



**ENGINEERING OPERATIONS COMMITTEE  
MEETING MINUTES  
JANUARY 14, 2022, 9:00 A.M. – 11:00 A.M.  
VIA TEAMS**

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Present:	Mark Bott Gregg Brunner Matt Chynoweth Andre' Clover	Mark Dionise Mark Geib Jason Gutting Tony Kratofil	Ryan Mitchell Kristin Schuster Will Thompson Brad Wieferich	Gorette Yung Hal Zweng
Absent:	Carol Aldrich	Rebecca Curtis	Brandy Solak	
Guests:	Talia Belill Ben Krom Aaron Mattson	Clint Mayoral Jim Ranger Dale Spencley	Dina Tarazi Carlos Torres Jeff Triezenberg	

**OLD BUSINESS**

1. Approval of the December 9, 2021, meeting minutes – Tony Kratofil

*ACTION: Approved*

2. Michigan Department of Transportation (MDOT) new materials and products – Jason Gutting

*ACTION: For information only*

**NEW BUSINESS**

1. Safety Topic: Auto Emergency Kit – Mark Bott

**<<See Appendix A>>**

*ACTION: For information only*

2. Pavement type selection: US-12 from west of 3<sup>rd</sup> Street to east of M-51, Berrien County – Ben Krom

Issue Statement – Pavement Type Selection

Route/Location: US-12 from west of 3<sup>rd</sup> Street to east of M-51, Berrien County

Job Number: 202003

Control Section: 11101

Letting Date: 11/4/2022

Department policy requires that a Life Cycle Cost Analysis (LCCA) be used to determine the most cost-effective pavement design.

Major Issue(s) – The Michigan Concrete Association asked why the LCCA was calculated as a non-freeway, since the current configuration is a freeway (with a full grade-separated interchange at M-51). Staff explained that this project proposes to remove the ramps and bridges at M-51, lower the grade, and put back an at-grade signalized intersection. Therefore, no changes to the LCCA were needed.

Background/History – Pavement selection was determined using the procedures outlined in the MDOT Pavement Selection Manual. Department policy requires that the pavement alternate with the lowest Equivalent Uniform Annual Cost (EUAC) be selected. Final pavement selection requires approval by the Engineering Operations Committee (EOC).

Recommendation(s) – Approve the pavement alternate with the lowest EUAC (hot mix asphalt (HMA)).

*ACTION: Approved*

3. Pavement type selection: US-31 from Division Street to Garfield Avenue, Grand Traverse County – Ben Krom

Issue Statement – Pavement Type Selection

Route/Location: US-31 from Division St to Garfield Avenue, Grand Traverse County

Job Number: 131655, 200948

Control Section: 28013

Letting Date: 11/4/2022

Department policy requires that a LCCA be used to determine the most cost-effective pavement design.

Major Issue(s) – None. The paving industries had no comments on this LCCA.

Background/History – Pavement selection was determined using the procedures outlined in the MDOT Pavement Selection Manual. Department policy requires that the pavement alternate with the lowest EUAC be selected. Final pavement selection requires approval by the EOC.

Recommendation(s) – Approve the pavement alternate with the lowest EUAC (HMA).

*ACTION: Approved*

4. Updated guidelines for fixed price-variable scope projects (FPVS) – Dina Tarazi

Issue Statement – Updated guidelines for FPVS projects.

Major Issue(s) – The Federal Highway Administration (FHWA), Michigan Division office has approved the proposed revisions to MDOT's guidelines for fixed price-variable scope projects. The update has been a coordinated effort between MDOT and FHWA Michigan Division staff and includes the following revisions:

- Removal of the existing requirement for completing all advertised work within three years on Capital Preventative Maintenance (CPM) projects.
- Addition of the contract modification process on FPVS Type 1 projects to allow for additional funding to complete the remaining project limits in the original construction season.

Background/History – Per the current policy, FHWA requires MDOT to complete all work for the entire project limits (all priorities) within three (3) years of the original construction completion on FPVS projects. This has resulted in MDOT limiting the use of FPVS projects to CPM or similar projects because the CPM program is a two-year plan allowing new projects to be added within that timeframe. Furthermore, due to continued deterioration of a pavement after being initially programmed and constructed, the original CPM fix may no longer be suitable within the three-year time restriction when funding becomes available to complete the remaining limits.

In addition, approval to proceed with establishing guidance for allowing contract modifications on the FPVS Type 1 process would add further value to the contracting method. The increase to the stated fixed price after award (if additional funding becomes available) to complete the remaining project limits in the original construction season would provide an immediate fix for that location, while minimizing repeated disruptions to traffic and risk of duplicate investment.

Recommendation(s) – The revised guidelines are approved for immediate use and have been incorporated into the department's Innovative Construction Contracting Guide located on MDOT's Innovative Contracting website.

*ACTION: For information only*

5. Approval for FPVS Type 3 contracting method: CR608 from Centerline Road to Richardson Road; Richardson Road to Youngs Road – Dina Tarazi and Dale Spencley

Issue Statement – Request approval for the use of the FPVS Type 3 contracting method on a Local Agency Project (LAP). Crush and shape the existing HMA, place three (3) inches of proposed HMA, shoulder material, guardrail, permanent pavement markings, and permanent signing.

Route/Location: CR608 from Centerline Road to Richardson Road (Priority A); and Richardson Road to Youngs Road (Priority B)

Job Number: 205343

Control Section: STL 68000

Letting Date: To be determined in accordance with the MDOT LAP Project Planning Guide

Total Est. Const. Cost: \$554,061 (Priority A); \$226,608 (Priority B)

Major Issue(s) – FPVS projects are intended to maximize the amount of work constructed within a pre-established budget. This method is most effective for projects where need far outweighs available funding. FPVS Type 3 projects receive bids through the traditional low bid process and allow for a contract modification with a comment/justification stating that it is a FPVS Type 3 project and limits are being extended into Priority B based on bid savings. These revised limits are also updated in JobNet to reflect the complete project limits.

Background/History – Priority B will be completed when Phase Four (4) of the project is completed during the 2023 construction season using a traditional bid process; however, using the FPVS method allows to fully utilize any bid savings that are realized which could potentially complete the project sooner.

Recommendation(s) – The Innovative Contracting Committee (ICC) has approved the use of the FPVS contraction method for this LAP project.

*ACTION: The LAP is Iscoda County. Approved.*

6. Approval for the use of construction manager/general contractor (CMGC) delivery method: Complex rehabilitation of the M-39 ramps K and L over I-94 in the City of Allen Park – Ryan Mitchell, Aaron Mattson, Clint Mayoral and James Ranger

Issue Statement – Request approval for the use of the CMGC delivery method for the complex rehabilitation of the M-39 ramps K and L over I-94 in the City of Allen Park.

Major Issue(s) – CMGC is desired to benefit the project, specifically the following project goals:

- Utilize contractor expertise for complex construction operations
- Accurately predict the required rehabilitation durations and costs
- Closely coordinate with larger I-94 reconstruction project
- Minimize impacts to traffic

Selecting the most qualified contractor and early contractor involvement is necessary to manage project risk and to ensure that the contractor's team clearly understands the project goals. The means and methods of the contractor, and timeframes to complete the defined scope of work are critical during the design phase to develop a constructible bridge rehabilitation approach that promotes site access and worker safety and allows development of an accurate construction schedule.

Background/History – The Ramp K bridge over I-94 is a unique bridge that consists of a cast-in-place post tensioned concrete box girder. The bridge developed cracks that need to be analyzed and addressed with external post-tensioning. Additional major work includes the replacement of all disc and pot bearings supporting the box section that will require temporary supports to maintain the superstructure.

Both bridges will also include miscellaneous capital preventative maintenance work consisting of epoxy overlay, deck patching, expansion joint replacement, expansion joint gland replacement, joint resealing, barrier repair, beam end repair, diaphragm repair, substructure repair, crash attenuator, and approach work.

The replacement of disc and pot bearings along with proposed external post tensioning will require specialized operations and a thorough investigation by the contractor of how these will be installed during construction. The desire to isolate this work through the manner of a CMGC is appropriate given the identified concerns for construction.

Project Cost: \$3.65M  
Letting Date: 11-1-24  
Job Number: 212999PES  
Control Section: 82022

Recommendation(s) – The ICC recommends approval to use the CMGC delivery method.

Status - New

*ACTION: Approved*

7. Approval for the use of CMGC delivery method: Complex rehabilitation of the US-31 over Pine River Bascule Bridge in the City of Charlevoix – Ryan Mitchell, Clint Mayoral, James Ranger and Jeff Triezenberg

Issue Statement – Request approval for the use of CMGC delivery method for the complex rehabilitation of the US-31 over Pine River bascule bridge in the City of Charlevoix.

Major Issue(s) – CMGC is desired to benefit the project, specifically the following project goals:

- Utilize contractor expertise for complex construction operations
- Minimize impacts to both marine traffic and vehicle traffic
- Accurately predict the required rehabilitation durations and costs
- Closely coordinate with City of Charlevoix
- Closely coordinate with the United States (U.S.) Coast Guard

Background/History – This bridge is an important link in the community, positioned in the middle of Charlevoix. This bridge is also an important link for ambulances transporting patients to Petoskey. The detour is approximately 50 miles long. Minimizing and accurately predicting the required detour durations is critical to this project.

Work includes bascule span steel superstructure repairs including replacement of track and tread castings, high-capacity jacking and shoring of existing superstructure, and potential alternate/emergency operations of the bridge in accordance with U.S. Coast Guard requirements.

The complexity of installing the steel tread castings and other steel repairs, and the ability to open and close the bridge during construction activities requires thorough investigation by the contractor who will be responsible for operating the bridge during construction, which potentially includes complex structural, mechanical, and electrical alternate solutions. This includes evaluating options for emergency openings when the segmental girder's tread plates are removed.

There are currently no long-term plans for replacement of this bridge. As such, this work is critical in ensuring continued reliable operations, and structural good condition.

Project Cost: \$5.7M

Desired RFQ Advertisement: February 2022

CMGC Selection and Contracting: April 2022

CMGC Notice to Proceed: May 2022

Letting Date: 9-1-22

Job Number: 214317PES

Control Section: 15012

Recommendation(s) – The ICC recommends approval to use the CMGC delivery method.

Status – New

*ACTION: Approved*

8. Ornamental fence installation on I-94 at the Grove Street bridge in the City of Ypsilanti – Carlos Torres and Kristin Schuster

Major Issue(s) – Ornamental fence installation is proposed on the rear of the existing bridge railings on the I-94 at Grove Street bridge in the City of Ypsilanti, Washtenaw County (Brighton Transportation Service Center (TSC) area, University Region).

Currently, MDOT does not have guidelines pertaining to the installation of decorative/ornamental fences when installed as part of MDOT projects. MDOT's Barrier Advisory Committee (BAC) is working on the development of statewide guidelines pertaining to ornamental fence installation. Until statewide decorative/ornamental fence guidelines are approved by the EOC and then implemented, EOC review and approval is requested for proposed ornamental fence installations on MDOT bridge railings.

Background/History – Ornamental fences have been installed on MDOT bridge railings and bridge decks. Until now, the review and approval process for ornamental fences has been somewhat subjective, and their approval has typically occurred at the region and/or TSC

level without input from MDOT's crash barrier engineer or MDOT's BAC. However, there are potential safety implications with installing a decorative/ornamental fence if installed within the clear zone, or if placed on top of or behind a crashworthy bridge railing and the fence is located within the railing's zone of intrusion (ZOI).

The posted speed limit for both directions of Grove Street is 25 miles per hour (mph), and the 2019 average daily traffic (ADT) on Grove Street was 11,296 vehicles per day with 3.9% commercial vehicle traffic.

#### West Side of Grove Street Bridge

On the west side of the structure, the existing six (6) foot raised sidewalk in front of the bridge railing will be widened an additional eight (8) feet, resulting in a 14-foot raised sidewalk in front of the bridge railing. The clear zone range on Grove Street based on ADT and posted speed is 14 inches to 16 inches, and the thickness of the aesthetic parapet tube railing is one (1) foot-zero (0) inches. Furthermore, the pavement marking plan shows a four (4) foot shoulder between the raised sidewalk and the edge of the nearest lane of traffic. The resulting distance from the nearest traveled lane to the face of the bridge railing would be 18 feet, which would put the bridge railing and any decorative fence placed behind the railing beyond the high end of the clear zone range.

#### East Side of Grove Street Bridge

On the east side of the structure, the existing six (6) foot raised sidewalk in front of the bridge railing will remain in place. The pavement marking plan calls for a seven (7) foot shoulder between the raised sidewalk and the nearest traveled lane. Since the existing bridge railing has an overall thickness of one (1) foot-zero (0) inches, the minimum distance between a decorative fence placed behind the bridge railing and the nearest traveled lane would be 14 feet, which would be the low end of the clear zone range. MDOT typically prefers using the high end of the clear zone range, but exceptions are made in some cases, and at times, the low end of the clear zone range has been used. Moreover, the 2011 American Association of State Highway Transportation Officials Roadside Design Guide (RDG) provide some ZOI guidelines for certain bridge railing types for different test levels. The RDG recommends a 24-inch ZOI for a combination railing, such as MDOT's aesthetic parapet tube railing, under TL-3 conditions (i.e., 100 km/h or 62 mph impact speed). Under TL-2 conditions (i.e., 70 km/h or 43 mph), the guidance is somewhat limited and does not offer a recommended ZOI value for a combination bridge railing. However, for a concrete bridge railing with an overall height greater than 27 inches, the recommended ZOI value is 12 inches. Two of the ZOI diagrams from the RDG were shared with the committee.

The concrete parapet portion of MDOT's aesthetic parapet tube bridge railing is 24 inches (two (2) feet-zero (0) inches) tall, but it has a metal tube railing mounted to the parapet which has some capacity to redirect impacting vehicles, and the overall height of MDOT's aesthetic parapet tube railing is 42 inches. Considering that the posted speed limit on Grove Street is 25 mph, well below TL-2 conditions, and the bridge railing's overall height is considerably greater than 27 inches, it would be reasonable to use a 12" ZOI value at this location. Since the existing bridge railing is one (1) foot-zero (0) inches thick, placement of a decorative fence behind the existing bridge railing would put the decorative fence outside of the ZOI. Moreover, the decorative fence would be at or beyond the low end of the clear zone range for northbound Grove Street traffic (i.e., the nearest bound of traffic). Consequently, it appears a

decorative fence installation behind the existing bridge railing on the east side of the bridge should not pose significant safety concerns.

Recommendation(s) – On the west side of the bridge, the decorative fence would be outside the clear zone for southbound Grove Street traffic (i.e., the nearest bound of traffic), so there are no potential safety concerns with the installation of a decorative fence on the west side of the Grove Street bridge.

On the east side of the bridge, decorative fence installation behind the existing bridge railing should not pose significant safety concerns due to the decorative fence being outside a 12-inch ZOI. Also, the decorative fence would be at or beyond the low end of the clear zone range for northbound Grove Street traffic (i.e., the nearest bound of traffic).

In summary, decorative fence installation on the rear of the existing bridge railings at the subject location should be permissible from a roadside safety perspective. Most BAC members were supportive of this recommendation. Therefore, EOC review and approval is requested.

Status – This project has a turn-in date of 2/22/22 and a letting date of 4/22/22. Therefore, a quick response is recommended.

*ACTION: Proposed I-94 at Grove Street bridge ornamental fence installation is approved by EOC. Furthermore, EOC supports the development of statewide guidelines addressing the installation of ornamental fences on MDOT bridge railings. Future guidance will be presented to EOC in draft form for review and approval.*

9. Professional opinion letter regarding single-slope concrete barrier tolerances – Carlos Torres and Kristin Schuster

Subject/Issue - Professional opinion letter regarding single-slope concrete barrier tolerances.

Major Issue(s) –

- Request for the EOC to approve implementation of construction tolerances in barrier face slope and slump on single-slope concrete barriers, based on the findings and recommendations provided by the Texas A&M Transportation Institute (TTI) in their professional opinion letter.
- Request for the EOC to support development and implementation of statewide construction tolerances in barrier face slope and slump on slip-formed, single-slope concrete barriers based on recommendations in TTI's professional opinion letter, dated 12/20/21.

Background/History – Concrete median barrier deficiencies have been observed in the field. Inspectors have noticed that some sections of barrier wall have slopes with angles much greater (i.e., flatter) than the target 10.8-degree value. The crashworthiness of the barrier came into question because, to the best of MDOT's knowledge, the largest barrier face angle



(i.e., flattest barrier slope) tested under the Manual for Assessing Safety Hardware (MASH) criteria was 11.0 degrees.

This matter was discussed internally within MDOT, and it was decided to reach out to an ISO 17025 certified crash testing facility for a professional opinion letter regarding the crashworthiness of concrete median barrier.

In their professional opinion letter, TTI indicated that the most relevant parameters for evaluating crashworthiness were barrier face slump (D1 and D2) and barrier face slope (S1 and S2).

TTI believes that MASH Test 3-10 should be performed on a barrier with a 15.27-degree slope and 3.45-inch slump before recommending the barrier is MASH TL-3 compliant.

TTI analyzed a single-slope barrier with a 14.25-degree barrier face slope and 1.5-inch barrier face slump to determine if it is MASH TL-3 compliant. Based on past testing, their finite element simulations, and analyses, TTI indicated that single-slope barrier installations having a barrier face slope and slump of less than or equal to 14.25 degrees and 1.5 inches, respectively, may be considered MASH TL-3 compliant. Single-slope barrier installations that exceed either of these thresholds should not be considered MASH TL-3 compliant without further testing. TTI believes it is sufficient to only perform MASH Test 3-10 (i.e., small car test at 62 mph) with the maximum slope and slump values. In other words, TTI doesn't feel it is necessary to conduct MASH Test 3-11 (i.e., pickup truck test at 62 mph) to establish MASH compliance.

Recommendation(s) –

- Approve implementation of construction tolerances in barrier face slope and slump on single slope concrete barriers based on the findings and recommendations provided by the TTI. Existing sections of concrete median barrier with a barrier face slope and slump of less than or equal to 14.25 degrees and 1.5 inches, respectively, would be permitted to remain in place.
- Support development and implementation of statewide construction tolerances in barrier face slope and slump on slip-formed, single-slope concrete.

Status – EOC support and approval are requested as soon as possible.

*ACTION: Approved with amendments, in that the proposed guidance be applied retroactively to all MDOT projects. The FHWA is okay with this proposed guidance. However, they would like to know the magnitude of other projects where the proposed guidance is applied.*

10. Updates on development of the MDOT Roadside Safety Hardware Assessment and Implementation Plan – Carlos Torres and Kristin Schuster

Subject/Issue – Updates on development of MDOT Roadside Safety Hardware Assessment and Implementation Plan.

Major Issue(s) –

- The FHWA is requiring the full suite of MASH crash testing in order to receive a federal aid eligibility letter.
- The FHWA will not issue updated eligibility letters for product modifications, including non-significant modifications, regardless of whether the modified product has been fully tested under MASH criteria.
- Some non-proprietary products are not subjected to full suite crash testing.
- Some products and product modifications are considered MASH compliant by others based on partial crash testing, finite element modeling, professional opinions by certified crash testing facilities, research studies, in-service performance evaluations, etc.
- Formal internal review and evaluation procedures should be established.
- Clarity on the groups responsible for evaluating roadside safety devices.

Background/History – To be discussed during the EOC meeting.

Recommendation(s) – The draft version of the plan is provided to the EOC at this time on a “for your information” basis, and also for EOC support to continue development of the plan as currently envisioned. The final version will be submitted to the EOC for review and approval.

Status – Currently in development.

*ACTION: For information only*

RA:lr

cc: EOC Members	C. Libiran (MDOT)	D. DeGraaf (MCA)
Meeting Guests	L. Mester (MDOT)	C. Mills (APAM)
Region Engineers (MDOT)	C. Newell (MDOT)	D. Needham (MAA)
Assoc. Region Engineers (MDOT)	M. Ackerson-Ware (MRPA)	R. Vandeventer (MITA)
TSC Managers (MDOT)	T. Burch (FHWA)	
L. Doyle (MDOT)	R. Brenke (ACEC)	

## Appendix A – Safety Topic

# Auto Emergency Preparedness Kit Checklist

You can avoid many dangerous weather problems by planning ahead. Plan long trips carefully, listening to the radio or television for the latest weather forecasts and road conditions. If bad weather is forecast, drive only if absolutely necessary.

## Auto Emergency Kit – Recommended Supplies:

- ☐ Jumper cables, flares or reflective triangle
- ☐ Flashlights with extra batteries
- ☐ First aid kit: remember any necessary medications, baby formula and diapers if you have a small child
- ☐ Food: non-perishable food such as canned food, and protein rich foods like nuts and energy bars
- ☐ Manual can opener
- ☐ Drinking water
- ☐ Basic toolkit: pliers, wrench, screwdriver
- ☐ Radio: battery or hand cranked
- ☐ Cat litter or sand: for better tire traction
- ☐ Shovel
- ☐ Ice scraper
- ☐ Warm clothes, gloves, hat, sturdy boots, jacket and an extra change of clothes for the cold
- ☐ Blankets or sleeping bags
- ☐ Charged cell phone and car charger
- ☐ Help sign
- ☐ If traveling with pets, include pet emergency items

## For all weather hazards, check or have a mechanic check the following:

- ☐ Keep your gas tank full – in case evacuation is needed.
- ☐ Do not drive through a flooded area – Six inches of water can cause a vehicle to lose control and possibly stall. A foot of water will float many cars.
- ☐ Be aware of areas where floodwaters have receded – Roads may have weakened and could collapse
- ☐ If a power line falls on your car you are at risk of electrical shock, stay inside until a trained person removes the wire.
- ☐ Antifreeze levels – ensure they are sufficient to avoid freezing.
- ☐ Battery and ignition system – should be in top condition and battery terminals should be clean.
- ☐ Brakes – check for wear and fluid levels.
- ☐ Exhaust system – check for leaks and crimped pipes and repair or replace as necessary. Carbon monoxide is deadly and usually gives no warning.
- ☐ Fuel and air filters – replace and keep water out of the system by using additives and maintaining a full tank of gas.
- ☐ Heater and defroster – ensure they work properly.
- ☐ Lights and flashing hazard lights – check for serviceability.
- ☐ Oil – check for level and weight. Heavier oils congeal more at low temperatures and do not lubricate as well.
- ☐ Thermostat – ensure it works properly.
- ☐ Windshield wiper equipment – repair any problems and maintain proper washer fluid level.
- ☐ Install good winter tires – Make sure the tires have adequate tread. All-weather radials are usually adequate for most winter conditions. However, some jurisdictions require that to drive on their roads, vehicles must be equipped with chains or snow tires with studs.