Performance Based Practical Design at ODOT

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PBPD - Why Now?

- Limited Funding/Resources
- Aging Infrastructure
- Environmental Constraints
- New Tools/Technology to evaluate performance
- Consistent with Organizational Philosophy of the ODOT
To provide easy movement of people and goods from place to place, we will:

Take care of what we have;

Make our system work better;

Improve safety;

Enhance capacity

**OUR MISSION**

A long-term, reliable, professional and highly productive organization

**OUR VISION**
Our Guiding Principles

We will serve, innovate, and communicate with purpose.

We will be productive, lean, efficient and effective.

We will utilize the public resources entrusted to us by satisfying the State's transportation needs.

We will be the standard of excellence for winter maintenance.

We will create a working environment based on trust and mutual respect.

We will value the diversity of all ODOT people.

We will work together — one team: the Ohio Department of Transportation.
What is PBPD?
- It is a design philosophy that will guide our decision making process to ensure that we are making the best investments in the transportation system as a whole.
- Requires that we clearly understand the problem (Purpose and Need) and craft a SAFE solution that addresses it.
PBPD

- **What is PBPD**
  - It is making informed, risk based decisions that balance the realities of fiscal constraints, R/W, environment, capacity and stakeholder input without sacrificing safety.
- **Key Points**
  - Safety **MUST** be a priority with any project.
  - No project is more important that the system as a whole.
  - 10 good projects are better than 1 great one.
  - In many cases the minimum “standard” is the existing geometric condition.
PBPD

• What PBPD is **NOT**
  – It is **NOT** the wanton disregard for our manuals solely in the name of cost.
  
  – It is **NOT** the blind following of manuals.
• ODOT's projected Construction program $1.6B - $1.8B/year not counting one time infusions like stimulus or turnpike funds.

• Current Cost Estimates of 3 Major New projects:
  • Cost of I-70/I-71 = $1.5B
  • Cost of Cleveland Innerbelt = $2.5B
  • Cost of Brent Spence = $2.5B

• Can we employ PBPD philosophy to reduce cost and still address purpose and need?
Key Is Informed Decisions

- HSM will be an important tool in PBPD. We must quantify and understand the safety ramifications of our decisions.
- Can use HSM to assess safety benefits resulting from incremental improvements as well as potential comparison of alternatives.
HSM

- If HSM predicts a decision will increase crashes does it mean it can’t be considered?
  - It depends:
    - How much does it increase crashes?
    - What are the severity of the crashes?
    - What are the offsetting benefits?
HSM Example
HAM-71 – Hard Shoulder Running
• **Problem - Urban Interstate is Extremely Congested During Peak Hours.**

• **No Major Capacity Jobs Planned Nor is There Funding for Any.**
HAM-71 – HSM Example

- Alternatives - Considering Peak Hour HSR.
- Imminent Resurfacing Projects Are Opportunity to Set Required Cross Section.
Considerations:
• “Extra” shoulder lane during peak hours
• Some narrower lanes (11’-6”)
• Loss of inside shoulder for breakdown during HSR hours (still useable outside)
• Truck tracking in curves checked - ok
• Congestion Reduced - But What About Safety???
HAM-71 – HSM Example

- Used HSM to predict safety affect of new HSR cross section.
- The benefits of congestion mitigation outweigh the potential risk to increase 2 crashes/mile/year.
- Predicted a relatively small increase in injury crashes.

<table>
<thead>
<tr>
<th>Number of Lanes Without HSR</th>
<th>6</th>
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<tbody>
<tr>
<td>Number of Lanes With HSR</td>
<td>8</td>
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<table>
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<tr>
<th>Number of crashes without any HSR</th>
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<tr>
<td>MV Fi</td>
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<td>9.6956</td>
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<th>Number of crashes with HSR open for 2 hours</th>
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<th>Change in Annual Crash Frequencies (Per hours of HSR operation)</th>
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<td>0.27722</td>
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<tr>
<th>Change in Frequency</th>
<th>2.86%</th>
<th>3.79%</th>
<th>7.45%</th>
<th>4.53%</th>
<th>3.97%</th>
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<th>Change in Human Capital Costs</th>
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<td>$21,501</td>
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Predict 2 additional crashes/mi/year
IMS Example – 20 Year Design
HAM-75 SB @ IR-275
Problem: Single Exit Only Lane from IR-75SB to IR-275 is Over Capacity Resulting in Standing Queues on Mainline I-75.
HAM-75 SB @ IR-275 – PBPD IMS

- Traditional “Standard” Fix is a $40M Fly Over Ramp;
- No Funding Source is Anticipated;
HAM-75 SB @ IR-275 – PBPD IMS

- Possible “Interim” Fix is to create extremely low cost additional Optional Diverge Lane to I-275
• The Decision - Wait for $40M funding or get stopped traffic off of mainline interstate now?

• Analyzing to determine how additional traffic will worsen other weaves.

• The answer will be based on:
  a) Severity of Impacts
  b) How Long Until Impacts Occur (very very probably BEFORE 20 years)
PBPD

• Where is ODOT at with PBPD?
  – We are in the process of documenting and formalizing how PBPD will be incorporated into our Planning and Design processes (the PDP).

  – Need to address issue of consistency with respect to what is PBPD.
PBPD

• Where are we headed with respect to PBPD?

  PROJECT (PDP) Level:
  • When, what and how. Potential examples:
    - specific consideration in Feasibility Studies;
    - Formal part of D.E. process;
    - Selection of design designations;
    - 20 year versus shorter design year;
    - Approval of IMS;
    - Value Engineering;
    - L&D Manual and standard changes
    - MUST more tightly defined Purpose & Needs
• Where are we headed with respect to PBPD?

PROGRAM Level (potential):
• Reevaluation of current project alternatives;
• A possible low cost bottleneck program that compliments the existing ramp clear program
• Summary
  – PBPD is just good planning and engineering.
  – It’s about right sizing solutions.
  – It’s about making affordable improvements to many parts of our system rather than very expensive improvements on only a couple of projects.
  – It’s about corridor context.
  – It’s about making good decisions and not just following manuals.
  – Sometimes good is much better than great or perfect.
PBPD

Questions?

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