Practical Design for Transportation Project Delivery

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101st Purdue Road School
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“It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change.”

Charles Darwin
Open Roads

Discussion Points:
- Where we’ve been
- Where we are
- Where we’re going
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Targets

- Use available funding more efficiently
- Deliver as promised
- Seek opportunities to balance system priorities
- Complete more projects, have greater impact
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Timeline

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What is Open Roads?

- Unique Brand to practice of Practical Design
- Signifies Opportunity, Empowerment, & Innovation
- Broad Application
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Where We’ve Been...
- Stakeholder Engagement/Collaboration
- Published *Open Roads* Program Guide
- Issued Technical Design Memorandum
- Formed Policy & Project Review Teams
- Modified SPMS/Change Management
- Adopted Reinvestment Guidelines for Cost Savings
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Where We Are...

- 100% of policy reviews completed;
- 78% of all project reviews completed.
- Estimated $64.3 Million (37%) in Construction Cost Savings.
$64.3 Million Costs Savings Thru 2/28/15

Projects
“If you haven’t looked for every possible design exception, you haven’t done your job as a designer.”

George Merritt, Safety & Geometric Design Engineer, FHWA Technical Resource Center

Results:
✓ 73 Level 1 Design Exceptions approved in CY14
✓ 46% increase over CY13; 58% increase over 5-yr. avg.
✓ $126.5 million in estimated cost savings
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Where We’re Going...

- Complete FY17 Project Reviews
- Complete Policy Recommendations
- Complete FY18-19 Project Reviews
- Embed Practical Design into DNA of PDP
- Emphasis upon Project Scoping
Project Case Studies

- SR26 Rehabilitation
- US31/ SR28 Interchange
- I65 Kankakee River Bridge
- I65 “Monster” Bridge
- SR9/ SR46 Intersection
$64.3 Million Costs Savings Thru 2/28/15

Projects

10% Target Savings
Open Roads Principles

- Sound Engineering Judgment
- Get The Scope Right
- Design Up
- Safer, System Focus
Common Design Elements

- Change in Scope/Work Type
- Shoulder Width
- Guardrail/Bridge Rail
- Hydraulics
SR26 Rehabilitation
"Design Up"
<table>
<thead>
<tr>
<th>Route:</th>
<th>SR26</th>
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<td>Classification:</td>
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<td>Project Length:</td>
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<td>JoAnn Wooldridge</td>
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Existing Condition:
• 9’ Lane Width
• 3’ Shoulders (variable surface)

Original Design:
• 12’ Lanes
• 4’ Paved Shoulder
• 4’ Aggregate Shoulder

Practical Result:
• 11’ Lane
• 2’ Paved Shoulder
• 1’ Aggregate Shoulder

66% increase in width

16% increase in width
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**SR26 Rehabilitation**

- **Pavement**
  - Lane Width reduction from 12’ to 11’
  - Underdrain depth reduced to 18”

- **Shoulders**
  - Shoulder width reduced from 4’ paved/4’ agg. to 2’ paved/1’ agg.
  - Modified side slopes and V-bottom ditches

- **Utilities**
  - Minimized utility relocation and impacts to wetlands and tree mitigation areas

- **Hydraulics**
  - Repair/modify/extend existing pipes vs replacement

**Savings:**

$3.5 million (26%)
US31/ SR28 Interchange

“Get The Scope Right”
Route: US31/SR28
Project Type: Major New
Purpose/Need: Access/Mobility
Context: Rural

Location: Tipton County
District Office: Greenfield
Project Manager: Tim Muench
Designer: URS Corp.
**Open Roads Solution:**
- Design Speed Reduced
- Bridge Width/Length Reduced
- Matched existing SR28 cross sections
- One Lane vs Two Lane Roundabouts
- Smaller Footprint = 10 ac. less right of way
- Alternative Roundabout Lighting Plan
- Eliminated Dixon Creek Ramp Bridges

**Savings:**
$4.2 million (33%)
165 Kankakee River Bridge

“Safer, System Focus”
Open Roads

I-65 Kankakee River Bridge

- Built in 1961
- Various girder and deck repairs/reconstruction in ‘81, ‘89, ‘94
- Programmed as Bridge Replacement in 2012 - $8.1 million
- Design modified in 2013; Added $1.6 million to widen
- 2014 Open Roads Solution:
  - Critical evaluation of structure and corridor improvement plans
  - Thin Deck Overlay
  - Joint Replacement
  - MOT - Night time Lane Closures
  - No bridge widening
  - Steel Girder Retrofit
  - Life Cycle Cost 27% less

Savings: $7.8 million (96%)
I 65 “Monster” Bridge
“Safer, System Focus”
Open Roads

165 “Monster” Bridge

Route: Interstate 65
Location: Marion County
District Office: Greenfield

Project Manager: Mark Blake
Designer: American Structurepoint
Open Roads

165 “Monster” Bridge

- Composite Steel beam bridge - 3,500 ft. long and 150 ft. wide
- Built in 1972; Deck overlay in 1989
- Programmed as Bridge Rehab. in 2015 - $24.5 million
  - Deck overlay
  - Joint replacement
  - Steel beam painting
- 2014 Open Roads Solution:
  - Critical evaluation of structure
  - Deck Patching, Joint Replacement, Spot Painting
  - MOT - Night time Lane Closures
  - Solution derived from detailed inspections, material testing, life cycle cost analysis, and engineering judgment
  - Extends useful life of structure 10-15 years at minimal expense

Savings: $19.1 million (78%)
SR9/ SR46 Intersection

“Safer, System Focus”
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SR9/ SR46 Intersection

Route: SR9/SR46
Location: Bartholomew Co.
District Office: Seymour

Project Manager: Travis Mankin
Designer: Burgess & Niple
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SR9/ SR46 Intersection

- **History:**
  - Intersection characterized by vast amounts of pavement, multiple lanes, untimed/uncoordinated stopping and turning movements.
  - Potentially up to 12 vehicles stopping/entering/turning in the intersection simultaneously.
  - Driver confusion, hesitation, acceleration = high accident rate.

- **Programmed Scope (2010):**
  - Single-lane Roundabout designed to lessen severity of crashes, and improve mobility.
  - $1.1 million Construction Cost.
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SR9/ SR46 Intersection

Before
Open Roads/Practical Design Solution:

- Value analysis, using Intersection Design Guide, yielded low benefit/cost ratio for round-a-bout design.
- Upgrade/enlarge Warning Signs and Stop Signs;
- Install raised rumble strips on approach.
- 12 intersection approach lanes reduced to 8 lanes by re-striping.
- 55% projected decrease in accidents at only 11% of original cost.

Savings: $990,000 (89%)
"If you always do what you’ve always done, you’ll always get what you’ve already got."

Roger Conners and Tom Smith
Change The Culture, Change The Game
Practical Design for Transportation Project Delivery

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