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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RESULTS

FINISH
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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.
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$64.3 Million Costs Savings Thru 2/28/15

Projects

10% Target Savings
“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
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$64.3 Million Costs Savings Thru 2/28/15

Projects

10% Target Savings

- Interstate 65
- Indiana 26
- Indiana 31
- Indiana 9

$2,000,000
$4,000,000
$6,000,000
$8,000,000
$10,000,000
$12,000,000
$14,000,000
$16,000,000
$18,000,000
$20,000,000
$22,000,000
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Principles

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

- Change in Scope/Work Type
- Shoulder Width
- Guardrail/Bridge Rail
- Hydraulics
SR26 Rehabilitation
“Design Up”
Open Roads

SR26 Rehabilitation

Route: SR26
Classification: Rural Collector
Project Length: 8 miles
AADT: 2,400
Accident History: Minimal

Location: Jay County
District Office: Greenfield
Project Manager: JoAnn Wooldridge
Designer: District Design
Work Type: 3R
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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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

SR26 Rehabilitation

Savings:
$3.5 million (26%)
**Open Roads**

**US31/ SR28 Interchange**

<table>
<thead>
<tr>
<th>Route:</th>
<th>US31/SR28</th>
<th>Location:</th>
<th>Tipton County</th>
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<tbody>
<tr>
<td>Project Type:</td>
<td>Major New</td>
<td>District Office:</td>
<td>Greenfield</td>
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<tr>
<td>Purpose/Need:</td>
<td>Access/Mobility</td>
<td>Project Manager:</td>
<td>Tim Muench</td>
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<td>Context:</td>
<td>Rural</td>
<td>Designer:</td>
<td>URS Corp.</td>
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![Image of interchange scene]
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BEFORE

AFTER
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”
I-65 Kankakee River Bridge

Route: Interstate 65
Location: Lake County
District Office: LaPorte

Project Manager: Charles Bradsky
Designer: Janssen & Spaans Eng.
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"
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I-65 “Monster” Bridge

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

Project Manager: Mark Blake
Designer: American Structurepoint
Open Roads

I-65 “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”
Open Roads

SR9/ SR46 Intersection

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

Project Manager: Travis Mankin
Designer: Burgess & Niple
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

SR9/ SR46 Intersection

- 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