Taking Design-Build Statewide

Missouri’s Safe & Sound Bridge Improvement Program

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Statewide Need

1,093 in serious or poor condition when program began.

10,405 bridges on MoDOT system.
Bridge Selection Criteria

Improve or replace 802 bridges in 5 years.

- Eliminate Condition 3 & 4 on Major Highways
- Eliminate Condition 3 on Minor Highways
- Eliminate as many Condition 4 on Minor Highways as possible w/in MoDOT’s budget
- Exclude Mississippi/Missouri River structures
- Exclude structures >1,000 feet long
- Minimal Right of Way & Roadway Work expected.
The Typical Bridge is ...

- 147 feet long, 24 feet wide
- 60 years old
  - Rehabs – 48 years old
  - Replacements – 66 years old
- In a rural location
- Avg. daily traffic of 1900 vehicles, but about 300 carry less than 400 vehicles per day.
Signs of Deterioration
Procurement Process

**Design-Build-Finance-Maintain**
- Announced in 2006.
- Effort ended in 2008, when credit market meltdown made DBFM unaffordable.

**Design-Build**
- Divided 802 bridges into 248 rehabs (let by MoDOT) and 554 full replacements (Design Build).
- Pledged to have 100 rehabs under contract by mid 2009.
Program Goals

1. Deliver good bridges at a great value.
2. Minimize public inconvenience through increased construction speed & flexible schedule.
Best-Value Selection

• KTU Constructors selected, May 2009
  [JV – Kiewit Western Co.-Traylor Bros. Inc.-United Contractors Inc.]
  • $487 Million design build contract
  • $685 Million Total Project Cost
Execution

• Planning Challenges
  • Just-in-time design was typical
  • Average 20+ bridges/month

• Logistical Challenges
  • 554 bridges in 111 different counties
  • Average distance between bridges – 11 miles
  • Avg. construction schedule: 45 calendar days/bridge
Design Philosophy

• Constructability Reviews
  • Designer/Builder/MoDOT input

• Design Speed & Design for Speed
  • Limited bridge types
  • Standardized design elements
  • 10-degree skew increments up to 40 degrees
  • Beam lengths in 5-foot increments
<table>
<thead>
<tr>
<th>Structure Types</th>
<th>Count</th>
</tr>
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<tbody>
<tr>
<td>Adjacent Core Slab</td>
<td>196</td>
</tr>
<tr>
<td>Adjacent Box Beam</td>
<td>116</td>
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<td>Adjacent CS/BB</td>
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<tr>
<td>Spread Box Beam</td>
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<td>Spread CS/BB</td>
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<td>Steel Girder</td>
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<td>NU Girder</td>
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<td>Flat Slab</td>
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<tr>
<td>Box Culvert</td>
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<td>Pipe Culvert</td>
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<td>Super-cor</td>
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<tr>
<td>Prestressed Slab</td>
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<tr>
<td>Hybrid Composite</td>
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</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>554</strong></td>
</tr>
</tbody>
</table>
Pre-Fabricated Materials

- CFM – Contractor-Furnished Materials
- Fabrication off Critical Path
- Pricing/Escalation
Construction Challenges

- Packaging of Bridges
- Consistency within 5 Regions
- Timely, Efficient Delivery of Materials
- Efficient Movement of Crew & Equipment
- Weekly Updates for Public
Web Site

Bridges Completed

Bridges Scheduled for 2011

Bridge Detail

- Bridge 9446
- ROAD CLOSURE
- Cooper Co. Rte. V over Petite Saline Creek
- Bridge Replacement
  - Built: 1906
  - Length: 171 ft.
  - Traffic Volume: 130 per day
  - Work Begins*: 2/22/2011
  - Closure Duration: 54 days
  - Date Completed: NOT COMPLETE

Contractor:
KTU Constructors

Detour

Find in main map.
Speed

Quickest Bridge Types:
• Box Culvert  7 Days
• Single Span  8 Days
• Two Span  31 Days
• Three Span  28 Days
• Four Span  33 Days

Avg. Closure Length – 42 days!
Recycling

- 9,000 tons of steel
- 148,000 tons of concrete
Safe & Sound …
On track for completion 1 year early!
More Information

Bridges Completed: 761
Bridges Under Construction: 31
Bridges Remaining: 10