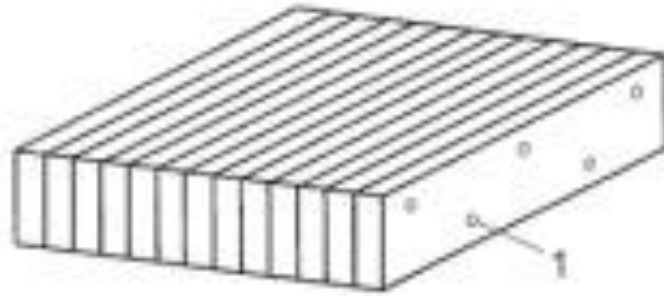
- Constructed in 1990
- Timber Superstructure comprised of 2 x 12 timbers spanning 24 feet nailed together.

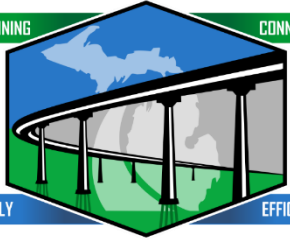




and STRUCTURES

US-2 Roadside Park in Naubinway





US-2 Roadside Park in Naubinway

2011 Bridge Inspection

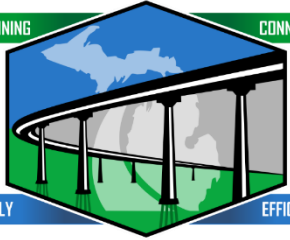
- During the Inspection a large truck drove over the bridge, and it deflected more than expected.
- November 8, 2011 – Superior Region conducted a load test.
- Load test used the Engadine Garage’s Water Truck with 2,000 gallons of water – Deflected 3/4”

	West Fascia	4' West	8' West	Centerline	8' East	4' East	East Fascia
Baseline	N.M.	53	52 1/4	52	51 1/4	51 1/4	N.M.
Test 1	N.M.	53	52 1/8	51 5/8	51 1/8	51	N.M.
Test 2	N.M.	52 1/4	51 3/4	51 1/2	51 1/8	51 1/4	N.M.
Test 3	N.M.	52 3/4	51 7/8	51 5/8	51 1/4	51 3/8	N.M.

BUREAU of BRIDGES

SPANNING

CONNECTING



and STRUCTURES

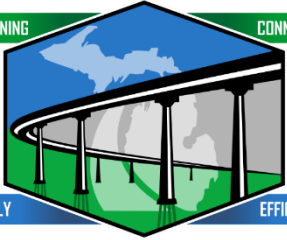
How do you fix this?

**Come see me in Session B8 at 3:30 Today –
Strengthening Nail Laminated Timber
Superstructures - Naubinway Rest Area
Case Study and St Joe County Road
Commission Case Study of the Heimbach
Road Bridge.**

BUREAU of BRIDGES

SPANNING

CONNECTING



SAFELY

EFFICIENTLY

and STRUCTURES

Questions?

