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Topics of Innovation

- MDOT's Research Administration
- Evaluation of New Materials and Products
- Every Day Counts
- Innovative Contracting
- Other Innovations

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Research Projects 2021 – 2023

Steps in the research process	When
1) Submit a Research Idea Anyone may submit a research idea. Use the form to briefly explain what issues or challenges need to be addressed through research. MDOT selects research ideas that will be further considered at the Research Development Meetings.	October and November 2019
2) Research Idea Selection The MDOT Research Executive Committee and Research Advisory Committees review all submitted research ideas and select which ideas will be further developed at the Research Development Meetings.	December 2019 to February 2020
3) Attend the Research Program Development Meetings Stakeholders discuss research ideas with colleagues and other technical experts from in and outside MDOT.	May 2020
4) Develop a Problem Statement The MDOT staff person assigned to the project (project manager) creates a problem statement for the research idea using input from the Program Development Meetings. The problem statement tells potential researchers what MDOT needs to learn from the research and how the results will be used.	May to Mid-June 2020
5) Research Problem Statement Approval and Research Program Approval The MDOT Research Executive Committee and Research Advisory Committees approve all problem statements and approve the research program as a whole.	Mid-June 2020 to August 2020
6) Solicit Proposals From Researchers MDOT invites researchers to submit proposals for carrying out the research described in the problem statement.	October 2020 (2021 projects) Spring 2021 (2022 projects) Spring 2022 (2023 projects)

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Recent Research Spotlights

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New Materials and Products

- New Materials Steering Committee and Guidance Document
- Tools Used for Evaluation
  - New Materials Evaluation Procedures
  - Pavement Demonstration Program
  - Research Findings & Results
  - National & International Studies

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Every Day Counts (EDC)

- FHWA Program with a State-based model to identify and rapidly deploy proven but underutilized innovations to:
  - shorten the project delivery process
  - enhance roadway safety
  - reduce congestion
  - improve environmental sustainability

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EDC - Current Efforts

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EDC - Current Efforts

Center for Accelerating Innovation

On-Ramp to Innovation

Virtual Public Involvement

Virtual Public Involvement

Virtual public involvement supports agencies' efforts to engage the public more effectively by supplementing face-to-face information sharing with technology.

INCREASING PUBLIC ENGAGEMENT

BENEFITS

- **Efficiency and Low Cost.** Virtual tools and platforms can primarily be made available to communities, many at a lower cost than traditional public engagement methods.
- **Accelerated Project Delivery.** Robust public engagement helps identify issues early in the project planning process, which results in the need to avoid decisions

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EDC - Current Efforts

Center for Accelerating Innovation

On-Ramp to Innovation

Advanced Geotechnical Methods in Exploration (A-GaME)

Tools for Enhanced, Effective Site Characterization

Advanced Geotechnical Methods in Exploration (A-GaME)

Mitigate risks and improve reliability by optimizing geotechnical site characterization with proven, effective exploration methods and practices.

IMPROVED GEOTECHNICAL SITE CHARACTERIZATION

BENEFITS

- **Reduced Risk.** Reducing uncertainties in subsurface conditions mitigates design and construction risks.
- **Improved Quality.** Improving confidence in the geotechnical characterization reduces unnecessary conservatism in design and projections of more reliable bases for design and construction of foundations and other geotechnical features impacting the highway system.
- **Accelerated Project Delivery.** Since a significant number of construction claims can be attributed to inadequate knowledge of subsurface site conditions, well-planned investigation programs improve decision-making and constructability, providing time and cost savings for transportation agencies.

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Innovative Contracting

- Design-Build (DB)
- Design-Build-Finance
- Construction Manager/General Contractor (CMGC)
- Job Order Contracting
- Fixed Price/Variable Scope (FPVS)
- Alternate Pavement Bidding
- Alternate Technical Concepts
- Public Private Partnerships

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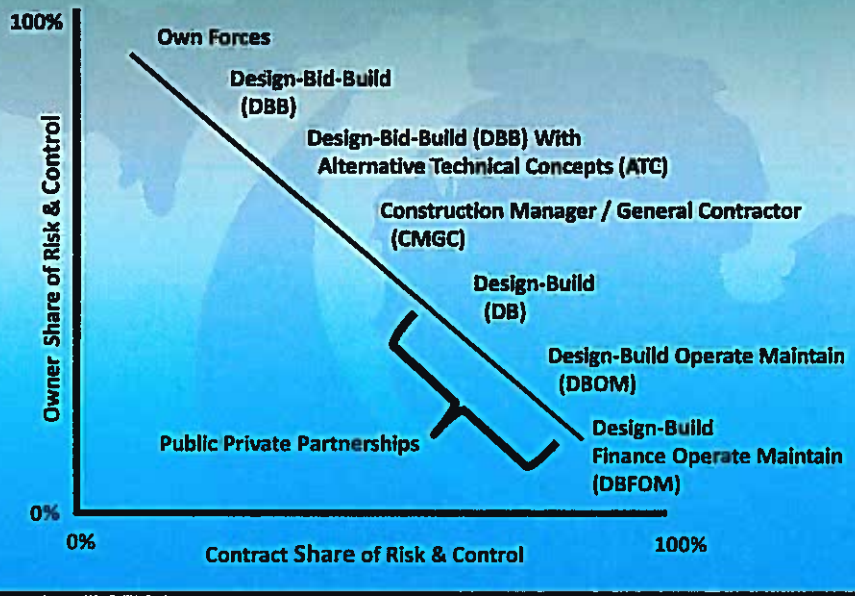
Contracting Method Selection



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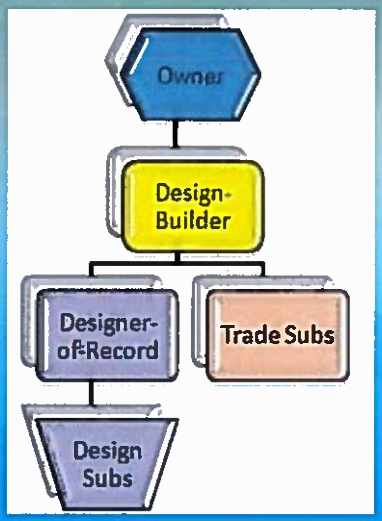
Design-Build (DB)

- Types of Projects
  - Road & Bridge Reconstruction
  - Bridge Rehabilitation
  - ITS Systems
  - Bike Path Construction
- Procurement Process
  - 2 Step: RFQ / RFP
- Post Award Activities
  - Final Design
  - Construction Oversight



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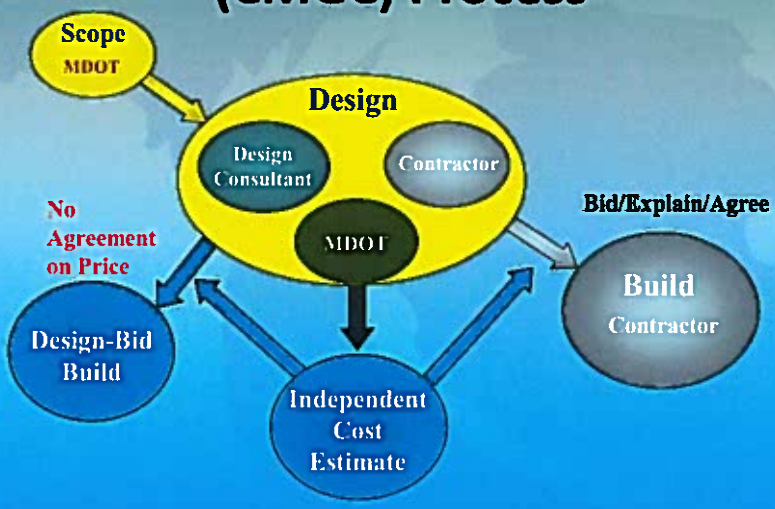
Construction Manager/General Contractor (CMGC) Process



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Fixed Price/Variable Scope (FPVS)

- More Infrastructure Needs than Available Funding
- Maximizing the Amount of Work That Can be Completed within the Available Funding

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Alternate Technical Concepts (ATC)

A means to incorporate a Bidder's concepts and innovations that provide equal or greater value into the bidding process.

Process:

- During advertisement, contractors meet with MDOT in a confidential one-on-one setting to propose their concepts.
- MDOT evaluates and approves or rejects the concepts.
- If approved, the contractors may base their bid on the alternate concept.

To date, MDOT has only used ATC on Design-Bid-Build Projects for maintenance of traffic items.

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Carbon Fiber Reinforced Polymer (CFRP) Prestressed Beams

- Pembroke Ave over M-39 (2011)
- M-50 over NS Railroad (2012)
- M-102 EB and WB over Plum Creek (2013 – 2014)
- I-94 EB & WB over Lapeer Road (2014)
- M-100 over Sharp Drain (2015)
- M-66 over West Branch River (2015)
- M-86 over Prairie Creek (2016)
- I-75 SB over Sexton-Kilfoil Drain (2017)
- M-3 over I-94 (2018)
- Brush Street over I-94 (2018)

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CFRP Fabrication Facility Opened in Michigan

- Bringing jobs into Michigan
- Provides ability to deploy products locally

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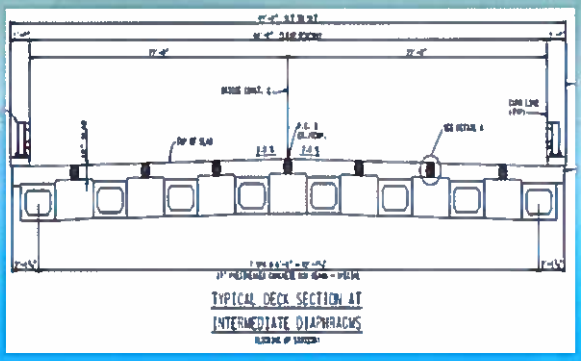
Overview: Design & Fabrication

- Superstructure Segments w/closure pours:
  - Beams & Deck – conventional design
  - Precast in 2 stages:
    - Stage 1 - Beams fabricated by precast fabricator
    - Stage 2 - Deck cast by prequalified contractor



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Overview: Superstructure segments

- Loop bars used and placed staggered to avoid conflict during placement
- Longitudinal bars added in the loop

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BridgeSlide on M-100, Potterville

Constructed in 2015

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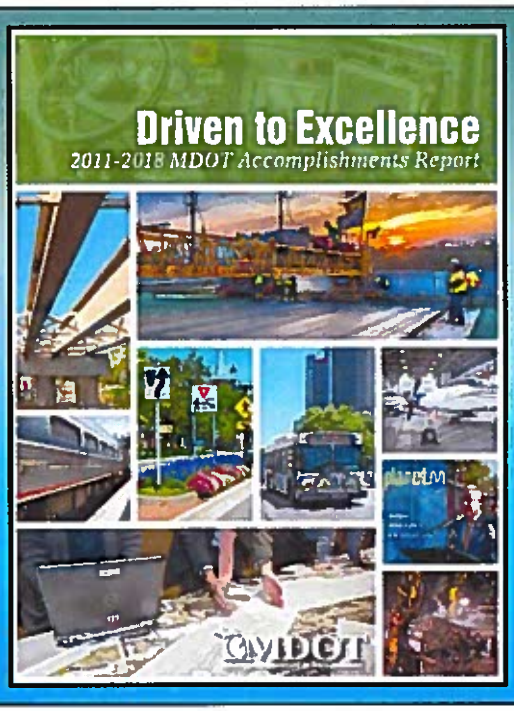
Questions?

MDOT
Michigan Department of Transportation



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