

Bridge Field Services

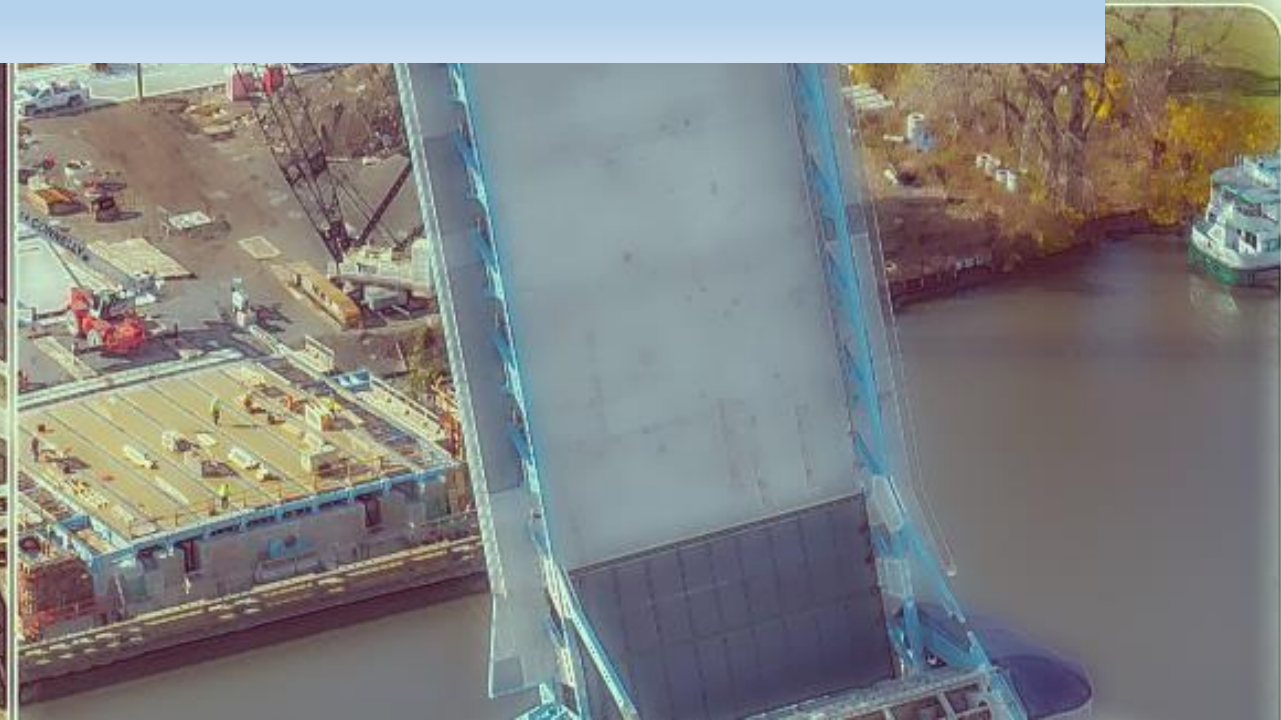
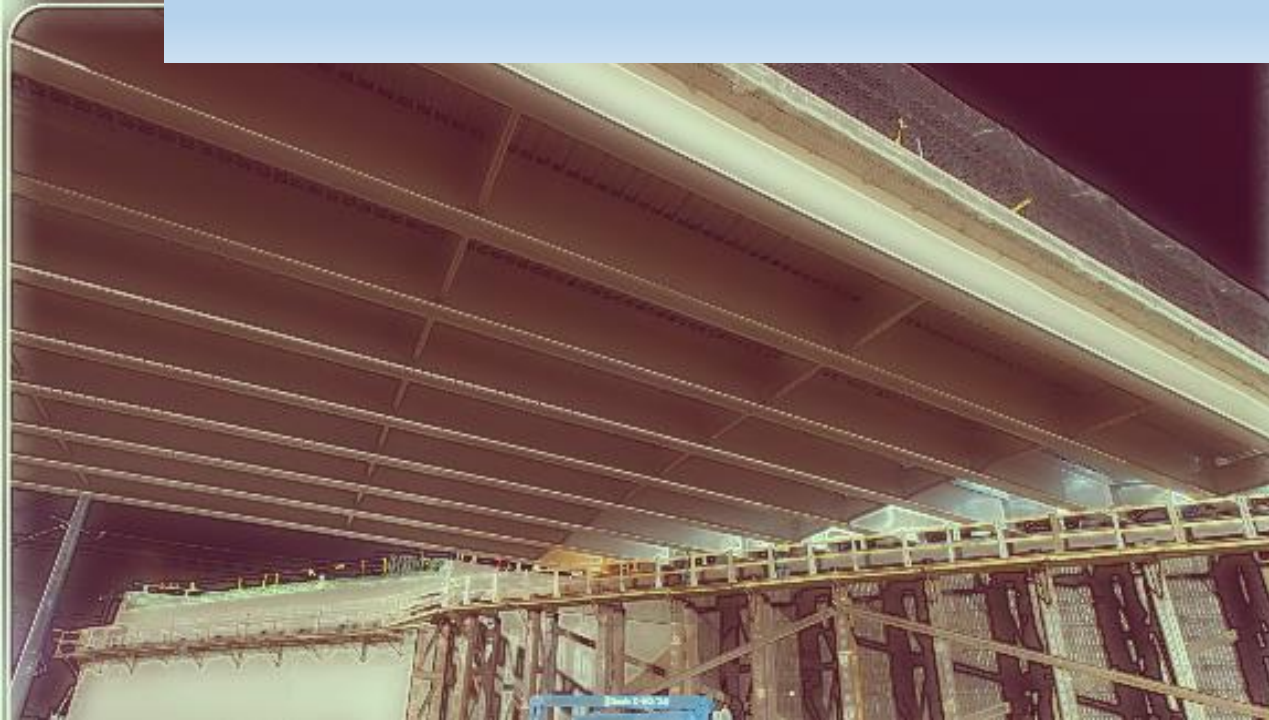
Michigan Bridge Conference
March 23, 2016



Corey Rogers, P.E.
Engineer of Bridge Field Services

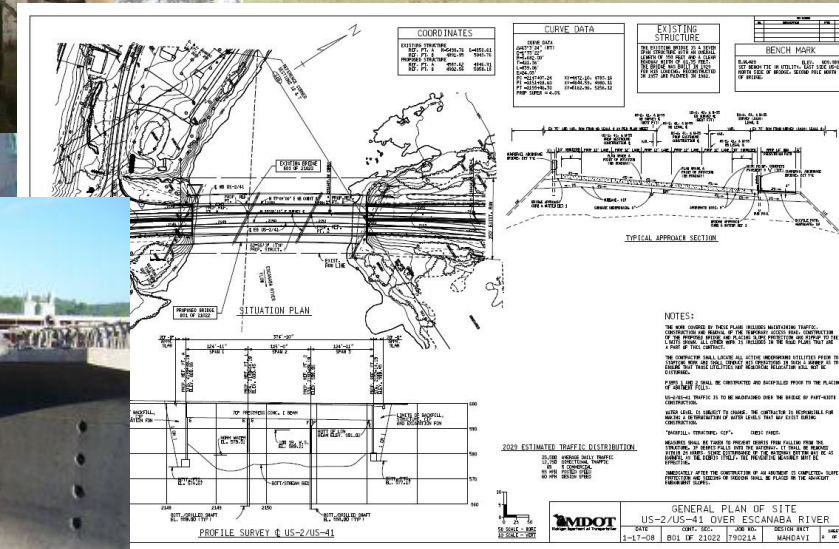


Bridge Field Services



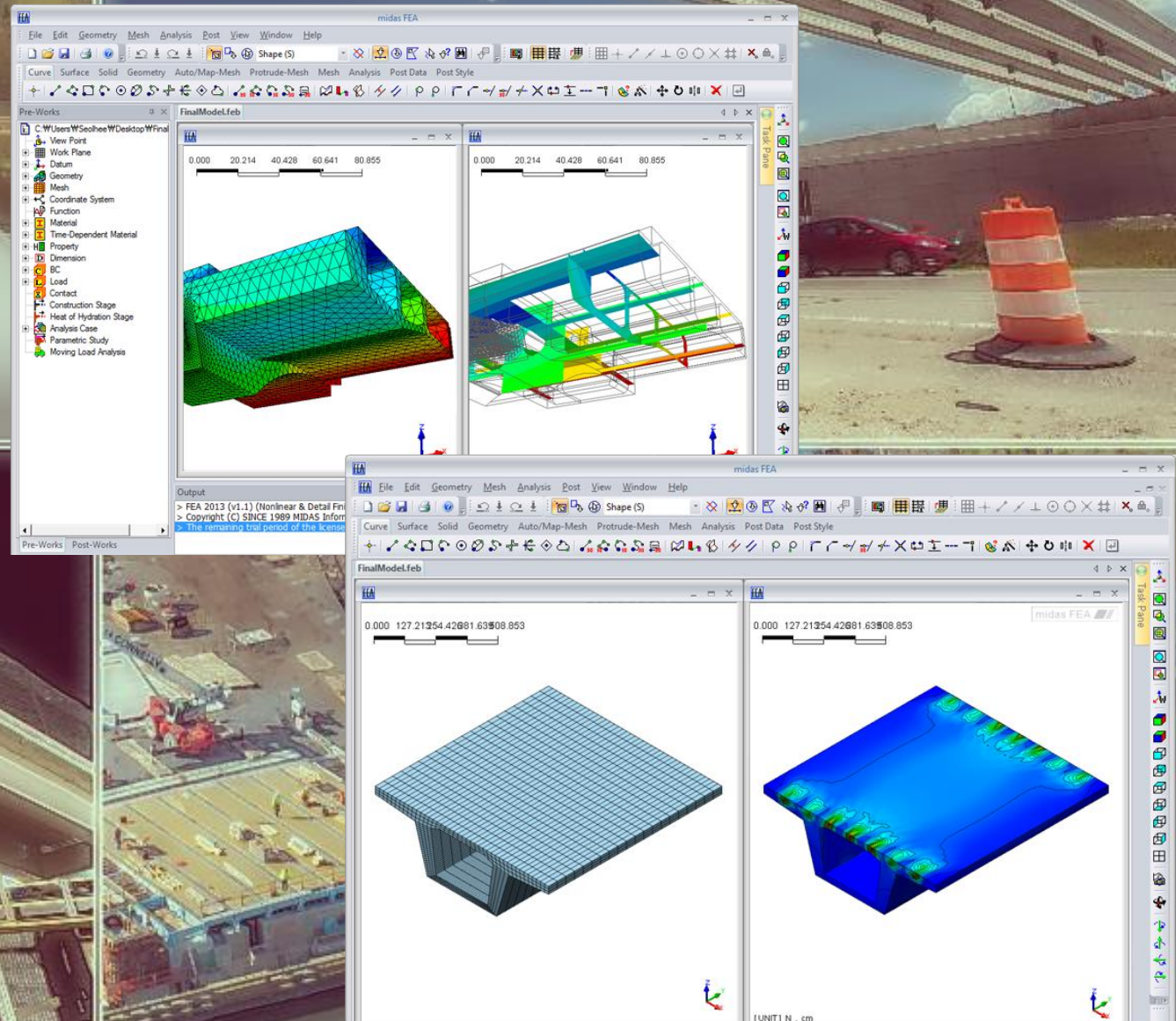
Bridge Field Services Resources

- New Structural Engineer Position
 - RFA Emergency Contracts
 - Design
 - Steel Repairs
 - Concrete Repairs
 - Temp Supports
 - Constructability Reviews
 - Concrete Shop Drawing
 - Specialized Inspection Support
 - Construction Support



Bridge Field Services Resources

- Structural Analysis and Durability Engineer
 - Finite Element Analysis
 - New Material Evaluation
 - Complex Structural Design Support
 - Resolution of Field Issues
 - Construction Loadings
 - Temp Shoring
 - Staged Construction
 - Research



Alignment and Consistency

- Statewide Bridge Alignment Team (Bridge Committee)
- MDOT/MITA Bridge Operations
- MDOT/ACEC Bridge Committee
- Statewide Ancillary Structures Alignment Team
- Construction Conferences
- Maintenance Conferences
- Bridge Inspection Calibration Meeting
- Statewide Alignment Construction Team (SACT)
- Design Squad Leader Meetings
- Concrete Precaster's Industry Meetings



Statewide Alignment Team for Ancillary Structures

- Design, fabrication, construction and specifications for foundations and support structures for:
 - Cantilevers,
 - Trusses,
 - Traffic Signal Mast Arms,
 - Light Standards,
 - CCTV Poles,
 - Dynamic Message Signs,
 - Retaining walls,
 - Sound walls, etc.
- 2016: Whitepaper, kick off meeting
 - Inspection frequency, inventory, and condition
 - New LRFD Specifications
 - Reuse Criteria



The background of the slide is a collage of four images related to bridge construction and maintenance. The top-left image shows a close-up of a bridge's concrete structure. The top-right image shows a bridge under construction with a crane visible against a blue sky. The bottom-left image shows a bridge deck with extensive scaffolding and construction equipment. The bottom-right image shows a bridge with a large blue crane or lifting device.

Training Classes

- **Structural Bolting Workshop**

- 2nd annual class to be held on March 23, 2016

- **Structural Welding Workshop**

- Under development, 1st annual class to be held spring of 2017

- **Bridge Deck Construction and Bridge Rehabilitation Inspection**

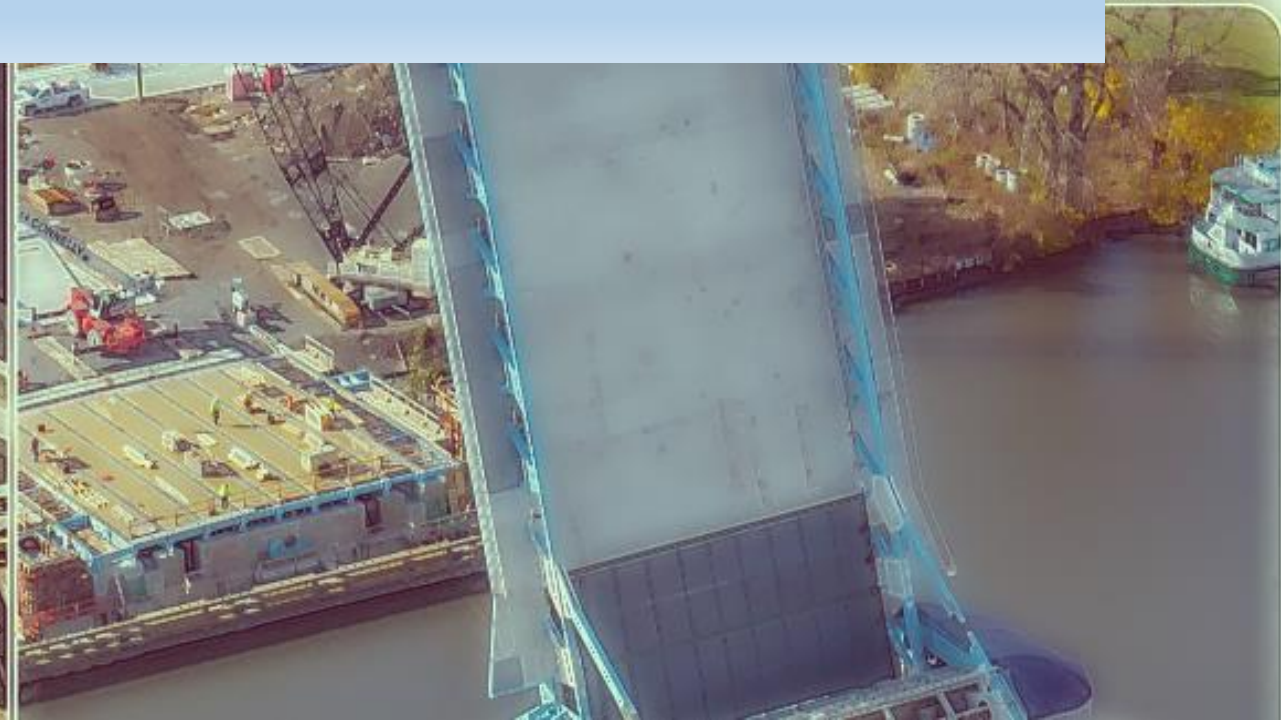
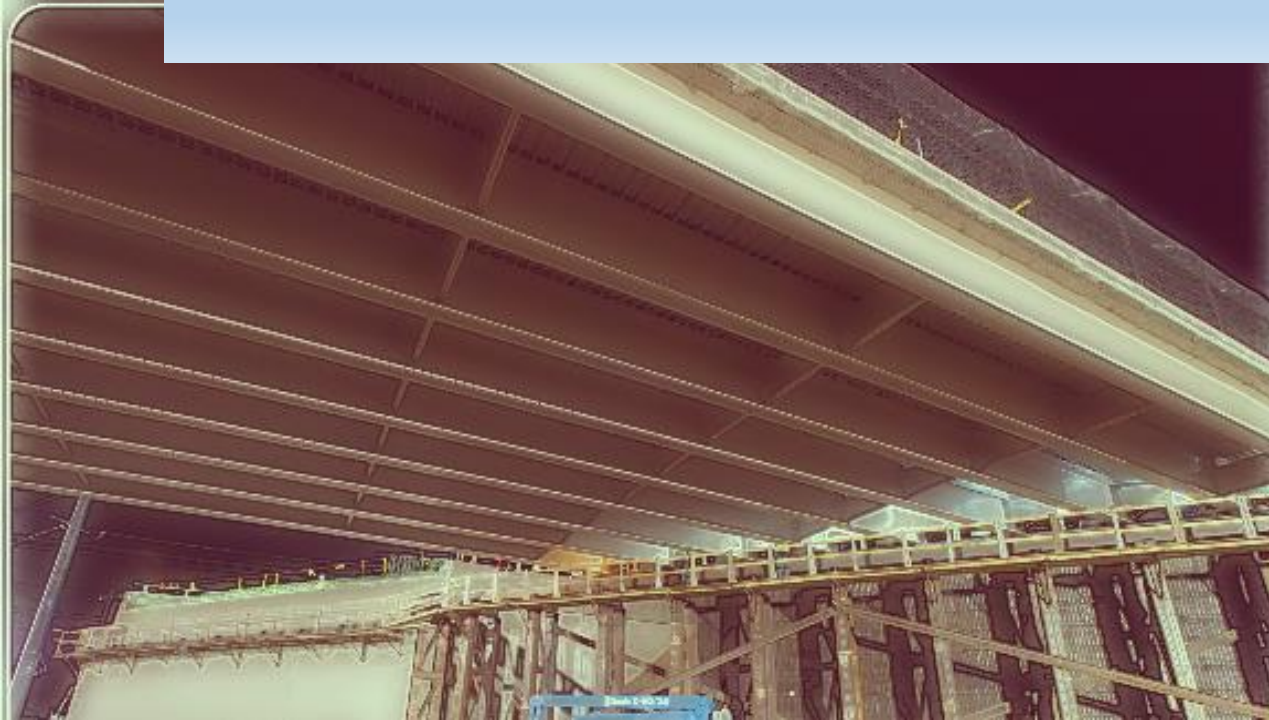
- April 6th and 7th

- **Bridge Painting School**

- March 10th and 11th



Structures Management



RFA Process

- Request for Actions

- Whitepaper
- Priorities 1-4
- RFA Committee
- MiBRIDGE
- In-house
- Emergency Contracts
- Special Letting
- Normal Letting

- Temp Support Left-In-Place

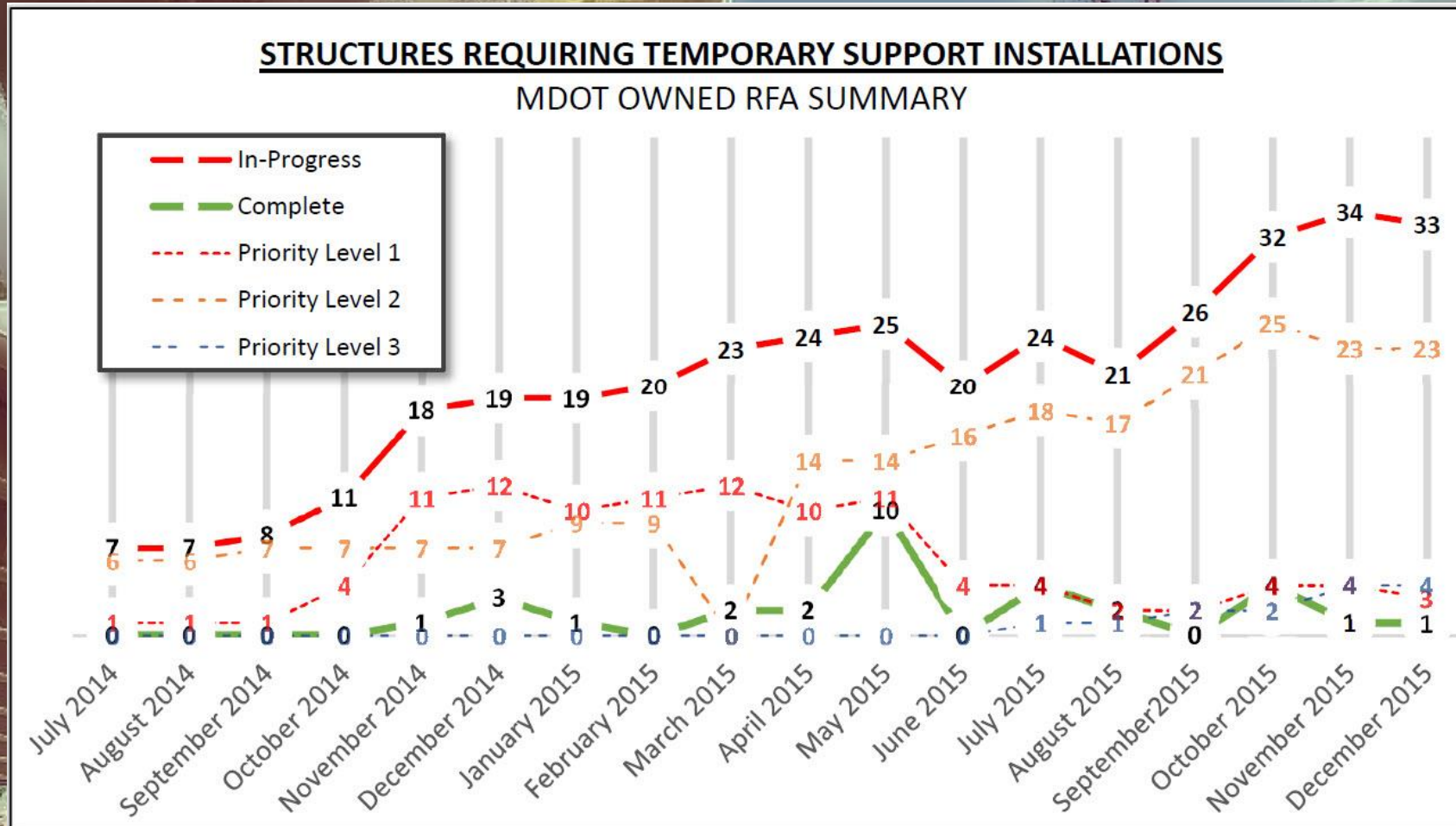
- Welded connections
- D1.5
- No shimming
- Longer term applications

Request for Action

- Loss of Bearing
- Abutment Spalls
- Concrete Beam End Deterioration
- Steel Corrosion



Temporary Supports

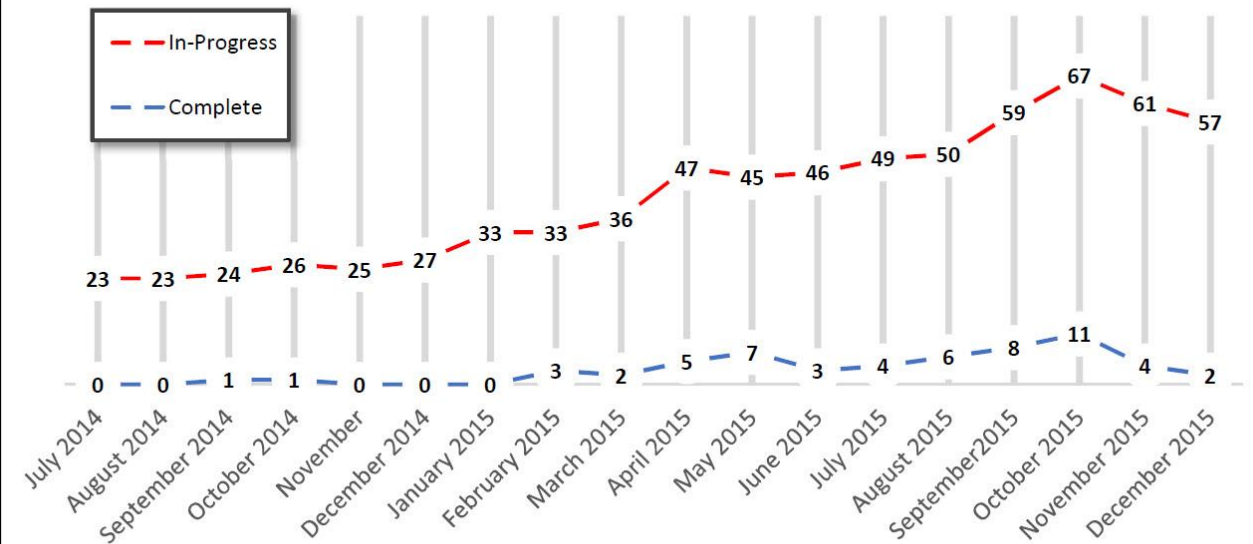


Priority Level 2 - Critical

- Severe section loss non-adjacent beams
- Required structural strengthening based on unsatisfactory load rating
- Moderate spalls or cracks below bearing assemblies at piers/abutments
- Concrete spalling PCI beams, non-adjacent
- Excessive bearing tilt

PRIORITY LEVEL 2 REQUESTS

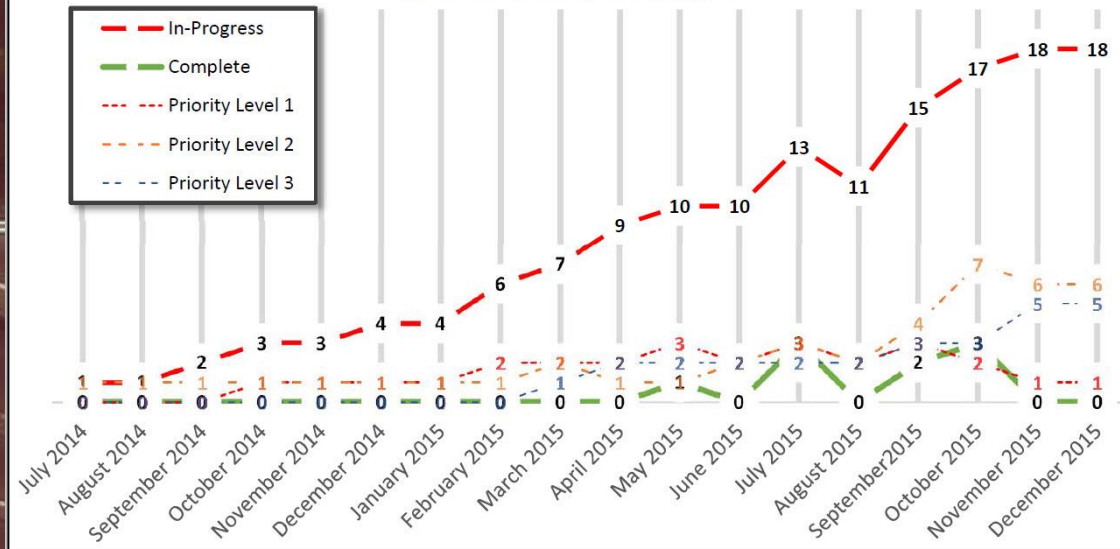
MDOT OWNED RFA SUMMARY



Steel and Concrete Repairs

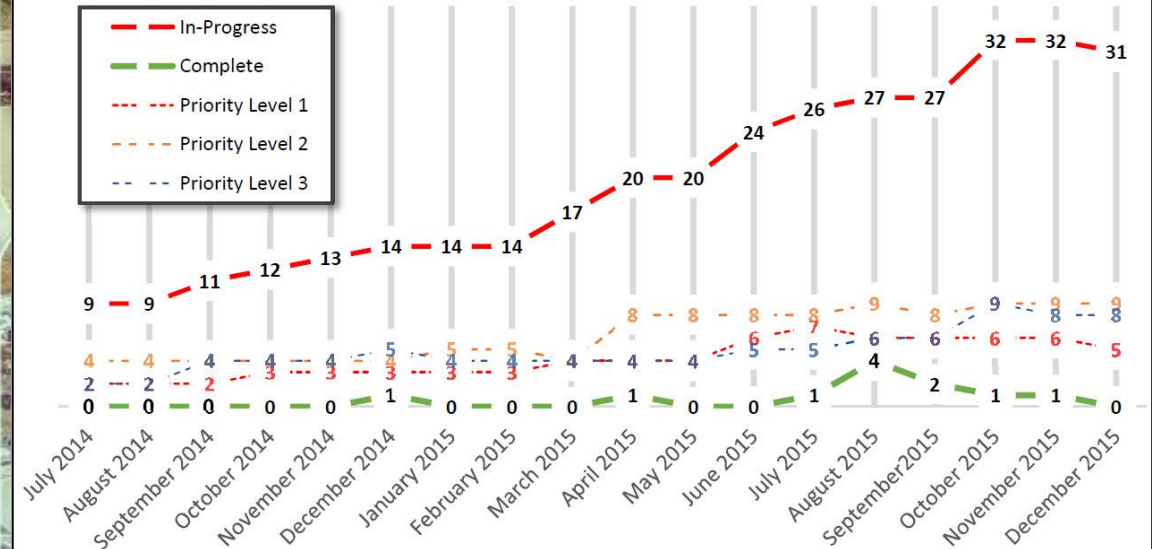
STRUCTURES REQUIRING CONCRETE REPAIRS

MDOT OWNED RFA SUMMARY



STRUCTURES REQUIRING STEEL REPAIRS

MDOT OWNED RFA SUMMARY



Current Repair Options

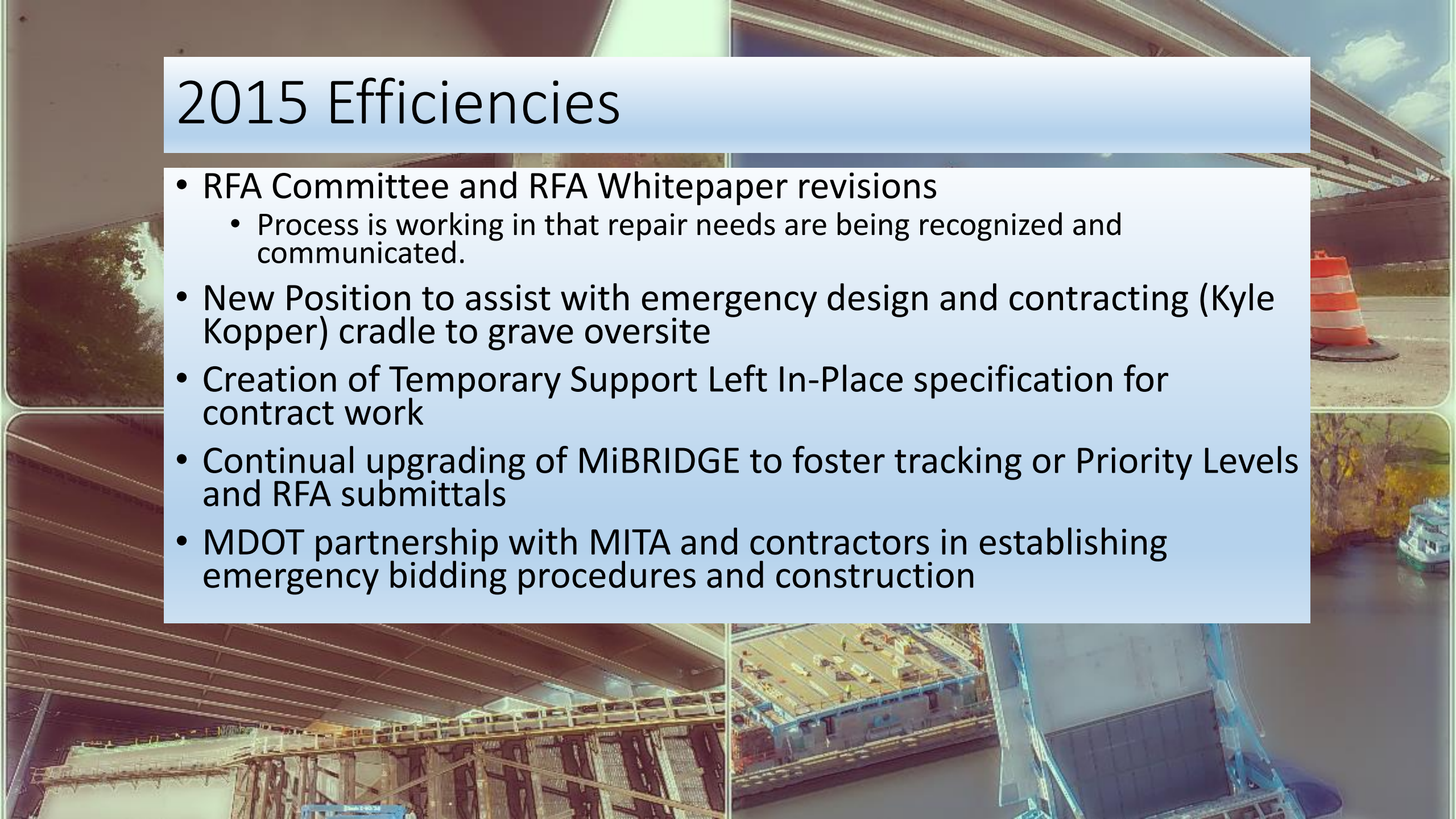
- Statewide Bridge Repair Crew - \$1 million operational budget
 - Immediately to 3 weeks turnaround time*
- Emergency Temporary Support Contracts - \$500k (2015) \$1 million (2016)
 - 3-4 weeks turnaround time
- Special Needs Design Contracts - \$3 million
 - 3 month average turnaround time
- Programming Process
 - 3 to 5 year program

* Turnaround refers to time from repair decision at RFA Committee to beginning field work.



2015 Efficiencies

- RFA Committee and RFA Whitepaper revisions
 - Process is working in that repair needs are being recognized and communicated.
- New Position to assist with emergency design and contracting (Kyle Kopper) cradle to grave oversight
- Creation of Temporary Support Left In-Place specification for contract work
- Continual upgrading of MiBRIDGE to foster tracking of Priority Levels and RFA submittals
- MDOT partnership with MITA and contractors in establishing emergency bidding procedures and construction



Future Strategy

- Focus on repairs versus Temporary Support Left-In-Place when possible and economical.
 - Current project underway on 496 to test the theory that concrete repair costs are on par with Temp supports.
- Emphasis on expansion joint replacement and pavement relief joints with MDOT direct maintenance forces.
 - Possible log job to assist with joint replacements if funding available
- Immediate implementation of epoxy coated, stainless steel or carbon fiber shear stirrups for concrete beam design.
- Continued programming focus on poor bridges and those with current temporary supports.

Emergency Contract Temp Supports

- Collaborative effort between the following:
 - Bridge Field Services
 - Special Structures
 - Reachall Crew
 - Bridge Repair Crew
 - Crystal Falls TSC
 - CFS – Ground penetrating radar
 - Hardman Construction

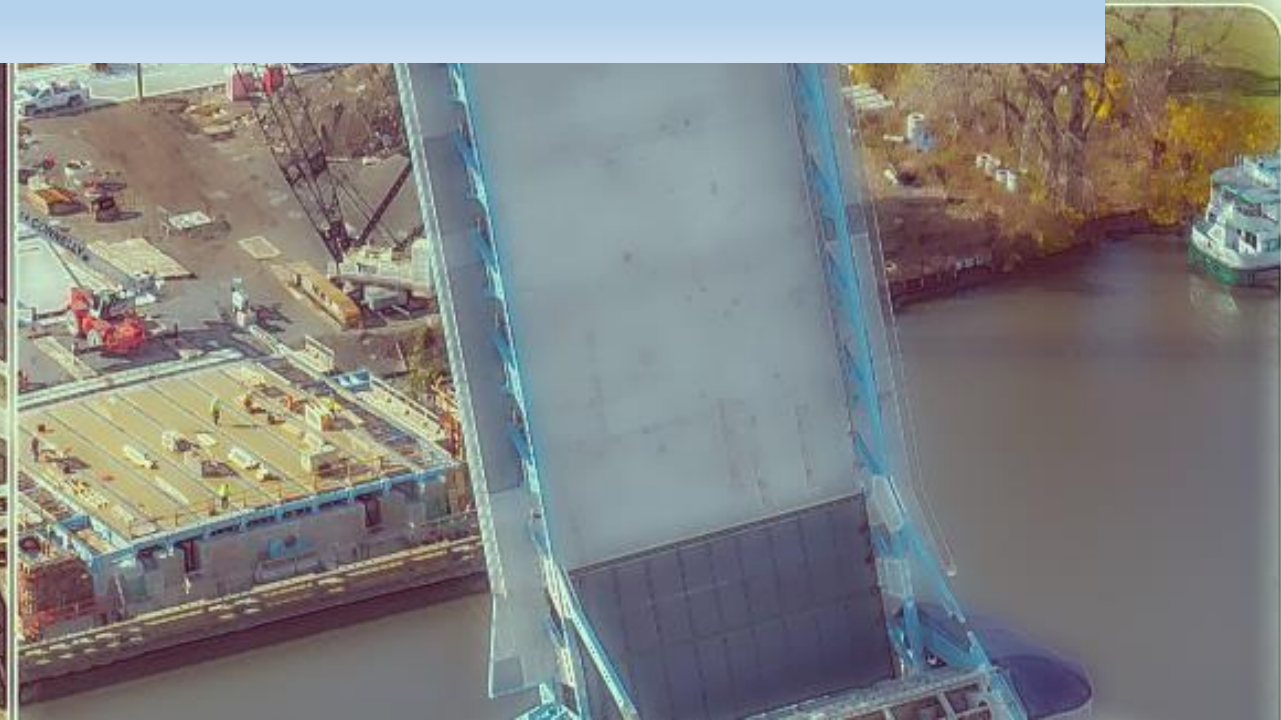
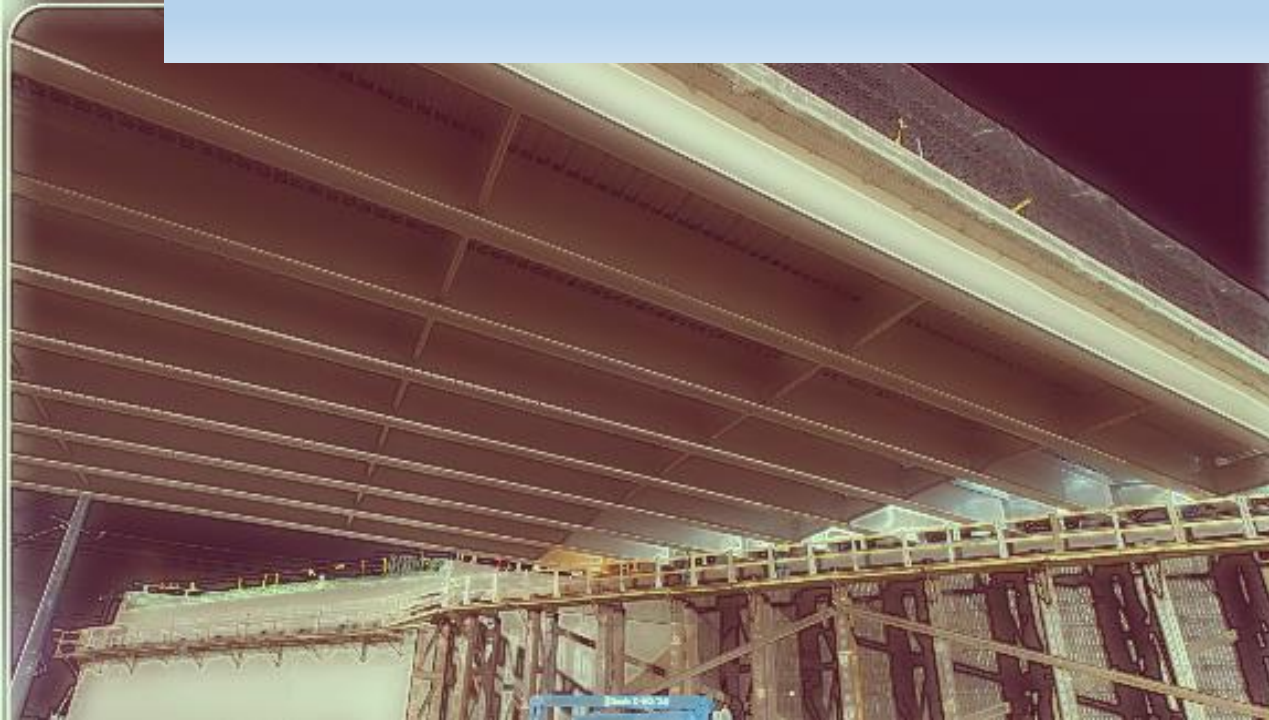


Bridge Maintenance

- Bridge Maintenance Wiki
- NHI Bridge Maintenance Course
- Portable Signals
- Reachall Crew
- Shotblasting Contracts
- Pavement Relief Joints
- Innovative Materials
 - Joints
 - PRJs
 - Epoxies



Bridge Construction

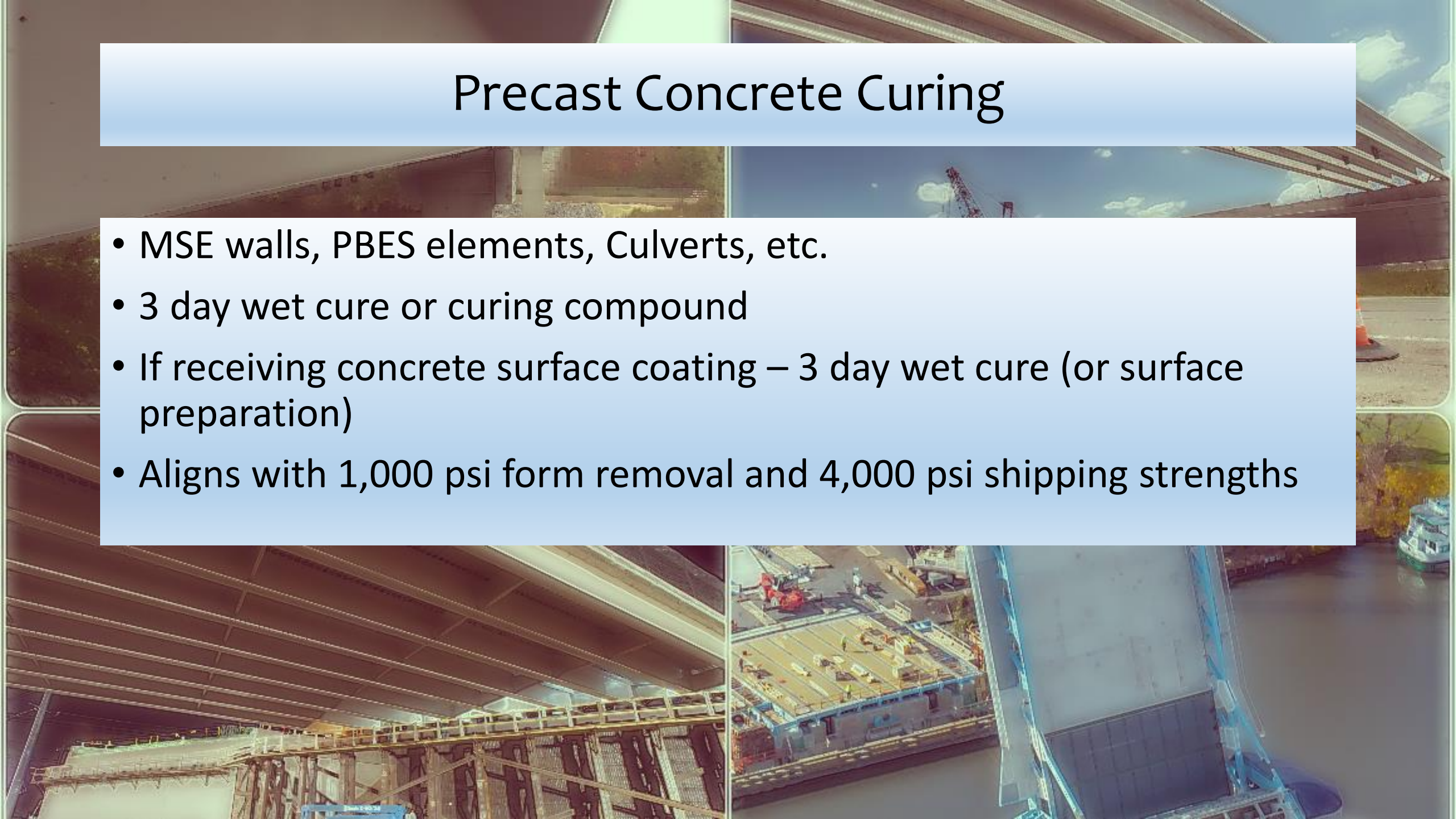


Bridge Demo

- Unintentional bridge collapses during demolition across the nation
- Need to revise bridge demolition specifications
- AASHTO SCOBS (T-4) research project soliciting state data
- Results of survey and AASHTO recommendations will be used to guide spec revisions

Precast Concrete Curing

- MSE walls, PBES elements, Culverts, etc.
- 3 day wet cure or curing compound
- If receiving concrete surface coating – 3 day wet cure (or surface preparation)
- Aligns with 1,000 psi form removal and 4,000 psi shipping strengths



ACB Modifications

- Changes to require revetment cables OR interlocking system
- Non-interlocking must contain the cables
- Two approved suppliers for each system

b. Materials. Provide and manufacture all materials for the block system according to *ASTM D 6684* unless specified otherwise in this special provision.

The following block systems are acceptable for use, or Engineer approved equal:

Tri-Lock 4015 and 4020
Midwest Construction Products
Office: (847) 639-2099
Local: (262) 794-7573
Website: <http://www.midwestconstruct.com>



Armorflex
Contech Engineered Solutions
9025 Centre Point Drive, Suite 400
West Chester, OH 45069
Corporate: (800) 338-1122
Local: (616) 403-5525
Website: <http://www.conteches.com>



Armorloc 4511 and 5011
Contech Engineered Solutions
9025 Centre Point Drive, Suite 400
West Chester, OH 45069
Corporate: (800) 338-1122
Local: (616) 403-5525
Website: <http://www.conteches.com>



Cabled Concrete
International Erosion Control Systems, Inc.
3030 N. Rocky Point Drive Suite 150
Tampa Bay, FL 33607
Corporate: (855) 768-1420
Local: (517) 348-8450
Website: <http://www.iecusa.com>



Hand Chipping

- Shallow
 - Mid point of top bar
- Deep
 - $\frac{3}{4}$ " below top bar
- Full Depth
 - Full depth
 - Used to address bottom spalls with sound overlay

Bridge Field Services Advisory

BFS 2015-03
October 26, 2015

From Mark Geib, Engineer of Operations Field Services Division

MDOT
Operations Field
Services Division
6333 Lansing Road
Lansing, MI 48917

Questions regarding
this advisory should be
directed to:

Corey Rogers, Engineer
Bridge Field Services
Phone: 517-322-3320
Rogersc5@michigan.gov

John Belcher, Bridge
Construction Engineer
Phone: 517-937-7400
Belcherj@michigan.gov

Hand Chipping on Structures

This Bridge Field Services advisory serves to delineate between pay items for hand chipping on structures. This includes standard pay items **Hand Chipping, Shallow**; **Hand Chipping, Deep**; and **Hand Chipping, Other Than Deck**. As well as **Hand Chipping, Full Depth** which is in the recommended special provision 12RC712-A060-02 "Bridge Deck Hand Chipping, Full Depth".

All pay items are measured as areas marked by the Engineer and include the following, where applicable:

- Saw cutting the perimeter
- Removal of material
- Blast cleaning steel reinforcement
- Preparing the area for patching
- Cleaning and coating exposed structural steel
- Protecting the work and environment during cleaning

Use **Hand Chipping, Shallow** for removal of material from the top of the bridge deck to the midpoint of the top bar on the top mat of reinforcement. Typically used for shallow spalls on the deck surface.

Use **Hand Chipping, Deep** for removal of material from the top of the bridge deck to $\frac{3}{4}$ inch below exposed reinforcing steel, or until sound concrete is reached. Typically used for deteriorated concrete on the deck surface that obviously extends past the top mat of reinforcement steel.

Use **Hand Chipping, Full Depth** for removal of material from the top of the bridge deck to the bottom of the bridge deck. This item should be used when repairing spalls and deteriorations on the bottom of the deck that require a full depth patch. The top surface of the deck may be sound and require additional effort to chip to reach the deteriorated bottom.

Use **Hand Chipping, Other Than Deck** for removal of concrete from all other non-prestressed elements that are not considered the bridge deck, regardless of depth.

The pay unit for **Hand Chipping, Shallow** and **Hand Chipping, Deep** is Square Yard.

The pay unit for **Hand Chipping, Full Depth** and **Hand Chipping, Other Than Deck** is Cubic Foot.

Please contact John Belcher, Bridge Construction Engineer, Bridge Field Services with questions regarding options for hand chipping.



FAA Permits

- Above Ground Level (AGL) heights of 200' or greater require permit
- Less than 200' dependent upon proximity to airport
- FAA Notice Criteria Tool
 - <https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp?action=showNoNoticeRequiredToolForm>
- Run tool for 199' with bridge coordinates. Pull permit if needed.

14.14|

FEDERAL AVIATION ADMINISTRATION PERMITS

CFR Title 14 Part 77.9

The Federal Aviation Administration (FAA) regulations that govern today's aircraft are found in Title 14 of the Code of Federal Regulations (14 CFR). Since 1958 these rules have typically been referred to as Federal Aviation Regulations but have recently been identified as the respective CFR Title XXX. Subchapter E of Title 14 "Aeronautics and Space", includes Parts 71, 73 and 77 pertaining to "Airspace". CFR Title 14 Part 77.9 addresses the permitting requirements associated with alteration due to bridge construction activities.

14.14.01

Definition

The need to obtain a permit from the FAA will depend on a number of factors including, but not limited to, the height of any permanent and temporary elements, the proximity of the project to an airport, the proximity of the project to airport navigational equipment and if the elements emit frequencies. Generally speaking a FAA permit will be required for the following:

- The permanent improvements constructed during the project or the material or equipment required to construct the project are 200' or more above ground level (AGL).
- The permanent improvements constructed during the project or the material or equipment required to construct the project intersect an imaginary surface extending outward and upward at the following slopes:
 - 100 to 1 for a horizontal distance of 20,000 ft. from the nearest point of the nearest runway.
 - 50 to 1 for a horizontal distance of 10,000 ft. from the nearest point of the nearest runway.
 - 25 to 1 for a horizontal distance of 5,000 ft. from the nearest point of the nearest runway.

MDOT defines the AGL as the highest ground elevation within the limits of the project. This point may be located on the roadway or on a bridge. If temporary work areas are required to facilitate the construction of a project these should also be included in the determination of the AGL.

The FAA provides access to a Notification Criteria Tool to assist in identifying the need for an airspace permit for projects with permanent improvements or temporary material or equipment with a height of less than 200' AGL. See link below.

<https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp?action=showNoNoticeRequiredToolForm>

Shotcrete

- Often get requests in field to use shotcrete in lieu of latex modified concrete (LMC) for substructure patches
- Reliance on a 2008 SP and added through contract modification
- New 2012 Spec Book version coming soon and will be available for inclusion into design packages
- Guidance on when to design for shotcrete vs. LMC patches.



DEQ Demo Notification

- DEQ must be notified every time we renovate or demolish a structure
 - Not just asbestos
- Anything beyond surface treatment
- DOT/Industry is working with DEQ to update form for our work
- Planned Renovation or Scheduled Demolition
- Work with Contractor to obtain verification of notification

NOTIFICATION OF INTENT TO RENOVATE/DEMOLISH

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
(MDEQ) AIR QUALITY DIVISION
NESHAP, 40 CFR Part 61, Subpart M

LARA MICHIGAN DEPARTMENT OF LICENSING AND
REGULATORY AFFAIRS (LARA), ASBESTOS PROGRAM,
P.A. 135 OF 1986, AS AMENDED, Section 220 (1-4) or (8)

DEQ/LARA USE ONLY

Postmark Date ____/____/____ Rec'd Date ____/____/____
Emergency Date ____/____/____ Valid No. ____
☐ OK ☐ Send Def Ltr. Date of Def Ltr. ____/____/____
FOLLOW UP ____/____/____ Spoke w/____
Comments: _____
Notification No. _____ Trans No. _____

Calculate LARA Asbestos Project Fee: (1% Project Fee)
Total Project Cost: _____ x 0.01 = _____
Type of Contractor: _____ License No.: _____
Licensing Authority: _____

1. NOTIFICATION:
Date of Notification: _____
Date of Revision(s): _____
Notification Type: ☐ Original ☐ Revised ☐ Canceled ☐ Annual
Mark appropriate boxes: (both DEQ and LARA may apply):
☐ Planned Renovation – 10 working days notice
☐ Emergency Renovation
☐ Scheduled Demolition – 10 working days notice
☐ Intentional Burn – 10 working days notice
☐ Ordered Demolition
LARA (MIOSHA) [Will not accept annual notifications]
☐ Demo, Reno, Encap. (>10 in. fl./15 sq. ft.) 10 calendar days notice
☐ Emergency Renovation/Encapsulation

2. PROJECT SCHEDULE:

	START DATE	END DATE
* Renovation	_____	_____
+Asb. Removal	_____	_____
+Demolition:	_____	_____
Encapsulation:	_____	_____

Work Schedule: Please indicate the anticipated days of the week and work hours for the purpose of scheduling a compliance inspection.

	Days of the Week	Work Hours
Asb. Removal:	_____	_____
Demolition:	_____	_____
Encapsulation:	_____	_____

* Includes setup, build enclosure, asbestos removal, demobilizing, etc.
+Include only those dates you are conducting asbestos removal/demo.
☐ Check here if this is a multi-phased project, attach a schedule showing the start/end date of each phase.

3. ABATEMENT CONTRACTOR: Internal Project #: _____
Name: _____
Mailing Address: _____
City/State/Zip: _____
E-mail: _____
Contact: _____ Phone: _____

4. DEMOLITION CONTRACTOR: Internal Project #: _____
Name: _____
Mailing Address: _____
City/State/Zip: _____
E-mail: _____
Contact: _____ Phone: _____

5. FACILITY OWNER: ("Facility" includes Bridges)
Name: _____
Mailing Address: _____
City/State/Zip: _____
E-mail: _____
Contact: _____ Phone: _____

6. FACILITY DESCRIPTION:
Facility Name: _____
Location Address/Description: _____
If Apt. # of units: _____
City/Twp. _____ State: _____ Zip Code: _____
County: _____ Nearest Crossroad: _____
Size: (sq. ft.) _____ No. of Floors: _____ Floor No.: _____
Age: _____ Present Use: _____ Prior Use: _____
Specific Location(s) in Facility: _____

7. DISPOSAL SITE:
Name: _____
Location Address: _____
City/State/Zip: _____

8. WASTE TRANSPORTER 1: **WASTE TRANSPORTER 2:**
Name: _____
Address: _____
City/State/Zip: _____
Phone: _____

9. ORDERED DEMOLITIONS: (See NESHAP regulations for definition of "Ordered Demolition.") A copy of the official Order must accompany this notification.
Gov't Agency Ordering Demo: _____
Name/Title of Person Signing Order: _____
Date of Order: _____ Date Ordered to Begin: _____

10. IS ASBESTOS PRESENT? ☐ Yes ☐ No ☐ To be removed prior to demolition

Estimate the amount of asbestos: Include RACM (Regulated Asbestos Containing Material) to be removed, encapsulated, etc. Also include the amount and type (floor tile, roofing, etc.) of non-tri-able Category I and/or Category II ACM that will not be removed prior to demolition. (NOTE: In a demolition, cementitious ACM cannot remain in a structure, as it is likely to become regulated in the demolition/handling process. It must be removed prior to demolition.)

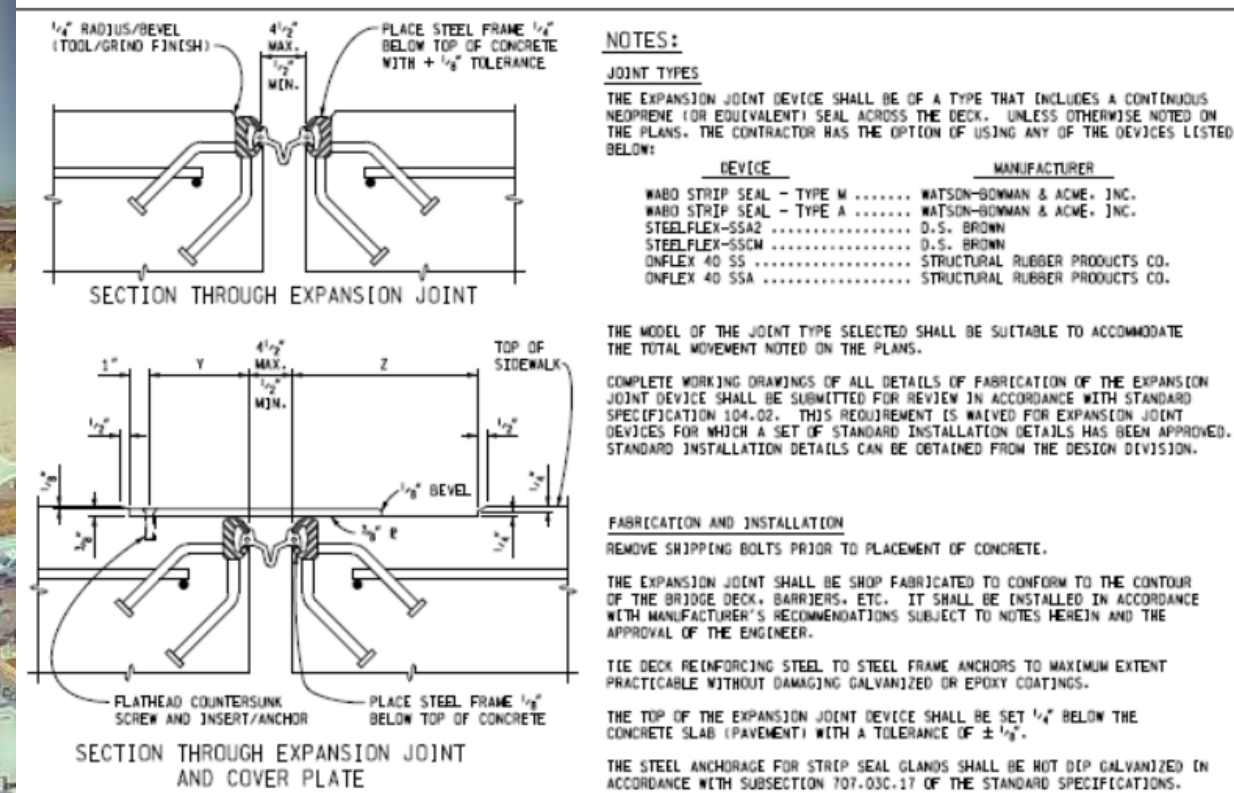
RACM to be Removed	RACM to be Encapsulated	Non-tri-able ACM <u>not</u> removed prior to demo. Category I	Non-tri-able ACM <u>not</u> removed prior to demo. Category II	Units of Measure
_____	_____	_____	_____	<input type="checkbox"/> Ln. Ft. <input type="checkbox"/> Ln. M.
_____	_____	_____	_____	<input type="checkbox"/> Sq. Ft. <input type="checkbox"/> Sq. M.
_____	_____	_____	_____	<input type="checkbox"/> Cu. Ft.* <input type="checkbox"/> Cu. M.*

*Volume (cubic ft./meters) should be used only if unable to measure by linear/square measure (example: asbestos has fallen off of surface).

(continued on reverse side)

Expansion Joint Updates

- Added new joint device – OnFlex 40 SSA from Structural Rubber Products Co.
- Place device $1/4'' \pm 1/8''$
- Added note reminding Contractor to remove the shipping bolt prior to placement of concrete
- Remember to tie the device to the steel reinforcement



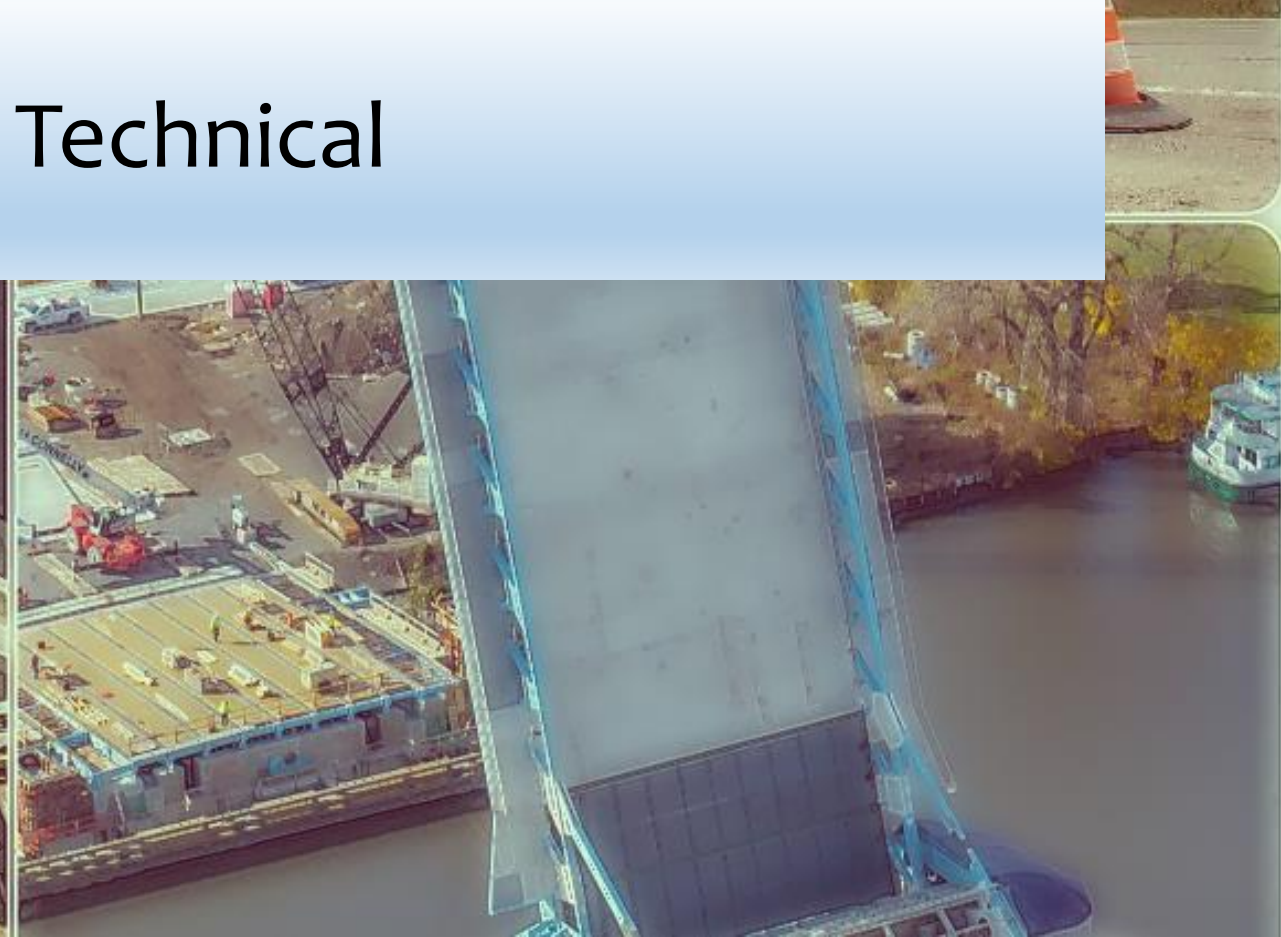
Temporary Structures



- Allows for the maintenance of traffic while utilizing conventional construction methods
- The Department is currently working on any necessary SPs and guidance documents



Structure Technical



New(er) Structure Types

• Decked Beams

- Bridge deck cast onto I-Beams or Box Beams at an offsite location
- Longitudinal closure pours
- Beams per 708
- Deck per 706
- Qualifications in Bridges and Special Structures (Fa)
- Deck could be cast at the precaster's yard, on-site, or at another location



New(er) Structure Types

- **LowSpan**

- *Prestressed* 3-sided culvert
- Combines advantages of prestressed beams and 3-sided culverts
 - Buried Structure = no bridge deck
 - Prestressing increases capacity without inefficient concrete member thicknesses
- Up to 60 ft spans with rises as low as 3 ft



Three-Sided Culvert Changes

- Delete MDOT Approved Manufacturer's List subsection 909.04G
- Create QPL subsection 909.04G and 909.04H
 - 909.04G includes Concrete Arch, Concrete Box-Arch, Concrete Flat-Top



- 909.04H includes Composite Arch Culvert ("Bridge in a Backpack")
 - To be used with Previously Approved Special Provision



- Contractor uses shape shown on the plans or submits value engineering proposal to change culvert shape

New MDOT Forms - Field Welding Plans

- MDOT Form 0394 – D1.1 Field Welding Plan
- MDOT Form 0395 – D1.5 Field Welding Plan
 - Detailed fields for all the necessary information
 - Creates consistency for MDOT and Contractors
 - Streamlines review and approval processes

Click Here to Download Form

Michigan Department of Transportation 0394 (09/15) PAGE 1 of

AWS D1.1 – FIELD WELDING PLAN
To be completed by the Contractor and submitted to the Engineer for approval.
Naming Convention: 0394 CS-JN YYYY-MM-DD Field Welding Plan.pdf

LOCATION	CONTROL SECTION	Bridge Field Services Approval Block
CONTRACTOR	JOB NUMBER	
WELDING CONTRACTOR	STRUCTURE NUMBER	
PREPARED BY	DATE	

SPECIFICATIONS

The Contractor must comply with the current AWS D1.1 – Structural Welding Code - Steel (as modified by the current FUSP 12SP707(A) - Structural Steel and Aluminum Construction), subsection 707.03.D.8 of the MDOT Standard Specifications for Construction, and all other contract requirements.

WELD INSPECTION AND TESTING

Test 100% of all welds in accordance with subsection 707.03.C.10 of the MDOT Standard Specifications for Construction and AWS D1.1. The testing must be performed by a Certified Welding Inspector (CWI) qualified as American Society for Nondestructive Testing (ASNT) Level II or Level III on Recommended Practice No. SNT-TC-1A. The Contractor must provide CWI and ASNT certifications to the Engineer prior to beginning the work. Upon completion of testing submit all non-destructive test reports, CWI and ASNT certifications to the Engineer.

SCOPE OF WORK

WELDER CREDENTIALS

All welders performing AWS D1.1 field welding on MDOT construction projects must be certified through [MDOT's Welder Certification Program](#) or qualified through [MDOT's Welder Qualification Program](#). Certified welders will have Form 5620 – Welder Certification Test Report and qualified welders will have Form 0396 – Welder Qualification Test Report for each welding process and position they are certified / qualified. The Contractor must submit all welder credentials with this form to the Engineer prior to beginning the work.

WELD PROCEDURE SPECIFICATIONS (WPS)

Weld Procedure Specifications (WPS) must be completed by the contractor and submitted to the Engineer for approval. The Contractor must submit all WPS's with this form to the Engineer for approval prior to beginning the work. The Contractor may complete the WPS's included as additional pages of this form or may delete the additional pages and attach their own WPS's to page 1 of this form.

FORM INSTRUCTIONS

- 1) Complete page 1 of Form 0394 and all required WPS's the for project and save as an Adobe PDF file;
- 2) Attach Form 5620 – Welder Certification Test Report or Form 0396 – Welder Qualification Test Report for all welders performing the welding;
- 3) Save Form 0394 with all attachments as follows: 0394 CS-JN YYYY-MM-DD Field Welding Plan.pdf;
- 4) Submit to the Engineer for approval.

Shop Drawing Review & Other QA Procedures

- Structural Fabrication Quality Assurance Guidance Document
- Shop Drawing Review Process
 - A team effort to facilitate accurate and timely construction
 - E-construction
- Structural Fabrication Nonconformance Process
 - MDOT Forms 0559 and 0560
- Structural Fabrication Request for Information Process
 - MDOT Form 0558

Administration

Highway Development

Transportation Planning

Jobs & Careers

MDOT - FHWA Partnership

History & Culture

Doing Business

Aeronautics

Title VI
Nondiscrimination

Sign up for email
from MDOT!



E-Mail Resource: MDOT-StructuralFabrication@michigan.gov

Submit the following documents to the Structural Fabrication Unit's email resource:

- Fabrication Notification
- Shop Drawings
- Weld Procedure Specifications (WPS)
- Pile Welding QC Plans
- Field Welding Plans
- Heat Straightening Plans
- Final Highway Structure Inspection Request

[MDOT Structural Fabrication Quality Assurance Guidance Document](#)

[MDOT Structural Fabrication Request for Information Process](#)

[MDOT Shop Drawing Review Process](#)

[MDOT Structural Fabrication Nonconformance Program](#)

Refer to the [Materials Quality Assurance Procedures Manual](#) for information on Quality Assurance Inspections of:

- Concrete Pipe, Culvert, and Related Items (§ 3.10)
- Prestressed Concrete Fabrication (§ 4.04)
- Structural Steel Fabrication (§ 4.05)
- Traffic Sign Support Structure Fabrication (§ 4.06)
- Tower Lighting Unit Fabrication (§ 4.10)
- Traffic Signal Mast Arm Pole and Mast Arm (§ 4.11)
- Buy America Requirements for Steel and Iron Products (§ 4.12)

Structural Steel Fabrication

Perform quality assurance inspection for structural steel elements required to be accepted based on "Fabrication Inspection" per the MDOT MQAP. Provide technical support to the project offices for structural bolting, welding, and erection of bridge elements and highway structures. Review and approve shop weld procedures specifications (WPS), pile welding QC plans, heat straightening plans, and structural field welding plans and perform technical review of structural steel shop drawings.

Brion Klopff, Structural Steel Specialist (field employee)

Phone: 517-204-6701

E-Mail: klopfb@michigan.gov

[MDOT Form 0394 – D1.1 Field Welding Plan](#)

[MDOT Form 0395 – D1.5 Field Welding Plan](#)

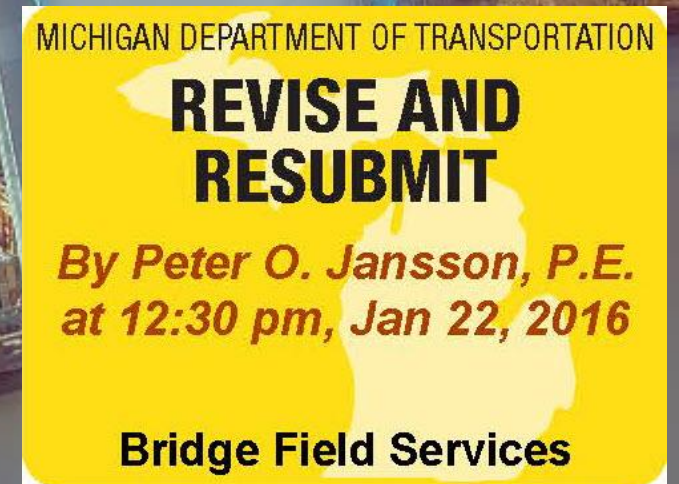
[MDOT Welder Certification Program](#)

[MDOT Welder Qualification Program](#)

[MDOT Pile Welding Program](#)

MDOT Shop Drawing Dynamic Stamps

- **Approved** - shop drawings appear to be in general conformance with the contract plans. All sheets are required to be stamped "Approved"
- **Approved subject to correction** - shop drawings appear to be in general conformance with the contract plans, but there are very minor corrections needed for historical records that will not affect fabrication of the elements. Only the first sheet is stamped "Approved Subject to Correction" and the drawings must be resubmitted for review and approval
- **Revise and resubmit** - shop drawings are not in general conformance with the contract plans and approval could result in elements being incorrectly fabricated. Only the first sheet is stamped "Revise and Resubmit". The Fabricator would be working at their own risk if they began fabricating and the Structural Fabrication Unit would notify the ENGINEER immediately and recommend fabrication wait until after drawings are stamped approved



The background image shows a large concrete bridge spanning a wide river. The bridge's massive concrete piers and deck are visible. On the right bank, there is a construction site with a red crawler crane and other equipment. The trees on the far bank are bare, suggesting a late autumn or winter setting. The sky is a pale, hazy yellow.

US-131 Over the Muskegon River

Corey E. Rogers, P.E.

Engineer of Bridge Field Services

External Post Tensioning

- Tendon size – 12 - .06” dia. Strands
 - 270 ksi low relaxation strands
- Spans 1-3 – 4 tendons, Span 2 – 8 tendons
- Stressed to 560 kips
 - Maintain approx. 450 kip load after anchor set
- Pressure grouting of ducts after stressing
 - Distances of 60’ at a height of 9’
 - Mock-up
- Full detour during PT grouting.



External Post Tensioning

- Dual end stressing
- In-place Friction Testing
- Calculated elongations and stress losses
 - Approx. 36” of elongation
 - Calculated elongations and stressed verified with load cells.
- Lost one strand of one tendon during stressing NB.
- Used graphite on SB to reduce friction.



External Post Tensioning



Project Completion



Project Completion



Project Completion



Project Completion

Ahead of Schedule and Under Budget



Project Completion



Questions?



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