Fast Projects That Are of Great Value

Tangible Result Driver – Dave Nichols,
Director of Program Delivery

MoDOT customers expect that transportation projects be completed quickly and provide major improvements for travelers. MoDOT will honor project commitments because it believes in integrity.

Fast Projects That Are of Great Value

Percent of estimated project cost as compared to final project cost

Result Driver: Dave Nichols, Director of Program Delivery
Measurement Driver: Renate Wilkinson, Planning and Programming Engineer

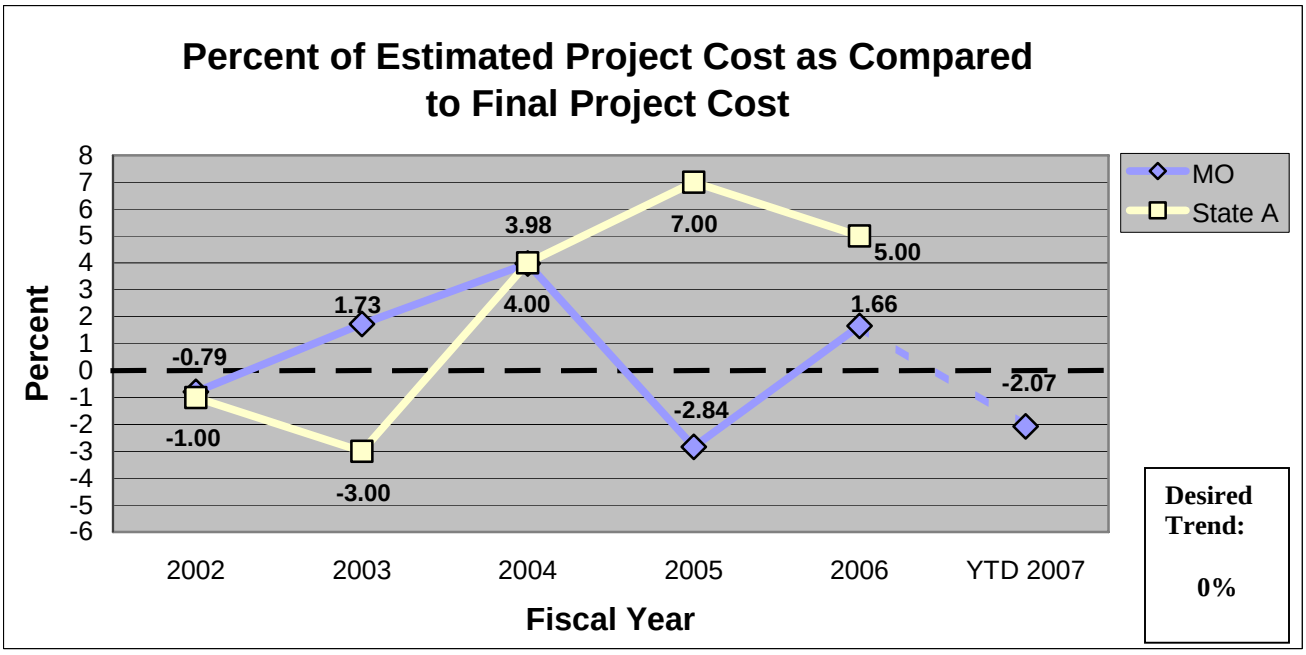
Purpose of the Measure:
This measure determines how close MoDOT's total program completion costs are to the estimated costs.

Measurement and Data Collection:
MoDOT determines the completed project costs and compares them to the estimated costs. The completed project costs are reported during the state fiscal year in which the project is completed.

Project costs include design, right of way purchases, utilities, construction, inspection and other miscellaneous costs. The estimated cost is based on the amount included in the most recently approved Statewide Transportation Improvement Program. Completed costs include actual expenditures. The costs do not include those that might result from any legal claims, which are rare occurrences, regarding the projects after they are completed. Positive numbers indicate the final (completed) cost was higher than the estimated cost.

Improvement Status:
The increased cost trend through state fiscal year 2004 reflects the increased number of projects in state fiscal years 2001, 2002 and 2003. The increased work volume resulted in higher awards and overall costs. The decrease in 2005 can be attributed to the lower work volume and increased competition among contractors. The increase in 2006 can be primarily attributed to inflationary pressures. The ideal status is no deviation in the estimated vs. final project cost, or 0 percent.

Very few states provide data for this measure, and most prefer to keep it confidential. The graph below shows how MoDOT performance compares with another state in this region. In 2002 and 2004, the performance of both states was nearly the same. In other years, it varied substantially.



Positive numbers indicate the final (completed) cost was higher than the estimated cost.

Fast Projects That Are of Great Value

Average number of years it takes to go from the programmed commitment in the Statewide Transportation Improvement Program to construction completion

Result Driver: Dave Nichols, Director of Program Delivery
Measurement Driver: Machelle Watkins, Transportation Planning Director

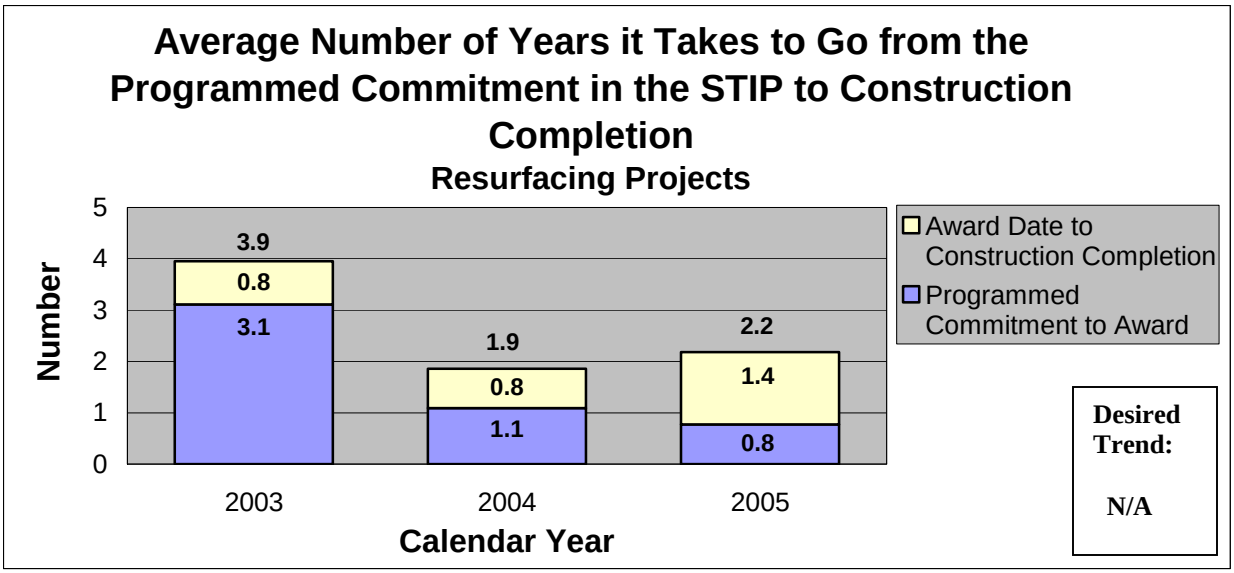
Purpose of the Measure:
This measure monitors how quickly projects go from the programmed commitment to construction completion.

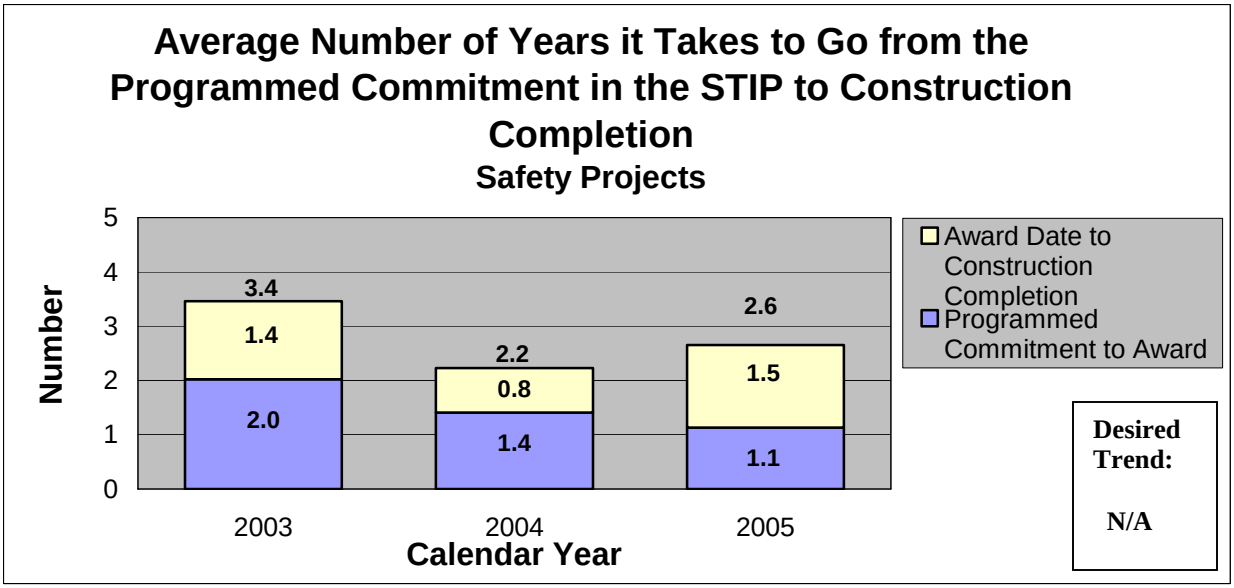
Measurement and Data Collection:
MoDOT compares how long it takes from when the project is added to the Statewide Transportation Improvement Program to when the project is completed. Data is categorized by the type of work, and distinguishes between design and construction stages.

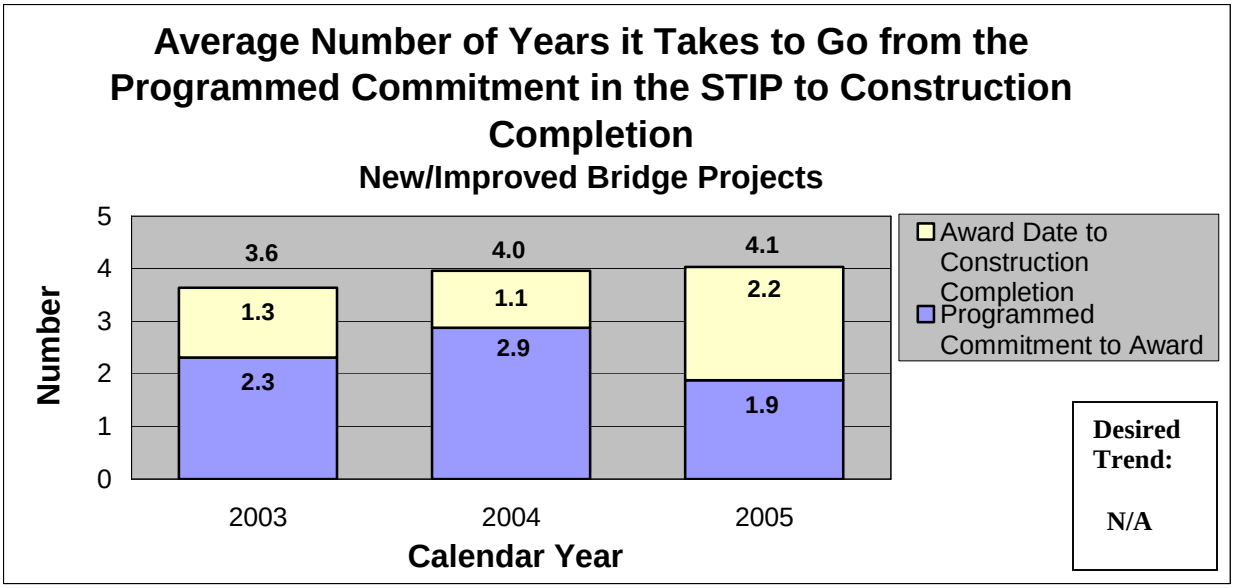
Improvement Status:
In general, resurfacing and safety projects take the least amount of time to develop and complete, around two years. New or improved bridge projects take more time, around four years. New or expanded highways take yet more time, from five to eight years. Major bridge projects take the most time, from seven to 11 years to develop and complete.

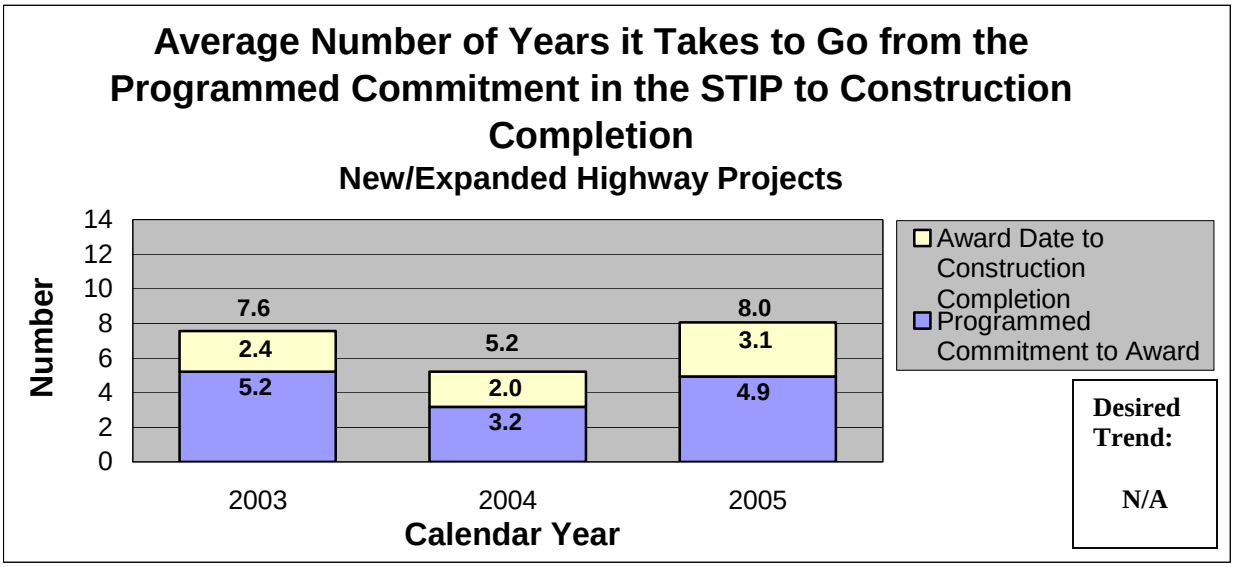
The apparent increase in construction time from 2004 to 2005 is due to different data used to denote project completion. The 2004 data represents completion of the contractor's construction activities. The 2005 data represents project finalization, which includes final payment and contract completion. The change in data was made because there is more data available for project finalization, making the measurement more representative.

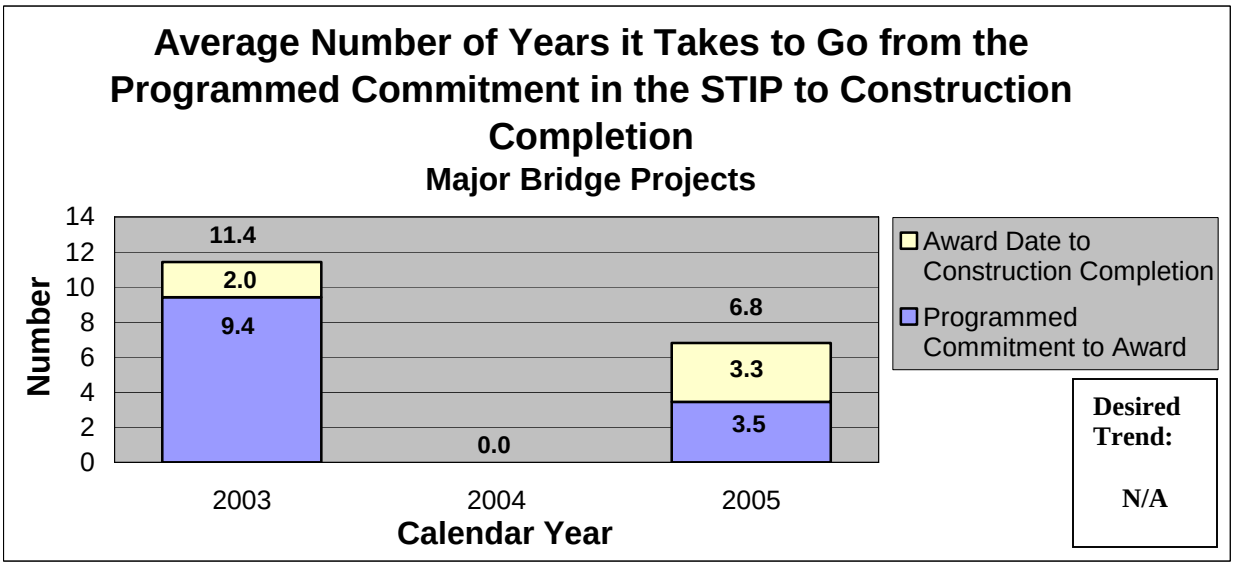
Efforts are being made to minimize the amount of time between construction completion and project finalization. We anticipate that project completion times will be shorter in the future.


Average Number of Years it Takes to Go from the Programmed Commitment in the STIP to Construction Completion
Resurfacing Projects
Number
5
4
3
2
1
0
3.9
0.8
3.1
1.9
0.8
1.1
2.2
1.4
0.8
2003
2004
2005
Calendar Year
Award Date to Construction Completion
Programmed Commitment to Award
Desired Trend:
N/A


Average Number of Years it Takes to Go from the Programmed Commitment in the STIP to Construction Completion
Safety Projects
Number
5
4
3
2
1
0
3.4
1.4
2.0
2.2
0.8
1.4
2.6
1.5
1.1
2003
2004
2005
Calendar Year
Award Date to Construction Completion
Programmed Commitment to Award
Desired Trend:
N/A


Average Number of Years it Takes to Go from the Programmed Commitment in the STIP to Construction Completion
New/Improved Bridge Projects
Number
5
4
3
2
1
0
3.6
1.3
2.3
4.0
1.1
2.9
4.1
2.2
1.9
2003
2004
2005
Calendar Year
Award Date to Construction Completion
Programmed Commitment to Award
Desired Trend:
N/A


Average Number of Years it Takes to Go from the Programmed Commitment in the STIP to Construction Completion
New/Expanded Highway Projects
Number
14
12
10
8
6
4
2
0
7.6
2.4
5.2
5.2
2.0
3.2
8.0
3.1
4.9
2003
2004
2005
Calendar Year
Award Date to Construction Completion
Programmed Commitment to Award
Desired Trend:
N/A


Average Number of Years it Takes to Go from the Programmed Commitment in the STIP to Construction Completion
Major Bridge Projects
Number
14
12
10
8
6
4
2
0
11.4
2.0
9.4
0.0
6.8
3.3
3.5
2003
2004
2005
Calendar Year
Award Date to Construction Completion
Programmed Commitment to Award
Desired Trend:
N/A

Fast Projects That Are Of Great Value

Percent of projects completed within programmed amount

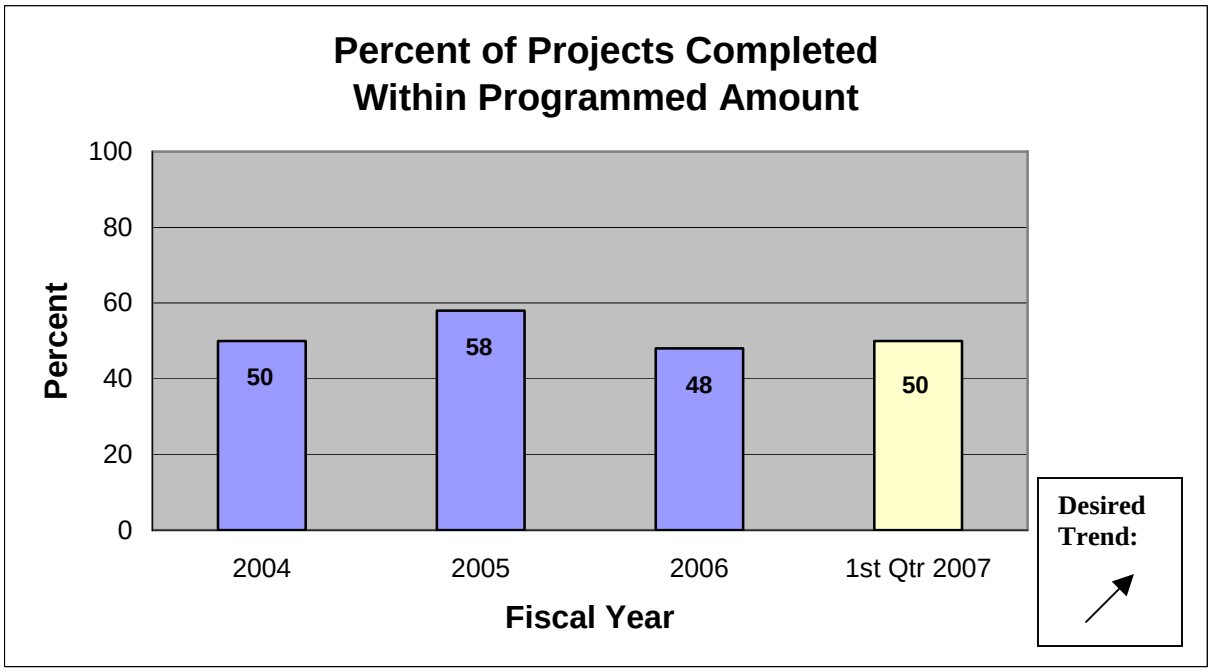
Results Driver: Dave Nichols, Director of Project Delivery
Measurement Driver: Dave Ahlvers, State Construction Engineer

Purpose of the Measure:
The measure tracks the percentage of projects completed within the programmed amount. The cost includes such items as engineering, right-of-way and contract payments.

Measurement and Data Collection:
The completed project cost is compared to the estimated cost for each project. The percentage of projects completed within the estimated cost is gathered from across the state.

Project costs include design, right-of-way purchases, utilities, construction payments, inspection and other miscellaneous costs.

Improvement Status:
MoDOT would like to see all projects completed within the programmed amount. The goal is to deliver projects at the programmed amount allowing the greatest number of projects to be built with the funding available. MoDOT's data indicates that there is a great deal of deviation among individual projects with half over and half under budget. Emphasis has been placed on scoping projects and developing estimates that represent the true cost of delivering the projects. MoDOT is striving to deliver quality projects cheaper by using practical design.



Fast Projects That Are Of Great Value

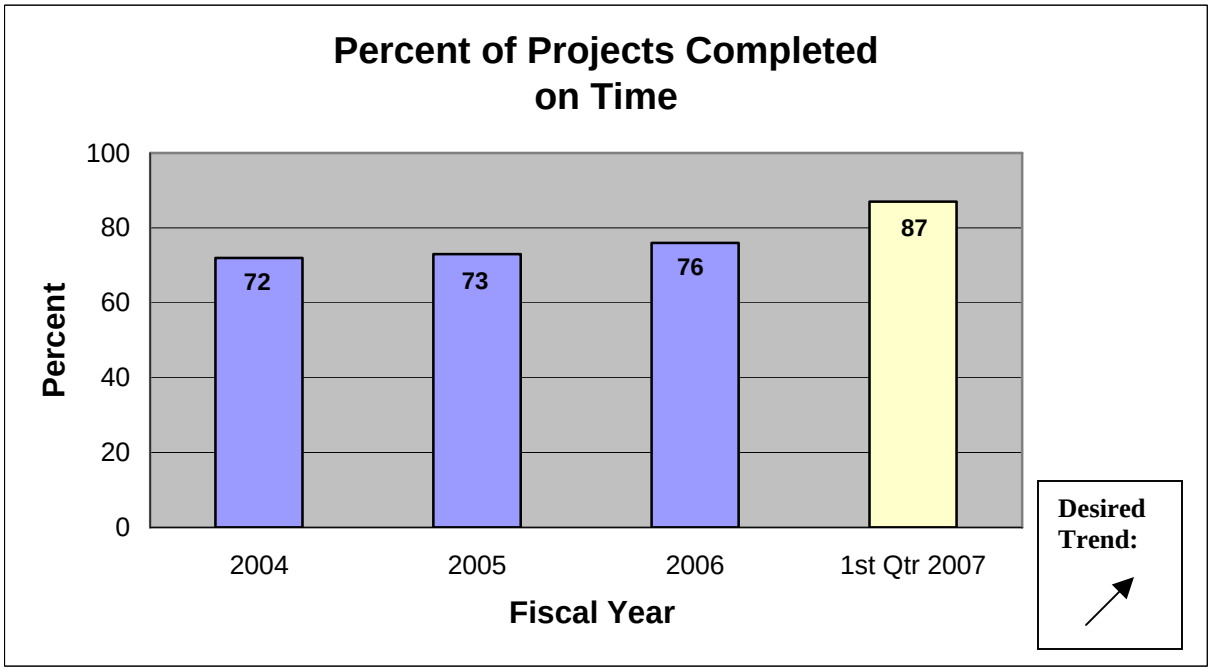
Percent of projects completed on time

Results Driver: Dave Nichols, Director of Project Delivery
Measurement Driver: Dave Ahlvers, State Construction Engineer

Purpose of the Measure:
This measure tracks the percentage of projects completed by the commitment date established in the contract. Adjustments to the completion date are made when additional work is required or for unusual weather occurrences. It indicates MoDOT's ability to complete projects by the agreed upon date.

Measurement and Data Collection:
The project manager will establish project completion dates for each project. They are documented in MoDOT's SiteManager and STIP databases. It will be part of the Plans, Specifications & Estimates submittal. The actual completion date will be documented by the Resident Engineer and placed in MoDOT's Management System.

Improvement Status:
The results indicate a significant increase from previous years in the percent of projects completed on time. MoDOT has focused on reducing the number of days available for construction in order to reduce congestion and inconvenience to the traveling public, while stressing the importance of completing projects on time. An emphasis has been placed on reviewing construction schedules and assessing liquidated damages, which should lead to improvements in timely completion.



Fast Projects That Are Of Great Value

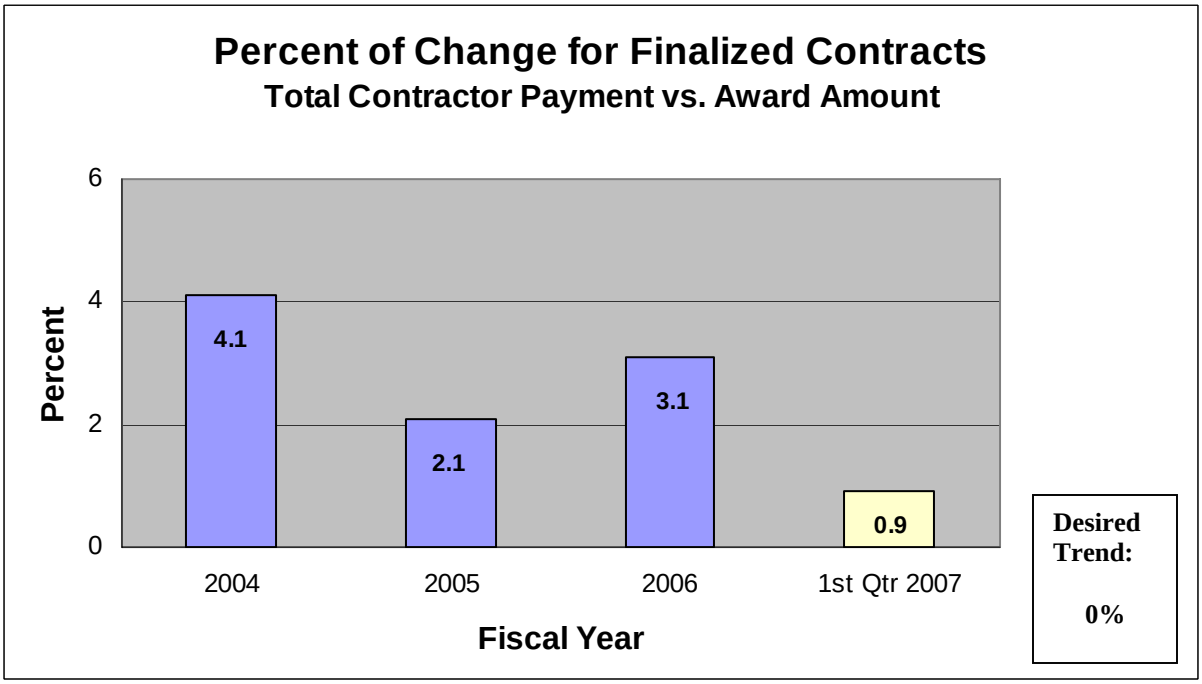
Percent of change for finalized contracts

Results Driver: Dave Nichols, Director of Project Delivery
Measurement Driver: Dave Ahlvers, State Construction Engineer

Purpose of the Measure:
The measure tracks the percentage difference of total construction payouts to the original contract award amounts. This indicates how many changes are made on projects after they are awarded to the contractor.

Measurement and Data Collection:
Contractor payments are generated through MoDOT's SiteManager database and processed in the financial management system for payment. Change orders document the underrun/overrun of the original contract.

Improvements Status:
MoDOT's performance for the first quarter of 2007 is well below the target of two percent. The overall improvement is a result of a strong emphasis placed on constructing projects within budget, the use of practical design and value engineering. By limiting overruns on contracts, MoDOT can deliver more projects, leading to an overall improvement of the entire highway system. Recently, the Performance Plus employee incentive program is placing additional emphasis on completion of projects within budget.



Fast Projects That Are Of Great Value

Average construction cost per day by contract type

Results Driver: Dave Nichols, Director of Project Development
Measurement Driver: Dave Ahlvers, State Construction Engineer

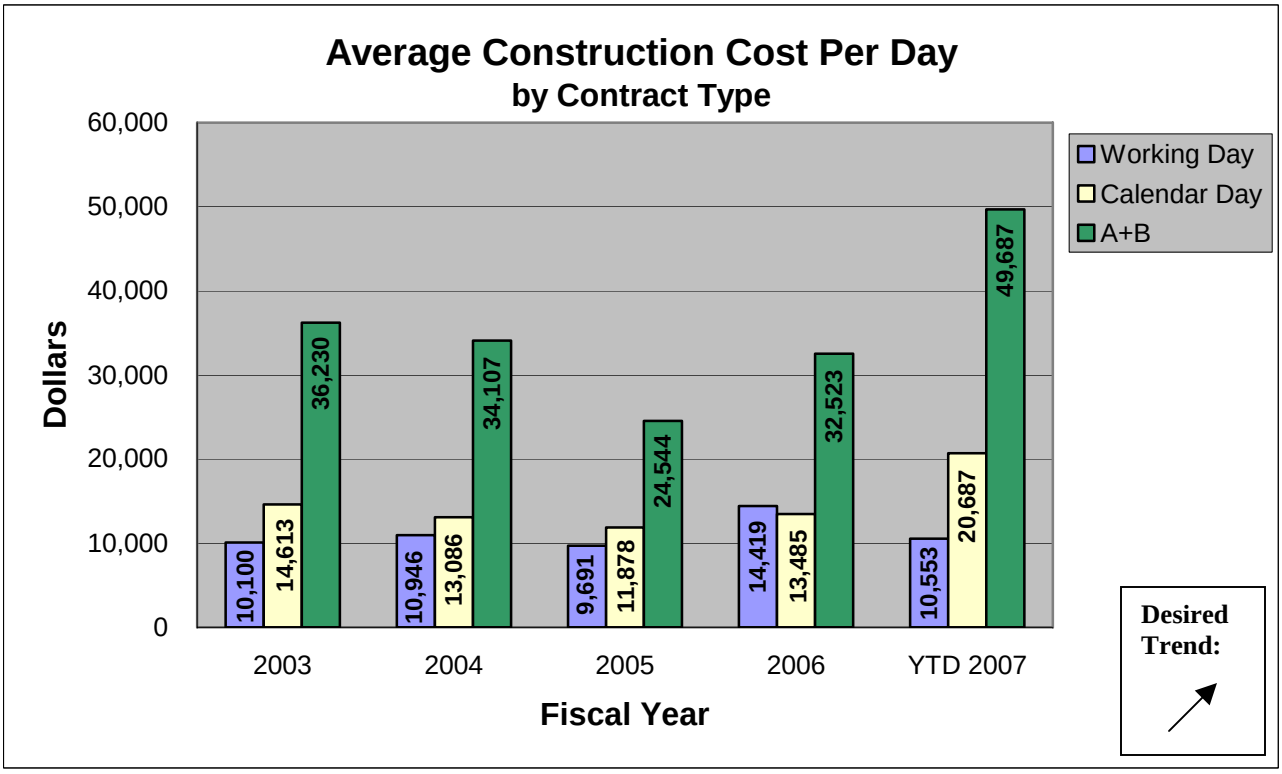
Purpose of the Measure:
This measure tracks the cost per day for project completion to determine the impact to the traveling public, enabling MoDOT to better manage project completion needs.

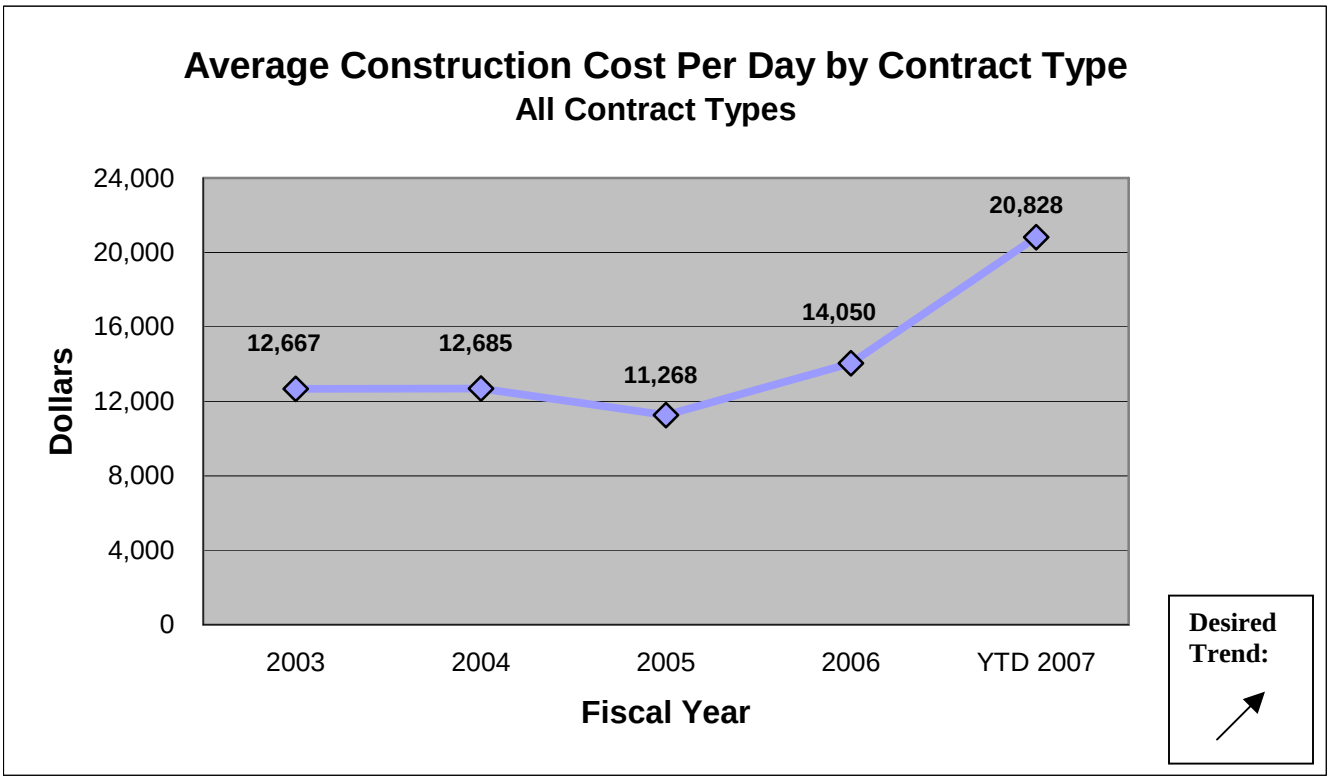
Measurement and Data Collection:
This information is gathered by extracting the actual time used for construction from the summary of working days in the SiteManager database and dividing it by the total costs of the project.

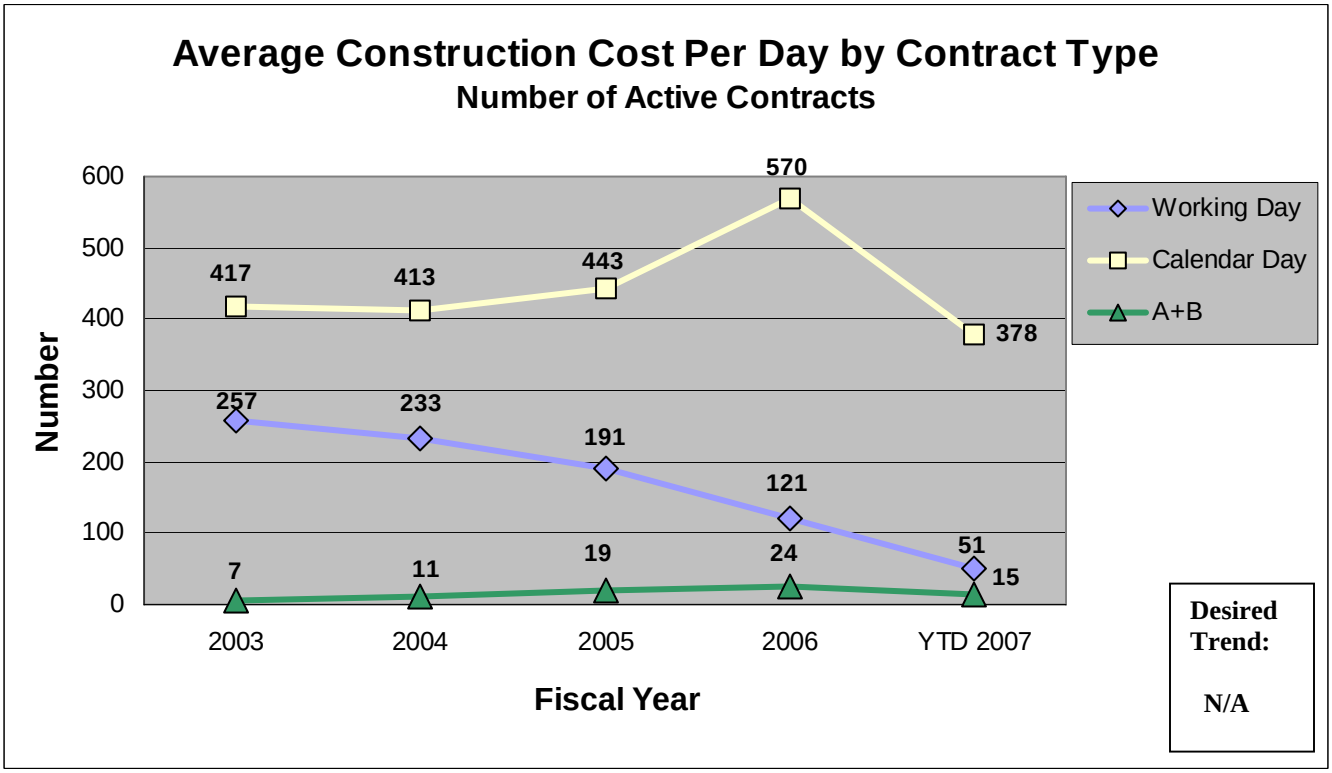
The measurement groups construction contracts into three categories:

- **WD** working day contracts
- **CD** calendar day contracts and;
- **A + B** or innovative contracts that provide incentive/disincentives to the contractor for early completion.

Improvement Status:
The greater use of A+B and calendar-day contracts resulted in a larger amount paid per calendar day. MoDOT's strategy of utilizing innovative contracting techniques has resulted in faster contract completion and fewer delays to the traveling public. Contract types are reviewed to make a determination of the most effective use of resources for timely completion of projects. Traditionally, there is a greater amount of work performed in the first quarter of the fiscal year due to optimal weather conditions.




Average Construction Cost Per Day by Contract Type
All Contract Types
24,000
20,000
16,000
12,000
8,000
4,000
0
Dollars
12,667
12,685
11,268
14,050
20,828
2003
2004
2005
2006
YTD 2007
Fiscal Year
Desired Trend:


Average Construction Cost Per Day by Contract Type
Number of Active Contracts
600
500
400
300
200
100
0
Number
417
413
443
570
378
257
233
191
121
51
7
11
19
24
15
Working Day
Calendar Day
A+B
2003
2004
2005
2006
YTD 2007
Fiscal Year
Desired Trend:
N/A

Fast Projects That Are of Great Value

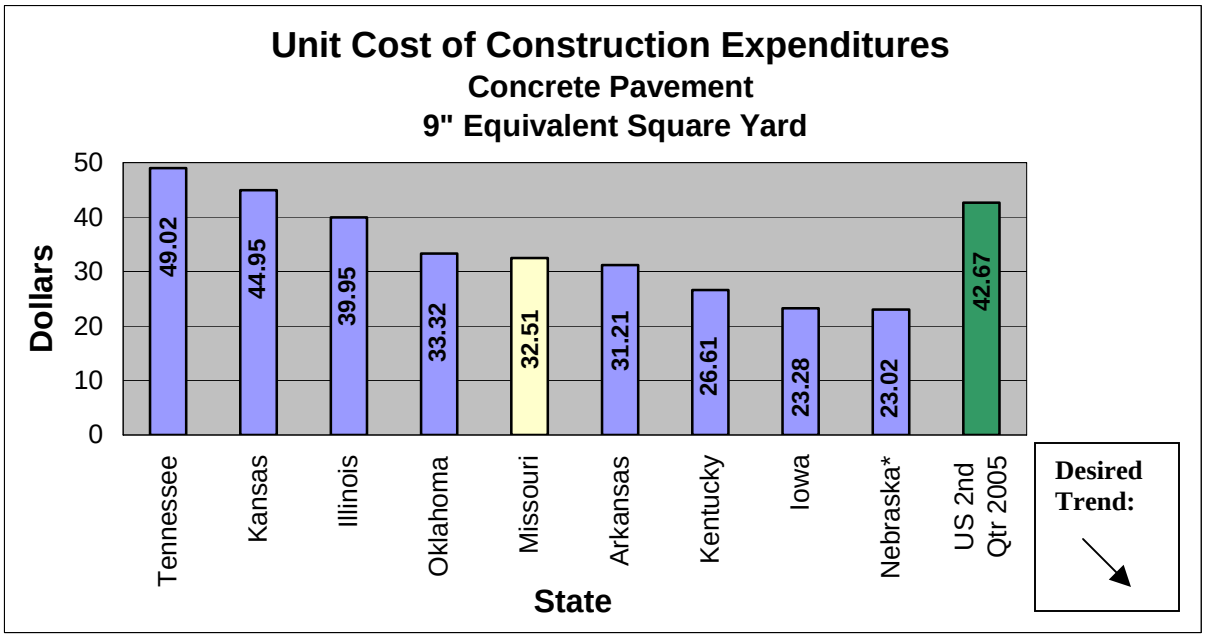
Unit cost of construction expenditures

Result Driver: Dave Nichols, Director of Program Delivery
Measurement Driver: Travis Koestner, Contract Services Engineer

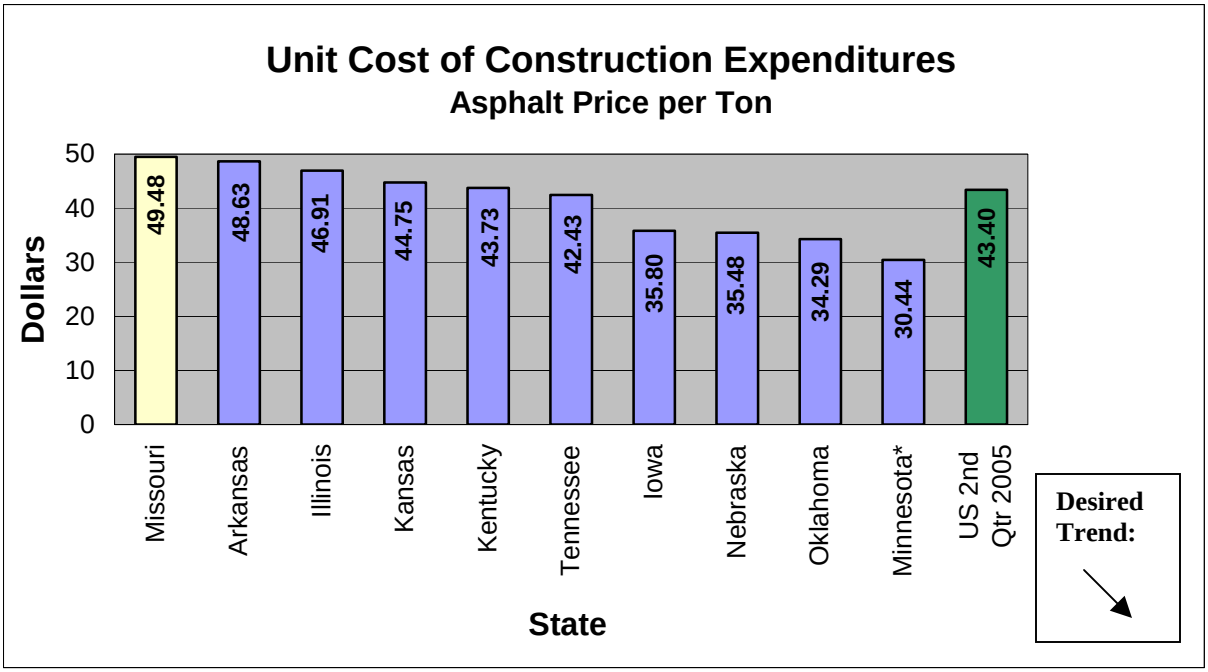
Purpose of the Measure:
This measure tracks how MoDOT projects provide great value by comparing the cost of major items of work for MoDOT projects to other state DOTs.

Measurement and Data Collection:
Value in this measure has simply been related back to dollars per unit of measure. Completed in January 2006, the raw data, provided by an outside vendor, was categorized by MoDOT staff. This information will be updated again in January 2007.

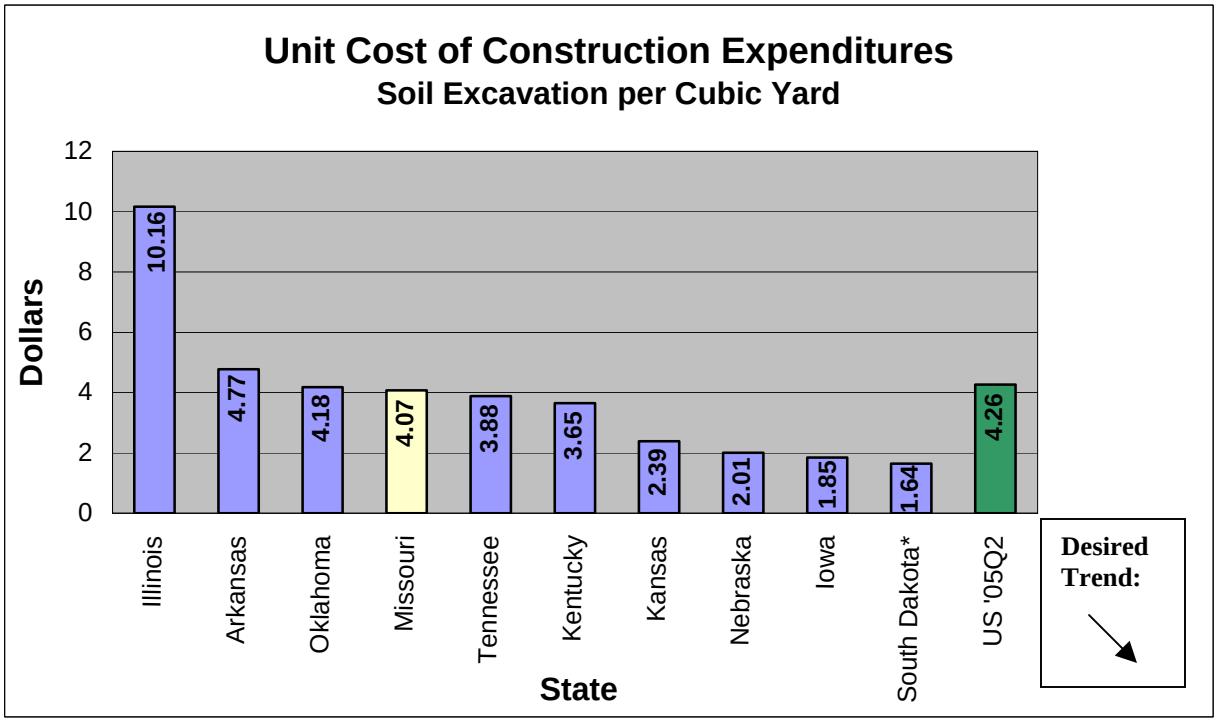
Improvement Status:
MoDOT customers should be able to gain an understanding of what it costs for a DOT to install an item of work. While value should not be defined as MoDOT prices per unit being the lowest as compared to other DOTs, prices can be compared keeping in mind that labor rates, material availability and general project conditions such as urban vs. rural will vary from state to state. MoDOT can use this information to gain an understanding of how prices in Missouri relate to surrounding states and eventually the rest of the country. MoDOT and surrounding states are seeing somewhat of a stabilization in prices due to the slowing of the petroleum market. It could be expected that prices would decline somewhat due to lower petroleum prices, but MoDOT has not experienced any decrease in prices thus far in fiscal year 2007. Prices, though, are no longer steadily increasing as was the case the last two years. MoDOT has realized good competition in the first quarter of FY07, averaging more than five bidders per proposal on major projects. This should result in prices closely reflecting market value.



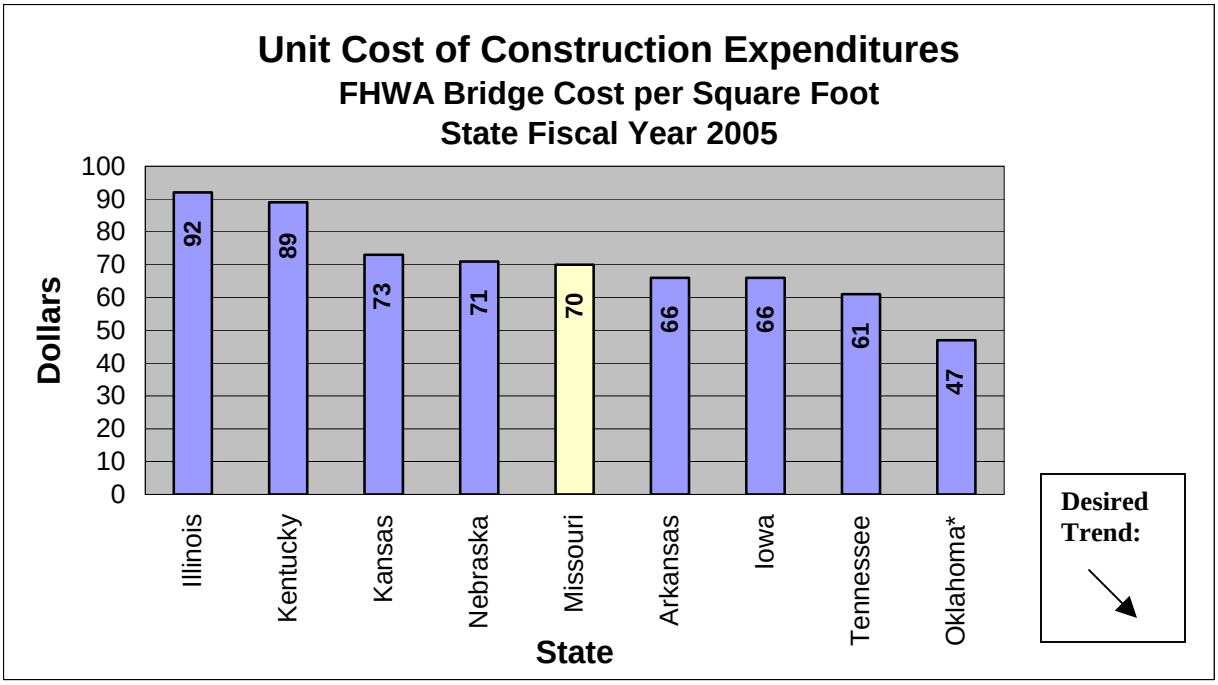
*Lowest in US
Source Data for states other than Missouri from Oman Systems Bid Tabs Professional latest data available as of Jan. 1, 2006. Items included concrete pavement items paid for by the square yard converted to a 9-inch equivalent. U.S. Data from FHWA "Price Trends for Federal-Aid Highway Construction" Second Quarter 2005. Missouri Data from MoDOT bid history.



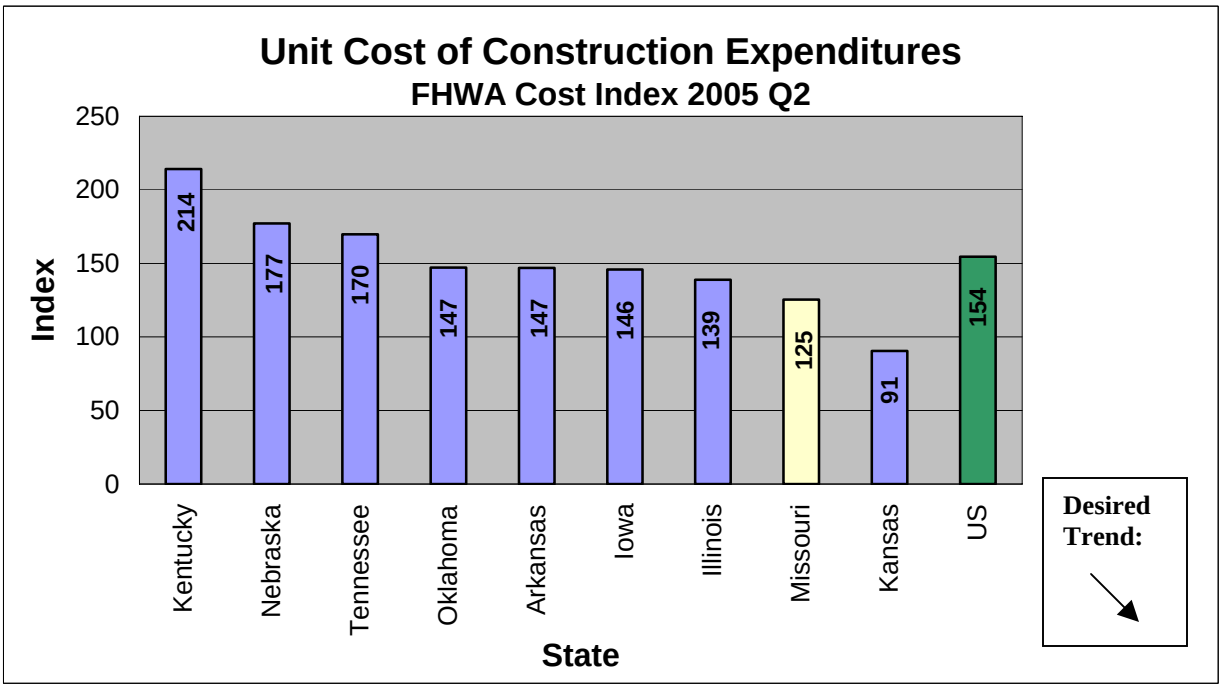
*Lowest in US
Source Data for states other than Missouri from Oman Systems Bid Tabs Professional latest data available as of Jan. 1, 2006. Items included asphalt items paid for by the ton. U.S. Data from FHWA "Price Trends for Federal-Aid Highway Construction" Second Quarter 2005. Missouri Data from MoDOT bid history.



*Lowest in US
Source Data for states other than Missouri from Oman Systems Bid Tabs Professional latest data available as of Jan. 1, 2006. Items include common excavation items paid for by the cubic yard. U.S. Data from FHWA "Price Trends for Federal-Aid Highway Construction" Second Quarter 2005. Missouri Data from MoDOT bid history.



*Lowest in US
Source data from FHWA memo "Bridge Construction Unit Cost" dated Dec. 7, 2005. FHWA does not publish an average U.S. cost per square foot for bridges.



Source: "Price Trends for Federal-Aid Highway Construction" Second Quarter 2005.

Fast Projects that are of Great Value

Annual dollar amount saved by implementing value engineering

Result Driver: Dave Nichols, Director of Program Delivery
Measurement Driver: Kathy Harvey, State Design Engineer

Purpose of the Measure:
This measure tracks the amount of money MoDOT saves by implementing value engineering proposals.

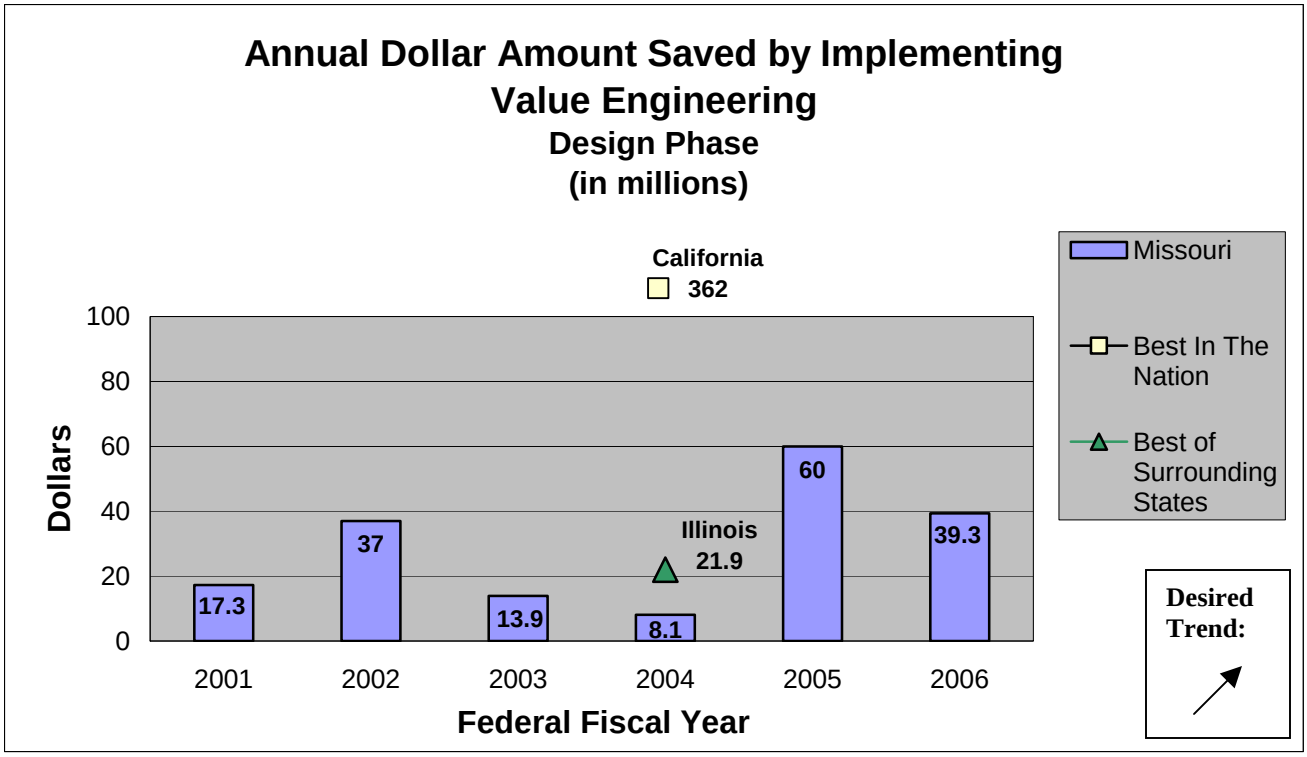
Measurement and Data Collection:
Value engineering (VE) has saved MoDOT over $270 million since 1988. VE achieves savings at the design phase and at the construction phase of a project. VE utilizes a team approach to refine the purpose and need and then develop innovative and creative ideas, which result in project savings while optimizing project performance. The VE team is usually independent from the project core team and includes participants from various disciplines both from within and outside of MoDOT.

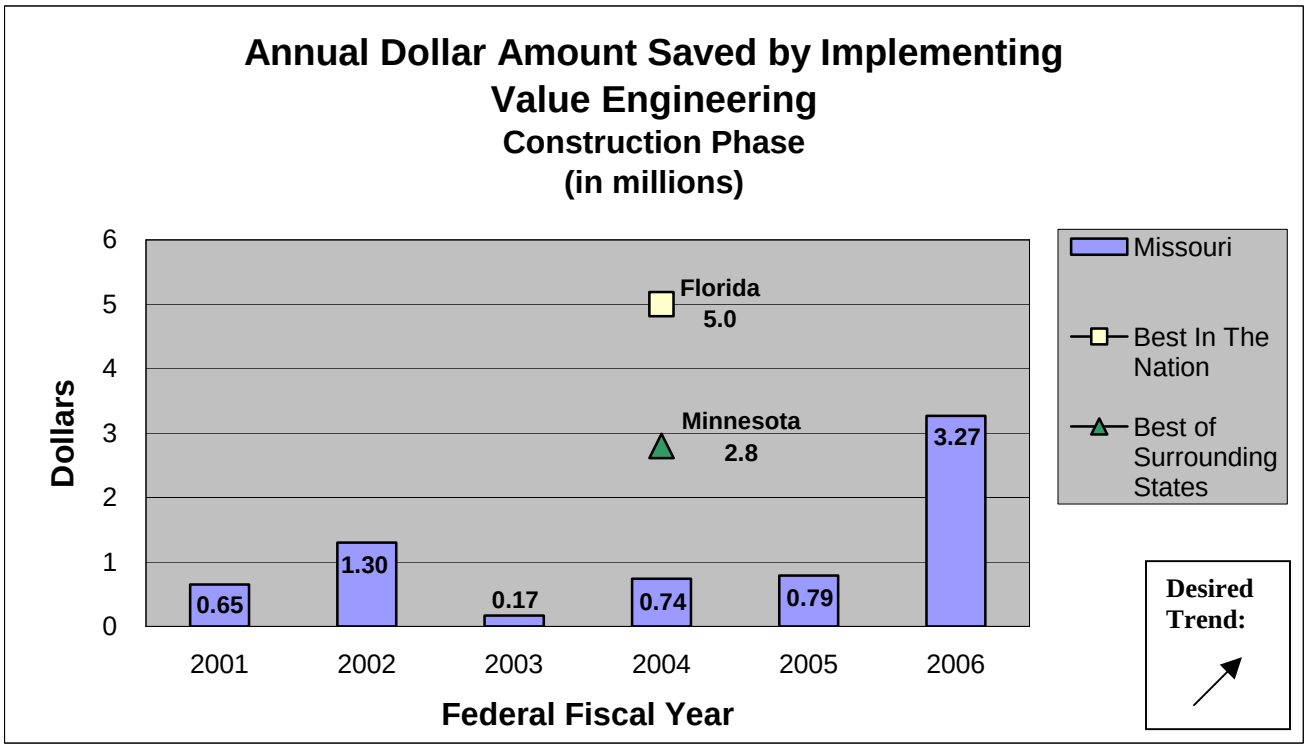
Direct comparison to other states is challenging because of differences in construction program size and project development processes state by state.

Improvement Status:
A recent emphasis on "Concept Stage" VE studies has proven to be successful at defining project scope and identifying basic functions of what the project must achieve. The focus has been to look at many concepts early in the project development process so that when a preferred concept is selected the design may continue with fewer challenges. By covering all the options early in the process, the design team gets answers sooner which saves on design time. Including external partners on VE teams will continue to prove valuable at building consent.

On the construction side, the implementation of the Performance Plus pilot program has increased the interest in VE studies by contractors. In addition, there has been a large effort to educate resident engineers on what VE studies are and their importance. Another component has been to encourage better reporting associated with the change order process. In 2006, construction savings from VE studies were $3,270,000; a significant increase from past years.

VE savings are reported annually to the Federal Highway Administration by each state and the results are available for Federal Fiscal Year 2004. For design phase savings, California is the best in the nation showing $362 million implemented. For construction phase savings, Florida is the best in the nation showing $5 million implemented. When compared to states similar to Missouri in program size, Illinois reported $21.85 million saved during design and Minnesota reported $2.8 million saved during construction.


Annual Dollar Amount Saved by Implementing Value Engineering
Design Phase
(in millions)
California
362
Illinois
21.9
Dollars
100
80
60
40
20
0
17.3
37
13.9
8.1
60
39.3
2001
2002
2003
2004
2005
2006
Federal Fiscal Year
Missouri
Best In The Nation
Best of Surrounding States
Desired Trend:


Annual Dollar Amount Saved by Implementing Value Engineering
Construction Phase
(in millions)
Florida
5.0
Minnesota
2.8
Dollars
6
5
4
3
2
1
0
0.65
1.30
0.17
0.74
0.79
3.27
2001
2002
2003
2004
2005
2006
Federal Fiscal Year
Missouri
Best In The Nation
Best of Surrounding States
Desired Trend:

Fast Projects that are of Great Value

Dollar amount saved by implementing practical design

Result Driver: Dave Nichols, Director of Program Delivery
Measurement Driver: Kathy Harvey, State Design Engineer

Purpose of the Measure:
This measure tracks the amount of money MoDOT saves by implementing practical design concepts.

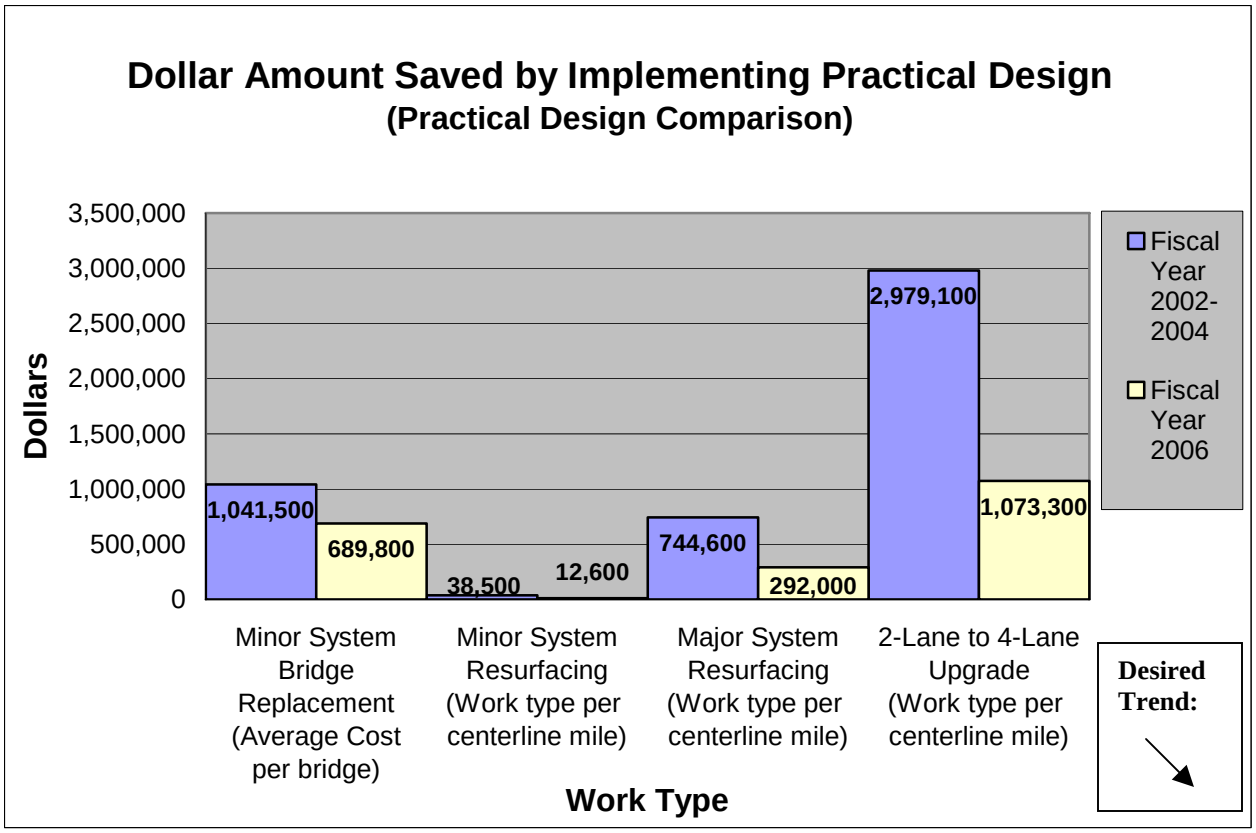
Measurement and Data Collection:
At the project level, significant innovations that result in cost savings can be realized through design modifications. These are variations from traditional standards to fit the individual characteristics and needs of a specific project. In MoDOT's new design environment, "Practical Design" is the umbrella for a more widespread application of this process. Practical design savings were previously reported as an annual lump sum for our 2005-09 STIP. During that initial implementation of practical design, $400 million was saved and put back into the construction program.

Since that initial effort, practical design has been incorporated into all projects from the conceptual stages; it has become our way of doing business. As such, it would be impossible to continue to report on total program savings. Therefore, this measure has changed and is focusing on average savings by type of work.

Projects were selected in four categories: Minor System Bridge Replacement, Minor System Resurfacing, Major System Resurfacing and Two-lane to Four-lane Upgrade. A comparison was made between project costs during fiscal year 2006 (post practical design) and projects awarded during fiscal years 2002-2004 (pre practical design) in each of the categories with costs inflated to 2006 as appropriate.

Improvement Status:
Practical design savings incorporated include:

- Minor System Bridge Replacement – Incentives such as closing a road for bridge replacement in the same location instead of bridge relocation; using a narrower width that matches the approach roadway width.
- Minor System Resurfacing – Using alternative methods such as chip seal or scrub seal instead of 1" Surface Level Course or 1 ¼" Bituminous Pavement.
- Major System Resurfacing – Reducing overlay thicknesses from 5 ¾" to 3 ¾"; using less cold mill before overlay; reducing shoulder thickness and width; using mill and fill instead of unbonded concrete overlay.
- Two-lane to Four-lane Upgrade: Cutting slopes and using existing right-of-way; using alternative methods of erosion control such as rock blanket instead of concrete slope protection.


Dollar Amount Saved by Implementing Practical Design
(Practical Design Comparison)
Dollars
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1,041,500
689,800
38,500
12,600
744,600
292,000
2,979,100
1,073,300
Minor System Bridge Replacement (Average Cost per bridge)
Minor System Resurfacing (Work type per centerline mile)
Major System Resurfacing (Work type per centerline mile)
2-Lane to 4-Lane Upgrade (Work type per centerline mile)
Work Type
Fiscal Year 2002-2004
Fiscal Year 2006
Desired Trend:

Fast Projects That Are Of Great Value

Percent of customers who feel completed projects are the right transportation solutions

Result Driver: Dave Nichols, Director of Program Delivery
Measurement Driver: Kathy Harvey, State Design Engineer

Purpose of the Measure:
This measure provides information regarding the public's perception of MoDOT's performance in providing the right transportation solutions.

Measurement and Data Collection:
MoDOT districts have identified 30 projects – three per district – in three different categories (large – major route listed as or funded through major project dollars; medium – district-wide importance; and small – only local significance). These projects have been completed within the past year and are now open to traffic. Surveys have been directed to the users of each specific facility, and administered by MTI in collaboration with the Truman School of Public Affairs at the University of Missouri. This measure will be reported annually. Districts will continue to identify one project in each of the three categories to be surveyed, although it is recognized that in the future it might not be possible for every district to have three projects that meet the criteria each year.

Preliminary results will be available in mid-December to enable reporting in the January 2007 Tracker.

Improvement Status:

Measure is Under Development