Flexibility in Design
MoDOT’s Approach to System Delivery

Kathy Harvey
State Design Engineer
Missouri Department of Transportation
Why be Flexible?

5,000 miles of Major Roads
27,000 miles of Minor Roads
10,000 Bridges
Practical Design = Flexibility
context sensitive solutions

practical design (prák’ti-kal di-zīn’ ) n. 1. A process by which the value of a project is maximized. 2. Ensuring that a project is the correct solution for its surroundings: RIGHT SIZING. 3. An approach to transportation in which an improvement is considered on the basis of its contribution to the entire system instead of its individual perfection.
## The Dangers of Rigid Standards

The way things were were

---

### General Design Data Notes

**Figure 4-04.1**

**Sheet 1 of 4**

**Rev. 11-1-04**
### The Dangers of Rigid Standards

**the way things were**

<table>
<thead>
<tr>
<th></th>
<th>PRINCIPAL ARTERIALS</th>
<th>OTHERS</th>
<th>OTHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INTERSTATE</td>
<td>&lt;1700</td>
<td>&gt;1700 (2 LN.)</td>
</tr>
<tr>
<td>GN)</td>
<td>ALL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLAT</td>
<td>70</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>ROLLING</td>
<td>70</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>(1)</td>
<td>28'</td>
<td>8'</td>
<td>40</td>
</tr>
<tr>
<td>VELED WAY</td>
<td>24'</td>
<td>10'</td>
<td>D-60</td>
</tr>
<tr>
<td>PROFILE GRADE</td>
<td>14'</td>
<td>12</td>
<td>44</td>
</tr>
<tr>
<td>ROADBED WIDTH</td>
<td>14'</td>
<td>12</td>
<td>150</td>
</tr>
<tr>
<td>RIGHT</td>
<td>28'</td>
<td>8'</td>
<td>12</td>
</tr>
</tbody>
</table>

**SEE PRELIMINARY GP**

- 6:1
- 4:1
- 3:1
- 4 3/4
- 7 1/2
The Dangers of Rigid Standards

the way things were

6 ft. Shoulder

10 ft. Shoulder
The Dangers of Rigid Standards

the way things were
Something Had to Change
implementation - *the road to success*

**Spring 2002** – Performance Spec.s written

**December 2004** – Practical Design concept pitched to Commission

**Spring 2005** – Districts challenged to cut STIP 10%

**Fall 2005** – First Practical Design Policy written

**December 2006** – *Engineering Policy Guide* is launched
The Road to Success
Winter 2004 – Spring 2005

• After pitching practical design to the State Highway Commission, the Chief Engineer challenged each district to cut the budget of their 5-year STIP by 10% and still deliver the program.

• Beside internal staff, the FHWA and the consulting community were challenged to help

• Engineers were told they could “put their Design Manuals ‘on the shelf ’ for one year”

• Engineers were to be guided only by three ground rules…
The Road to Success

ground rules

• **Safety** - Every project must get safer. There is no room for compromise where safety is concerned.

• **Communication** - There is collaboration in developing every practical solution.

• **Quality** - The practical solution must function properly and cannot leave a legacy of maintenance challenges.
The Road to Success

Immediate results

• The district challenge resulted in an initial savings of $400 Million across the 5-year STIP.
• District representatives were assembled to discuss their experiences, good and bad.
• About 400 ideas and comments were discussed and documented.
• These were boiled down to 25 broad policies in 5 general areas.
MoDOT’s entire senior management team and FHWA officials met for two days and crafted flexible policies across the five major areas.

These five areas accounted for 80% of MoDOT’s program delivery expenditures.

1. Paving & Base - 35%
2. Bridges - 17%
3. Grading - 11%
4. Right of Way - 10%
5. Traffic Control – 7%
MoDOT has made great strides to build a good transportation system and increase taxpayers' trust in its ability to deliver what was promised. The same innovative concepts such as practical design and design-build that were used to deliver those commitments, have made MoDOT a leader in the transportation industry. These forward thinking, innovative concepts were continued with the decision to incorporate all MoDOT's engineering manuals under a
Has it Worked?

Safety

• Largest drop in traffic-related fatalities of any state in the nation in 2006, with a continued downward trend every year since

• Fatal crashes dropped below 1000 in 2007 and still further in 2008. MoDOT is on track with even better results for ‘09

• 11% decrease in run-off-road accidents since 2004
Has it Worked?

Quality

• Since 2002, MoDOT delivered a $7.0 Billion program 0.4% under budget.
• Pavement condition on major roads went from the 3rd worst to the 9th best.
• 83% of the state’s major roads are now in good condition. That’s up from 47% in 2004.
Has it Worked?

Communication

- 90 percent of newspapers editorials in 2008 were positive
- Customer satisfaction with MoDOT rose to 78% in 2008
- 95% of customers believe projects are the right transportation solution
How to be Flexible

lessons learned

• Top-Down Leadership

Change of this magnitude must be a “top-down” undertaking. A radical change in everyday culture will not endure long at the grass roots level.

• Openness

The organization must be completely open to collaboration, but willing to accept certain non-voluntary actions.
How to be Flexible

lessons learned

• Political Environment

A radical cost control program should be accomplished hand-in-hand with state and federal government leaders, not in spite of them.

• Change

An organization must be completely open to whatever change is necessary to accomplish a radical departure from traditional philosophies.
How to be Flexible

lessons learned

• Focus on the system

Deliver “good” projects everywhere, instead of “perfect” projects somewhere

• Honor Commitments

Projects must be flexible but the system must be unyielding. What has been promised to the public must be delivered