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.

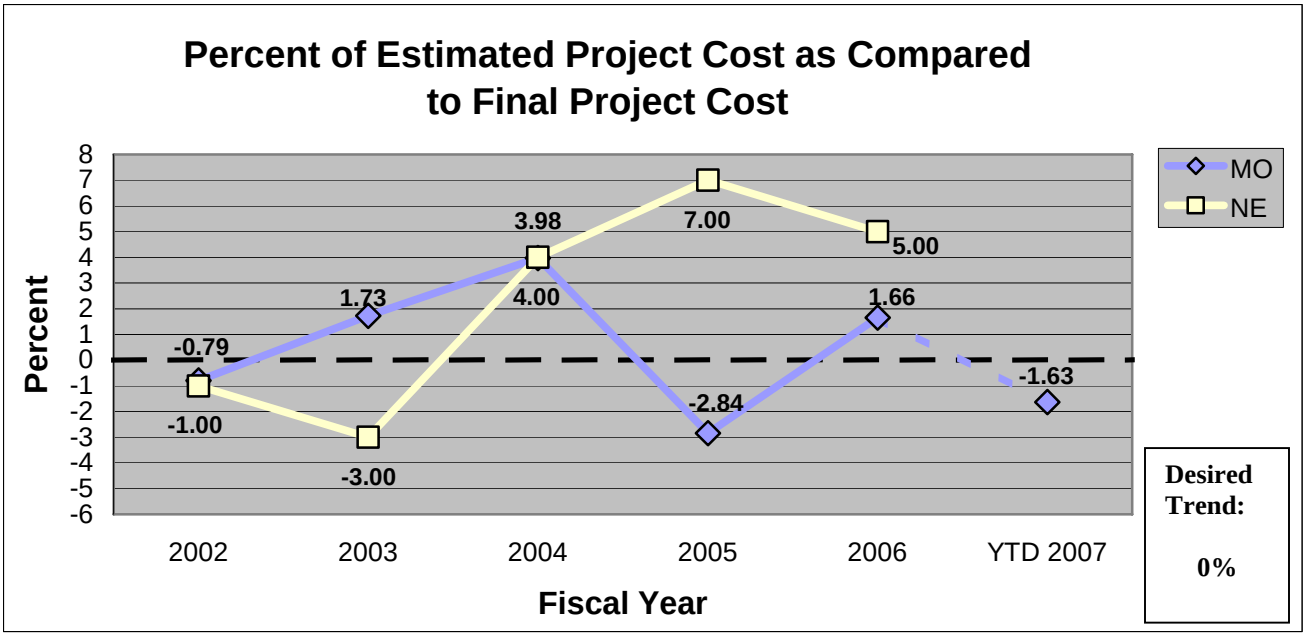
Project costs include design, right of way purchases, utilities, construction, inspection and other miscellaneous costs. The estimated cost is based on the amount included in the most recently approved Statewide Transportation Improvement Program. Completed costs include actual expenditures. The costs 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.

This is an annual measure and the data is updated each quarter. In November of each year this data is provided to the Legislature through the Report to the Joint Committee on Transportation Oversight.

Improvement Status:
The increased cost trend through fiscal year 2004 reflects the increased number of projects in fiscal years 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.

While a number of states track construction costs, very few provide data for total project costs. Fewer still compare estimated total project costs to final total project cost. The graph below shows how MoDOT performance compares with neighboring Nebraska*. In 2002 and 2004, the performance of both states was nearly the same. In other years, it varied substantially.

To date a total of 194 jobs have been completed at a cost of $541 million. This represents a deviation of –1.63 percent or $9 million less than the estimated cost of $550 million. District construction budgets are adjusted based on variations from estimated costs. Therefore, districts have an incentive to develop accurate estimates and complete the projects within estimate.



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

*Data from Nebraska Department of Roads one-year schedule of highway improvement projects.

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.

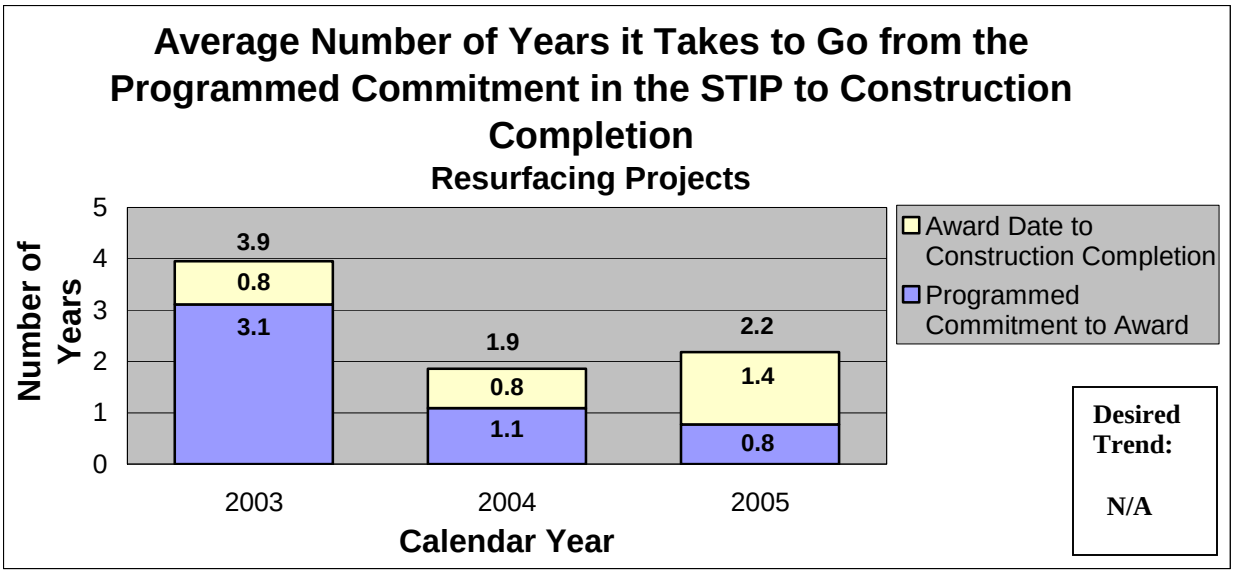
Measurement and Data Collection:
MoDOT compares how long it takes from when the project is added to the Statewide Transportation Improvement Program to when the project is completed. Data is categorized by the type of work, and distinguishes between design and construction stages.

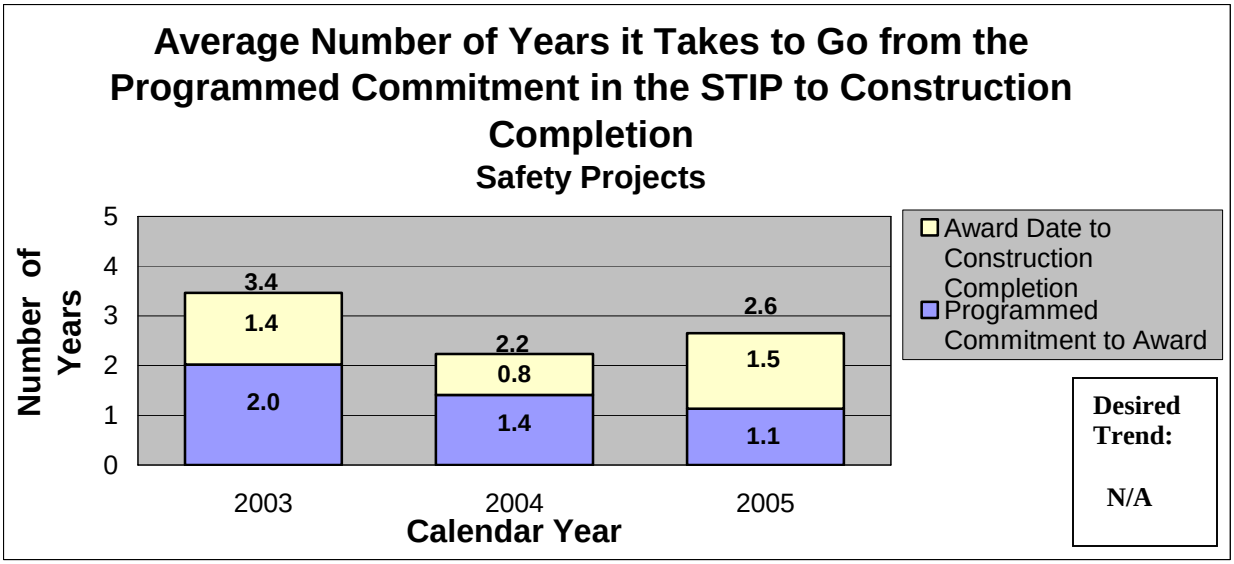
This is an annual measure and data is updated each July.

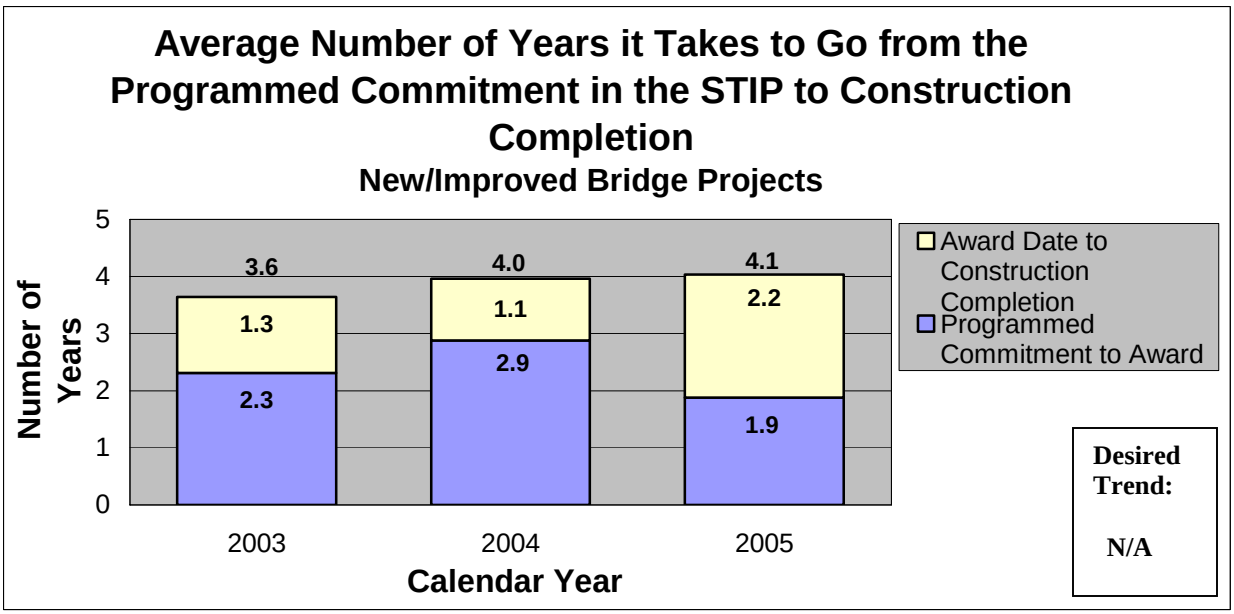
Improvement Status:
In general, resurfacing and safety projects take the least amount of time to develop and complete, around two years. New or improved bridge projects take more time, around four years. New or expanded highways take yet more time, from five to eight years. Major bridge projects take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

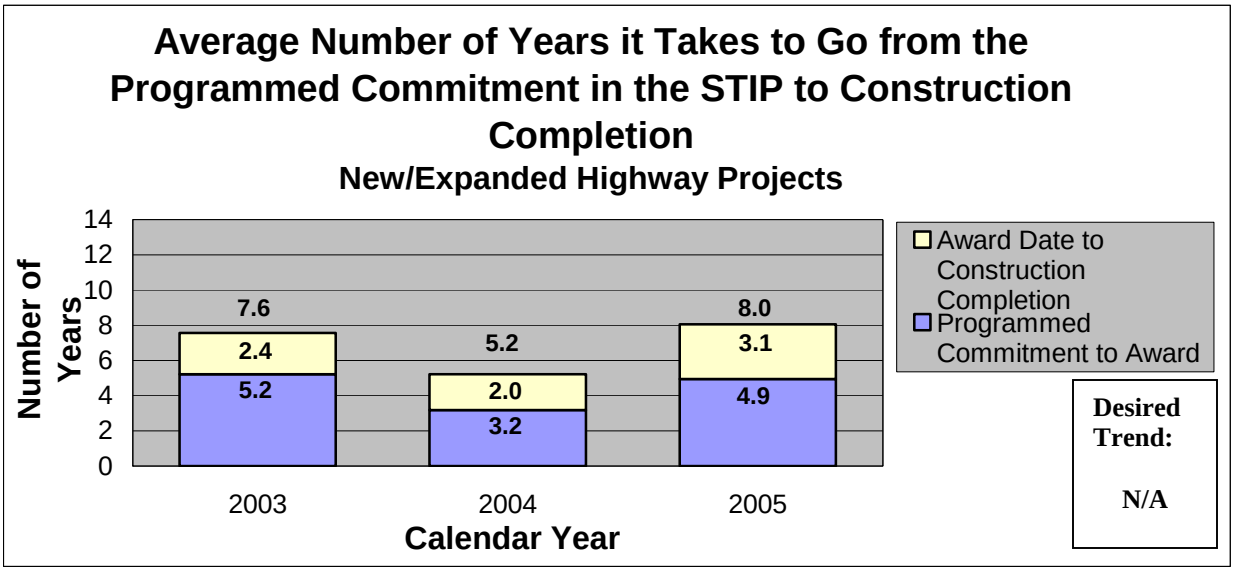
The apparent increase in construction time from 2004 to 2005 is due to different data used to denote project completion. The 2004 data represents completion of the contractor's construction activities. The 2005 data represents project finalization, which includes final payment and contract completion.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

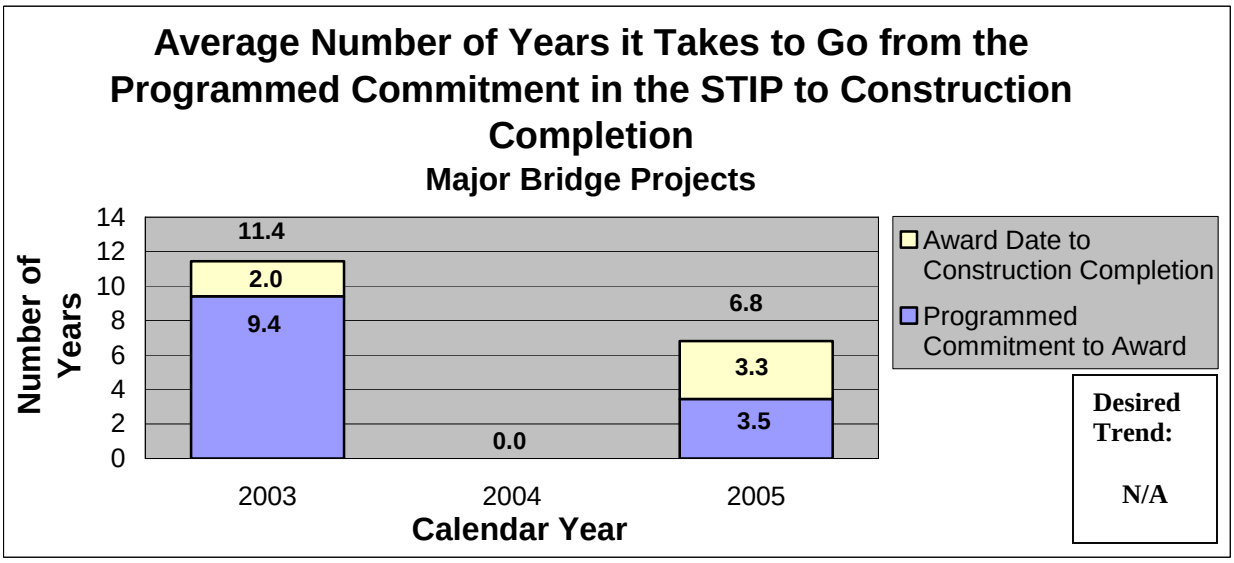
Efforts are being made to minimize the amount of time between construction completion and project finalization. We anticipate that project completion times will be shorter in the future.


Average Number of Years it Takes to Go from the Programmed Commitment in the STIP to Construction Completion
Resurfacing Projects
Number of Years
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 of Years
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 of Years
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 of Years
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 of Years
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 Program Delivery
Measurement Driver: Dave Ahlvers, State Construction & Materials Engineer

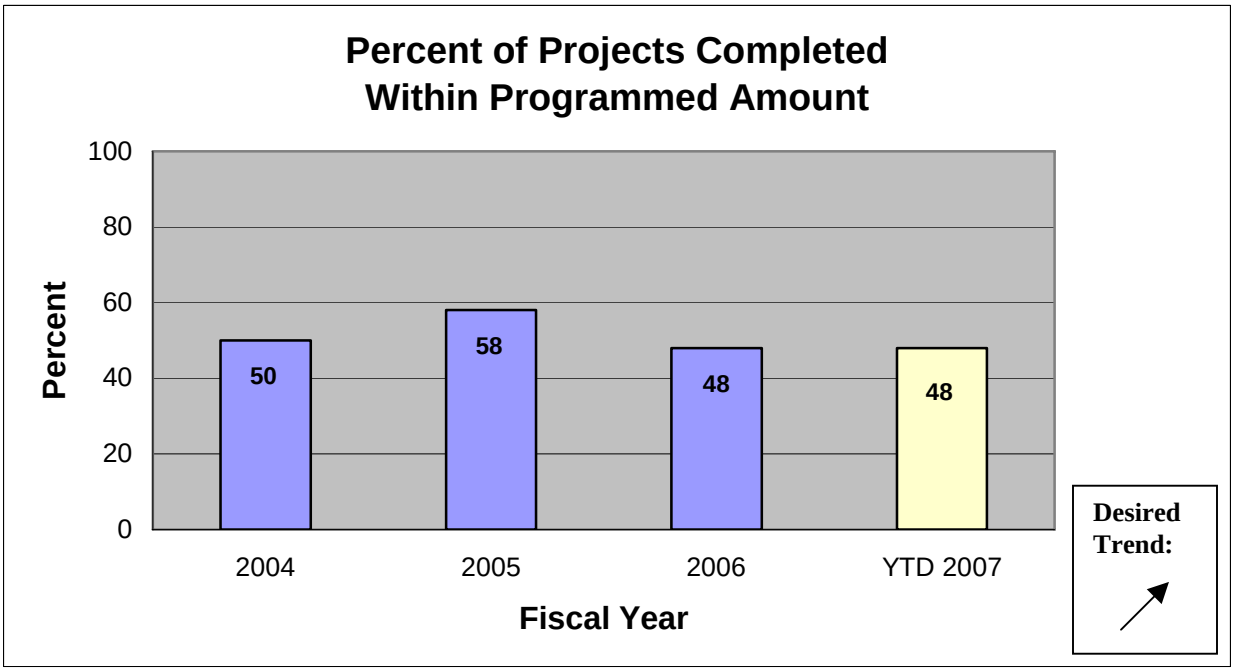
Purpose of the Measure:
The measure tracks the percentage of projects completed within the programmed amount. The cost includes such items as engineering, right-of-way and contract payments. MoDOT would like to see all projects completed at or near the programmed amount. The goal to deliver projects at or near the programmed amount allows the greatest number of projects to be built with the funding available.

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.

This is an annual fiscal year measure with the data updated quarterly and the year information finalized in each July Tracker edition.

Improvement Status:
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 and by encouraging the use of value engineering.



Fast Projects That Are Of Great Value

Percent of projects completed on time

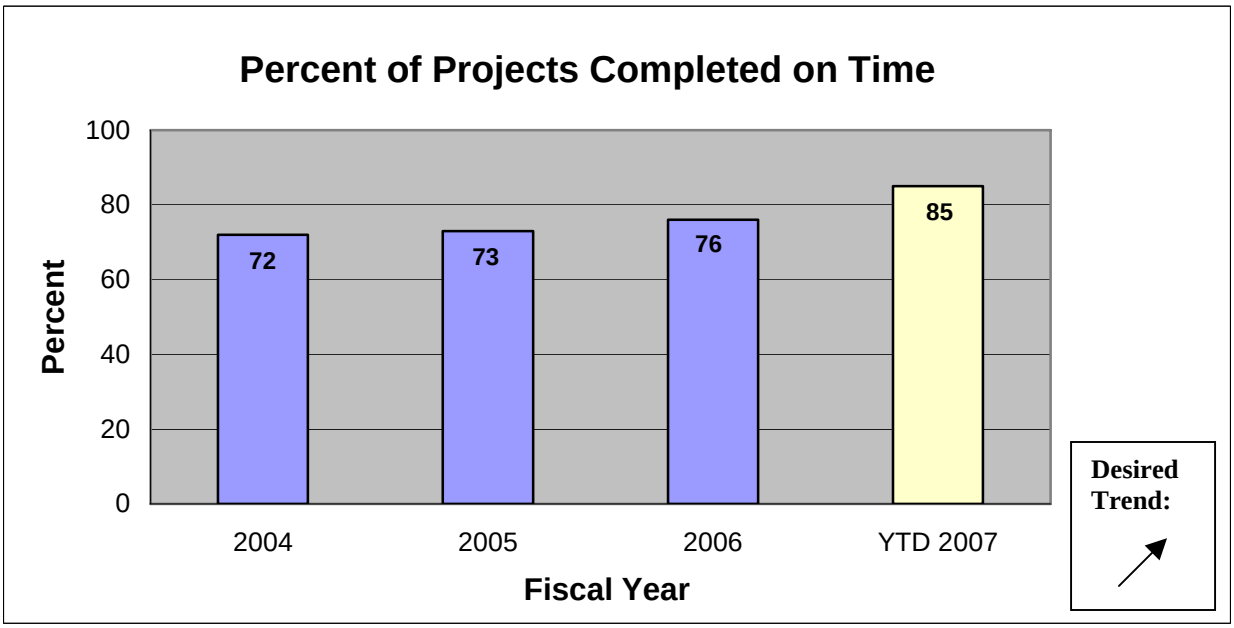
Results Driver: Dave Nichols, Director of Program Delivery
Measurement Driver: Dave Ahlvers, State Construction & Materials Engineer

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 and become 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.

This is an annual fiscal year measure with the data updated quarterly and the year information finalized in each July Tracker edition.

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 has led to improvements in timely completion.



Fast Projects That Are Of Great Value

Percent of change for finalized contracts

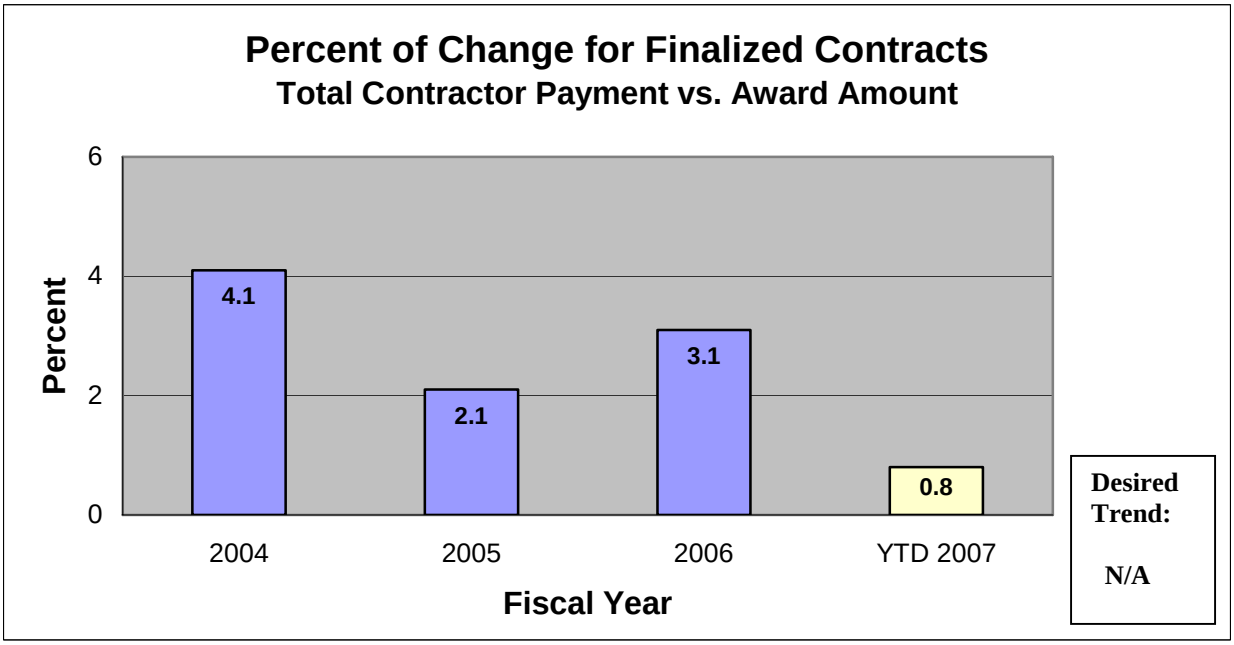
Results Driver: Dave Nichols, Director of Program Delivery
Measurement Driver: Dave Ahlvers, State Construction & Materials Engineer

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.

This is an annual fiscal year measure with the data updated quarterly and the year information finalized in each July Tracker edition.

Improvements Status:
MoDOT's performance for fiscal year 2007 to date is well below the target of 2 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 Program Delivery
Measurement Driver: Dave Ahlvers, State Construction & Materials 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.

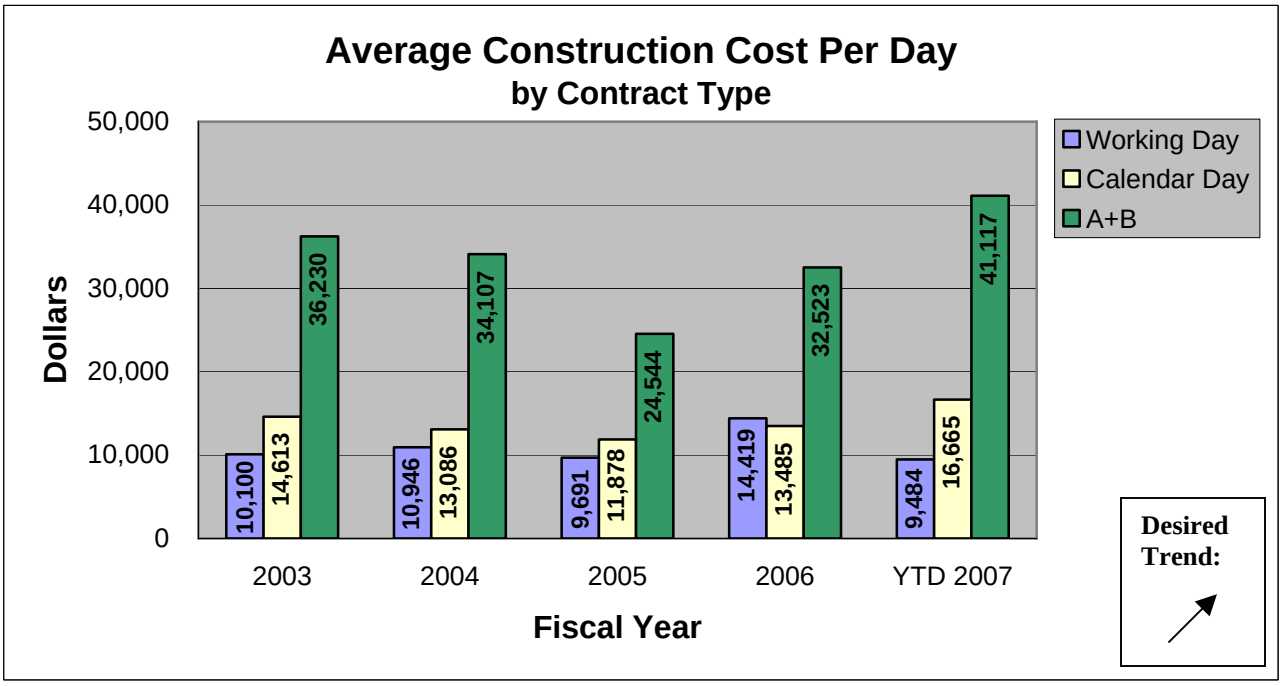
Measurement and Data Collection:
This information is gathered by extracting the actual time used for construction from the summary of working days in the SiteManager database and dividing it by the total costs of the project.

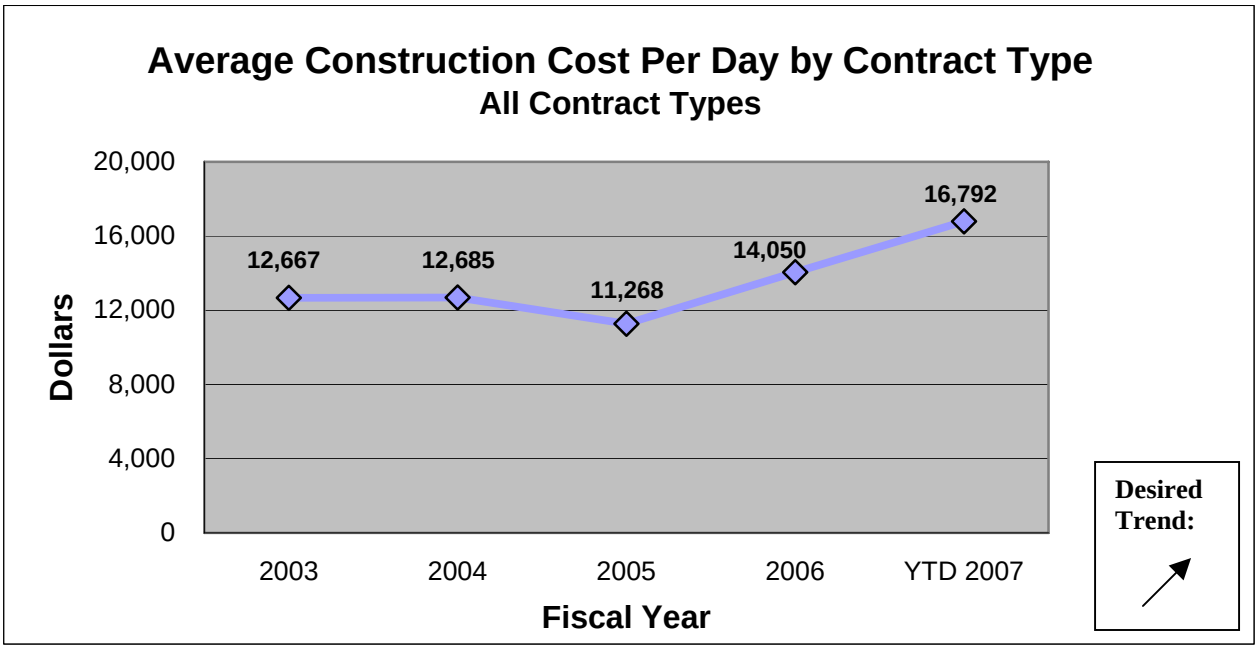
The measurement groups construction contracts into three categories:

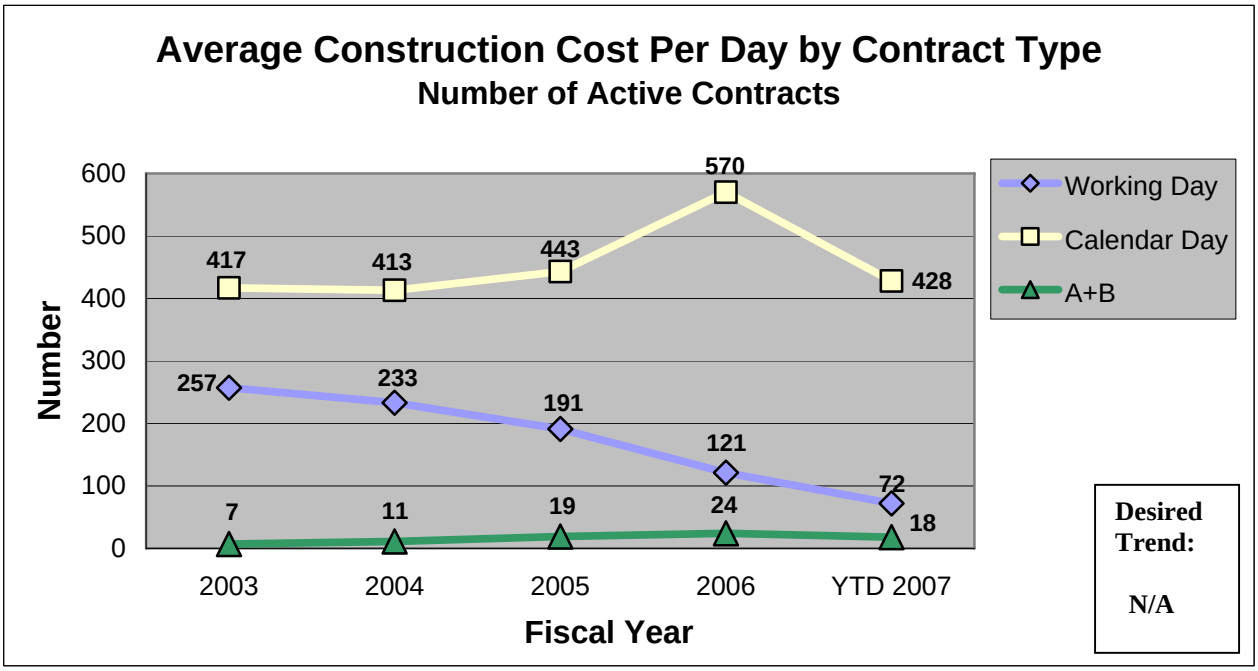
- **WD** working day contracts
- **CD** calendar day contracts and;
- **A + B** or innovative contracts that provide incentive/disincentives to the contractor for early completion.

This is an annual fiscal year measure with the data updated quarterly and the year information finalized in each July Tracker edition.

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.




Average Construction Cost Per Day by Contract Type
All Contract Types
20,000
16,000
12,000
8,000
4,000
0
Dollars
12,667
12,685
11,268
14,050
16,792
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
428
257
233
191
121
72
7
11
19
24
18
2003
2004
2005
2006
YTD 2007
Fiscal Year
Working Day
Calendar Day
A+B
Desired Trend:
N/A

Fast Projects That Are of Great Value

Unit cost of construction expenditures

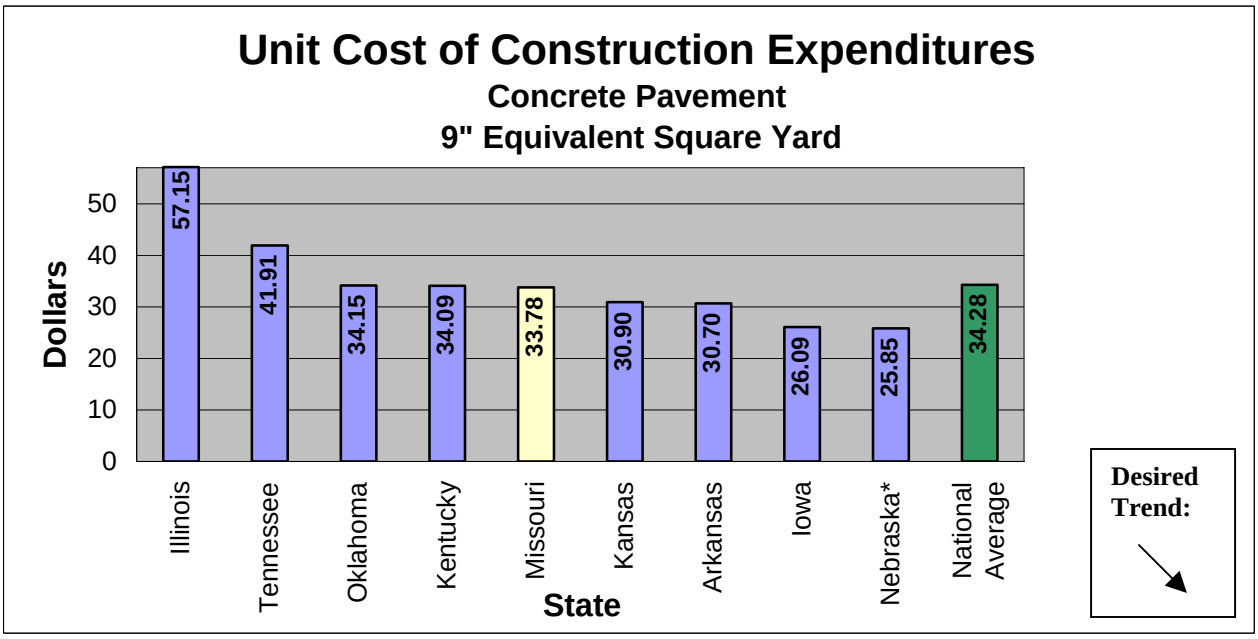
Result Driver: Dave Nichols, Director of Program Delivery
Measurement Driver: Travis Koestner, Bid & Contract Services Engineer

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. 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.

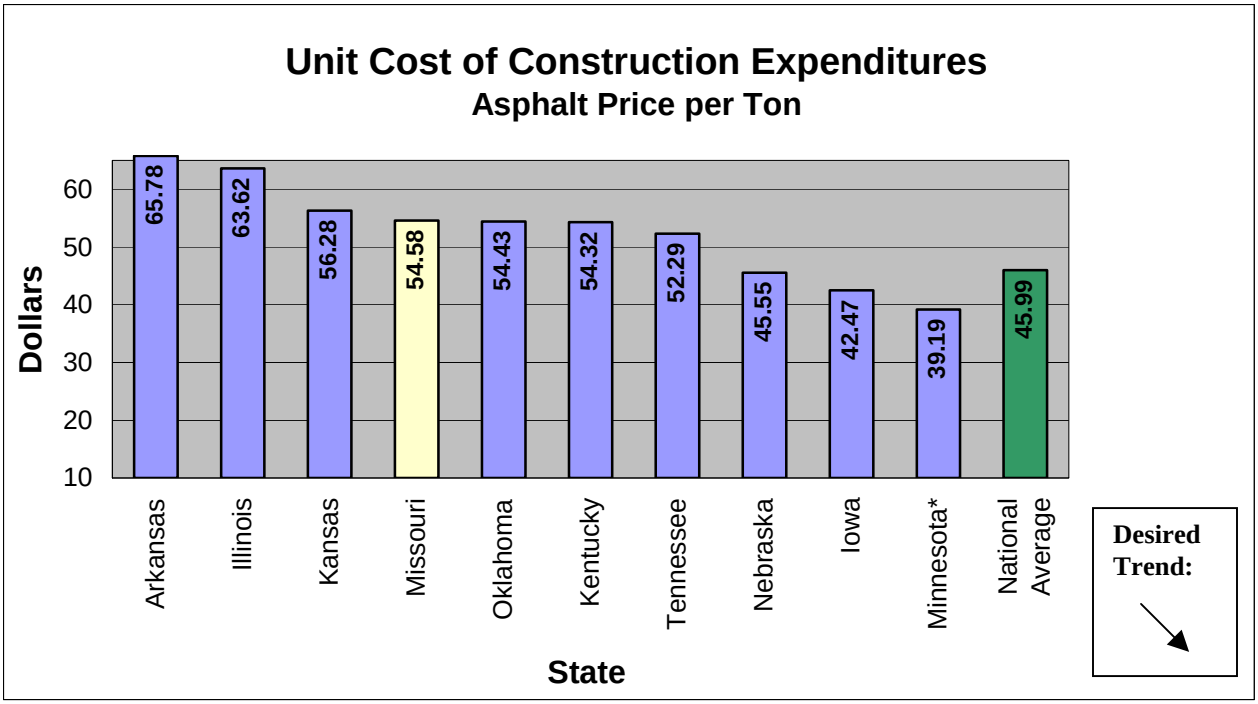
Measurement and Data Collection:
Value in this measure has simply been related back to dollars per unit of measure. MoDOT staff categorizes raw data from an outside vendor for the unit cost from other states. Identifying the "lowest in the country" is from data produced by FHWA as well as the FHWA national average price. Bridge price data is also from FHWA. The most recent data from FHWA is used for Tracker.

This is an annual measure and the data is updated each January. The FHWA comparative data may lag as much as one year.

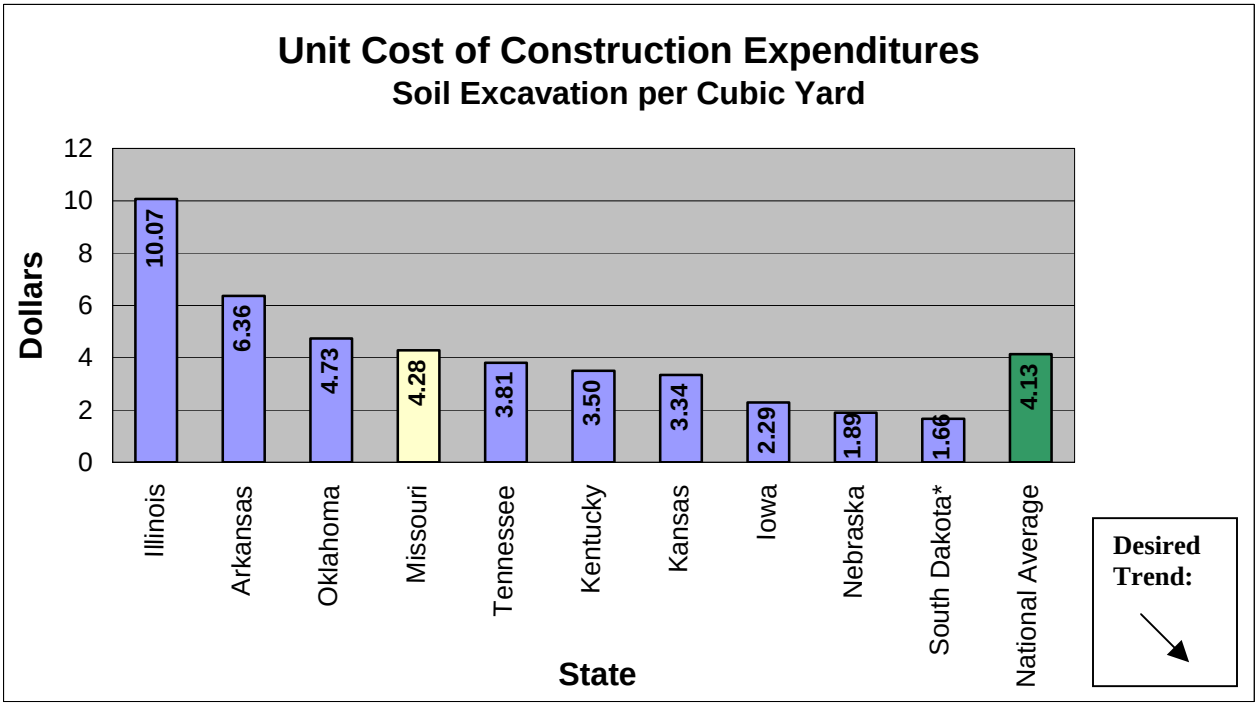
Improvement Status:
MoDOT prices have remained in the same relative position vs. states surrounding Missouri in the areas of concrete pavement and soil excavation while the average asphalt price for 2006 compares more favorably than in 2005. The percentage increase in price for MoDOT for the items of work in all categories is approximately one-half that of the straight average increase of the states compared. This can be attributed to the increase in competition that MoDOT has seen in the past six to eight months. Examples of strategies to keep the level of competition as high as possible include continued use of alternate and optional pavement, working with the districts when scheduling major projects and the implementation of electronic bidding in January 2007.



*Lowest in US

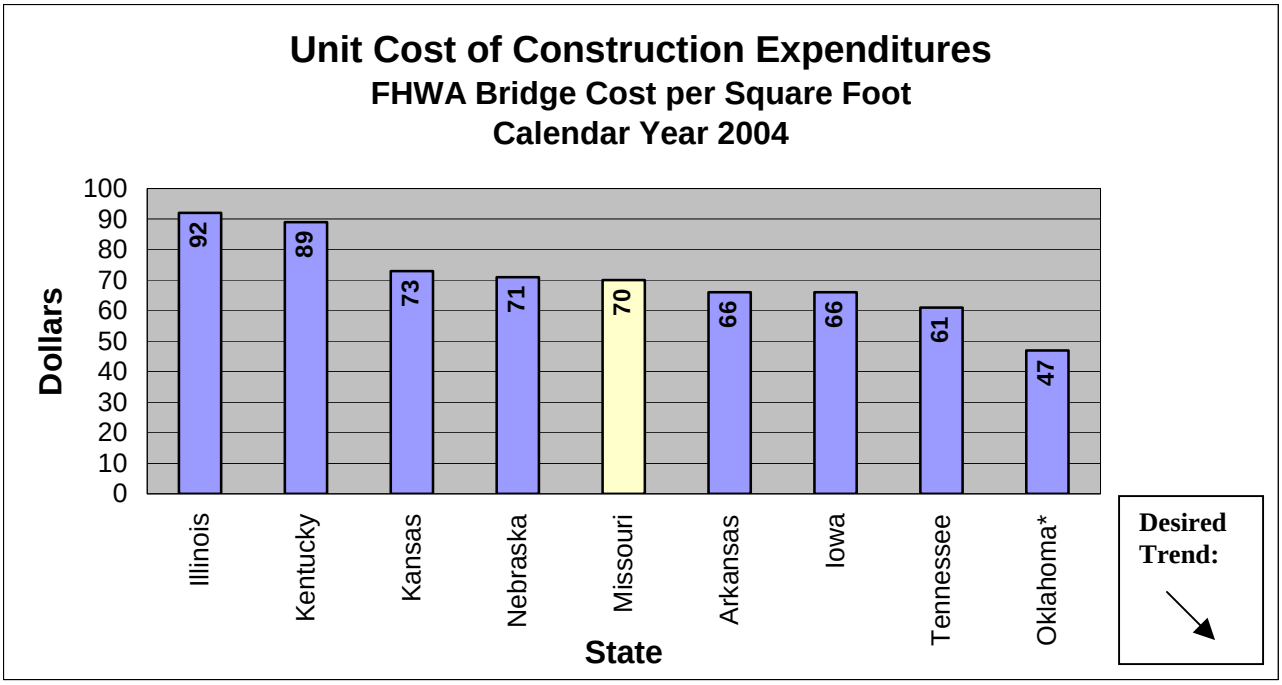


*Lowest in US

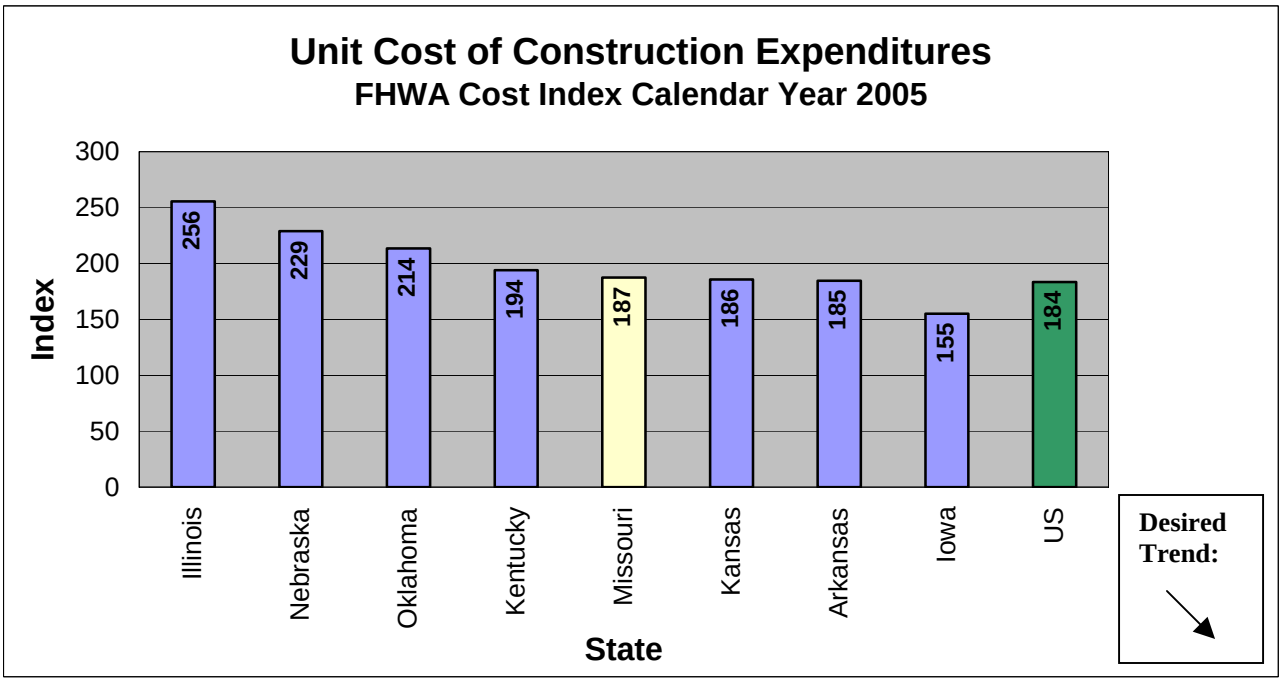


*Lowest in US

Footnote for the charts above:
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. FHWA Data from FHWA "Price Trends for Federal-Aid Highway Construction" First Quarter 2006. 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: FHWA "Price Trends for Federal-Aid Highway Construction" Fourth 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.

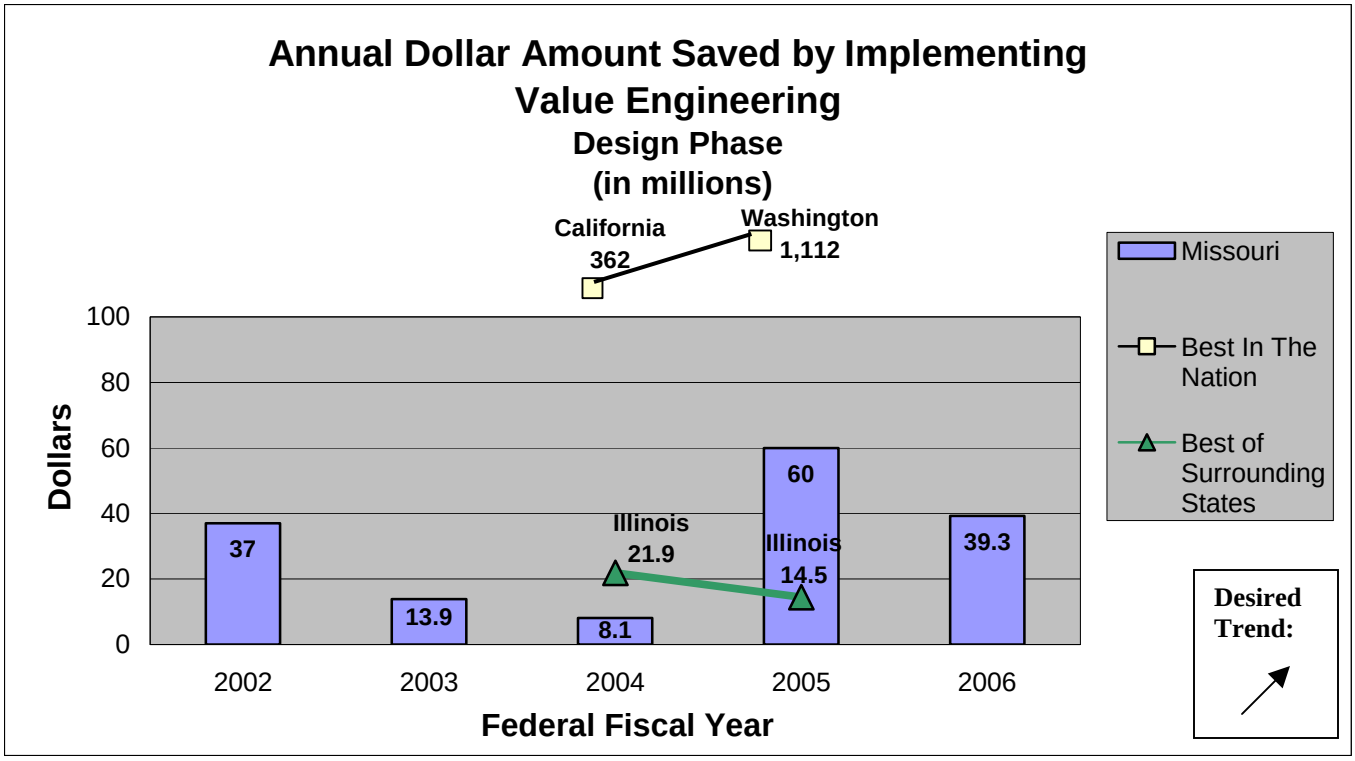
Measurement and Data Collection:
Value engineering (VE) has saved MoDOT over $277 million since 1988. VE achieves savings at the design phase and at the construction phase of a project. VE utilizes a team approach to refine the purpose and need and then develop innovative and creative ideas, which result 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. VE studies are done on projects at all stages of development, from the concept stage to final design and during construction.

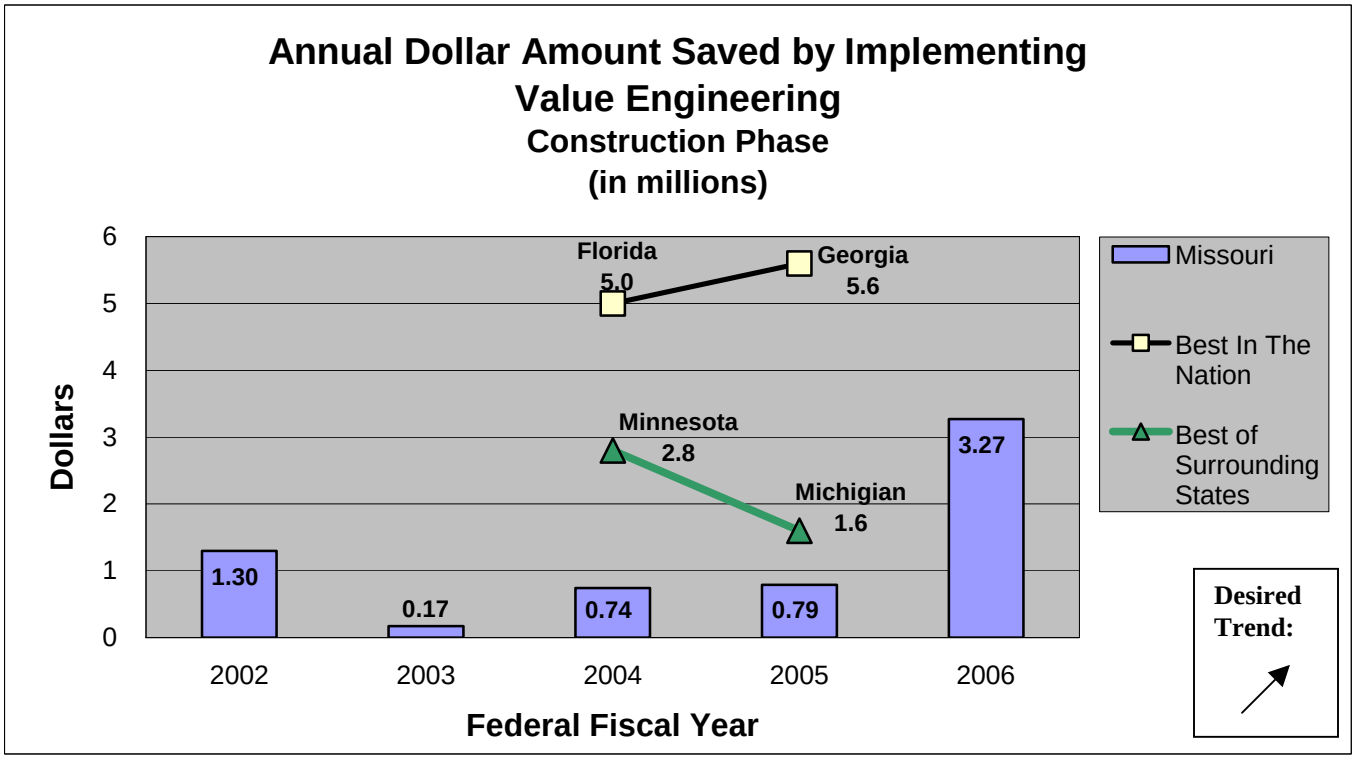
VE savings are reported annually to the Federal Highway Administration by each state and the results are available for Federal Fiscal Year 2005. For design phase savings, Washington is the best in the nation showing $1.112 billion implemented. For construction phase savings, Georgia is the best in the nation showing $5.6 million implemented. When compared to states similar to Missouri in program size, Illinois reported $14.5 million saved during design and Michigan reported $1.6 million saved during construction. Direct comparison to other states is challenging because of differences in construction program size and project development processes.

This is an annual measure using a federal fiscal year, running from November 1 to October 31. New updates are reported in the December Tracker edition.

Improvement Status:
Traditionally, VE studies during the design phase of a project were a five-day formal event that required a tremendous amount of organization and facilitation. As a result, VE studies were only done on the significant few projects where large savings could be realized. In an effort to increase the number of VE studies being done and thus increase the potential for cost savings, the format of the study has been revised to be more flexible. VE studies now match the size and needs of the project, ranging from four hours to five days. Any trained staff can conduct studies, but the documentation goes through the VE administrator. This change has already increased the number of VE studies being done during the design phase of the project (25 in 2006 vs. eight in 2005), and almost $40 million was saved in 2006. That was down from 2005, when practical design began influencing VE studies; it was significantly higher than 2003 and 2004.

On the construction side, the implementation of the Performance Plus pilot program has increased the interest in VE studies by contractors and MoDOT staff. In addition, there has been a large effort to educate resident engineers on what VE studies are and their importance. Better reporting associated with the change order process has been encouraged. In 2006, construction savings from VE studies were $3.27 million; more than the last four years combined.


Annual Dollar Amount Saved by Implementing Value Engineering
Design Phase
(in millions)
California
362
Washington
1,112
Illinois
21.9
Illinois
14.5
37
13.9
8.1
60
39.3
Dollars
100
80
60
40
20
0
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
Georgia
5.6
Minnesota
2.8
Michigian
1.6
1.30
0.17
0.74
0.79
3.27
Dollars
6
5
4
3
2
1
0
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 and 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.

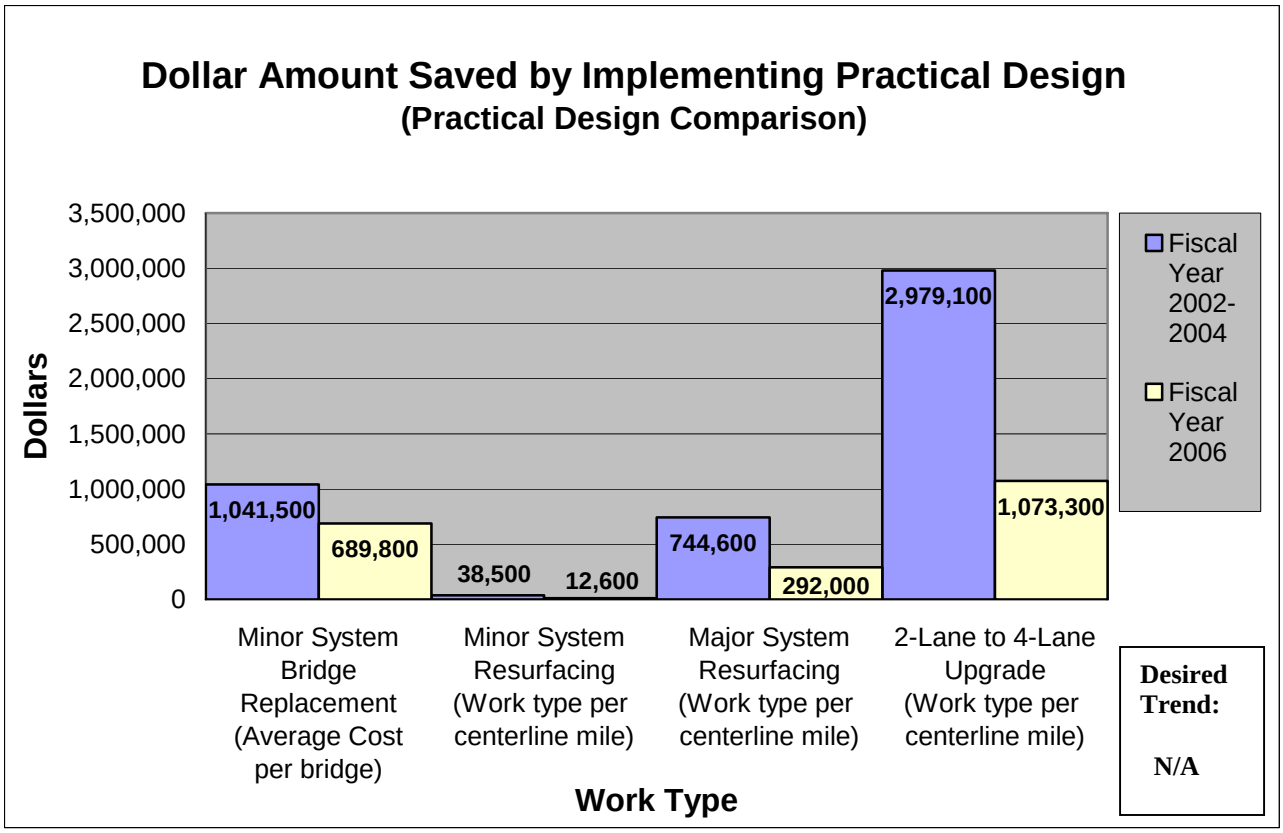
Projects were selected in four categories: Minor System Bridge Replacement, Minor System Resurfacing, Major System Resurfacing and Two-lane to Four-lane Upgrade. A comparison was made between project costs during fiscal year 2006 (post practical design) and projects awarded during fiscal years 2002-2004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

This is an annual fiscal year measure and the data is updated each July.

Improvement Status:
Percentage of savings varies by the work type with the largest reduction, 64 percent, seen for the two-lane to four-lane upgrade work. The following points summarize the practical design elements that were significant contributors to the savings for each work type:

- 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 1inch surface level course or 1¼ inch bituminous pavement.
- Major System Resurfacing – Reducing overlay thicknesses from 5¾ inches to 3¾ inches; 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.

New this year is a practical design competition. This competition is open to all ten districts, Central Office Bridge and all consultants. Entries are due in February and the results will be announced at the TEAM meeting in March. This competition is one way to share best practices and great ideas with designers all over the state.


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:
N/A

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 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 were completed within the past year and are open to traffic. The Truman School of Public Affairs at the University of Missouri, in collaboration with MoDOT, developed a survey that was directed to the users of each specific facility. A sample of residents was drawn from zip code areas adjoining the roadway where the project was recently completed. The sample included 400 addresses per project area for a total of 12,000 surveys sent. Nearly 2,900 surveys were returned.

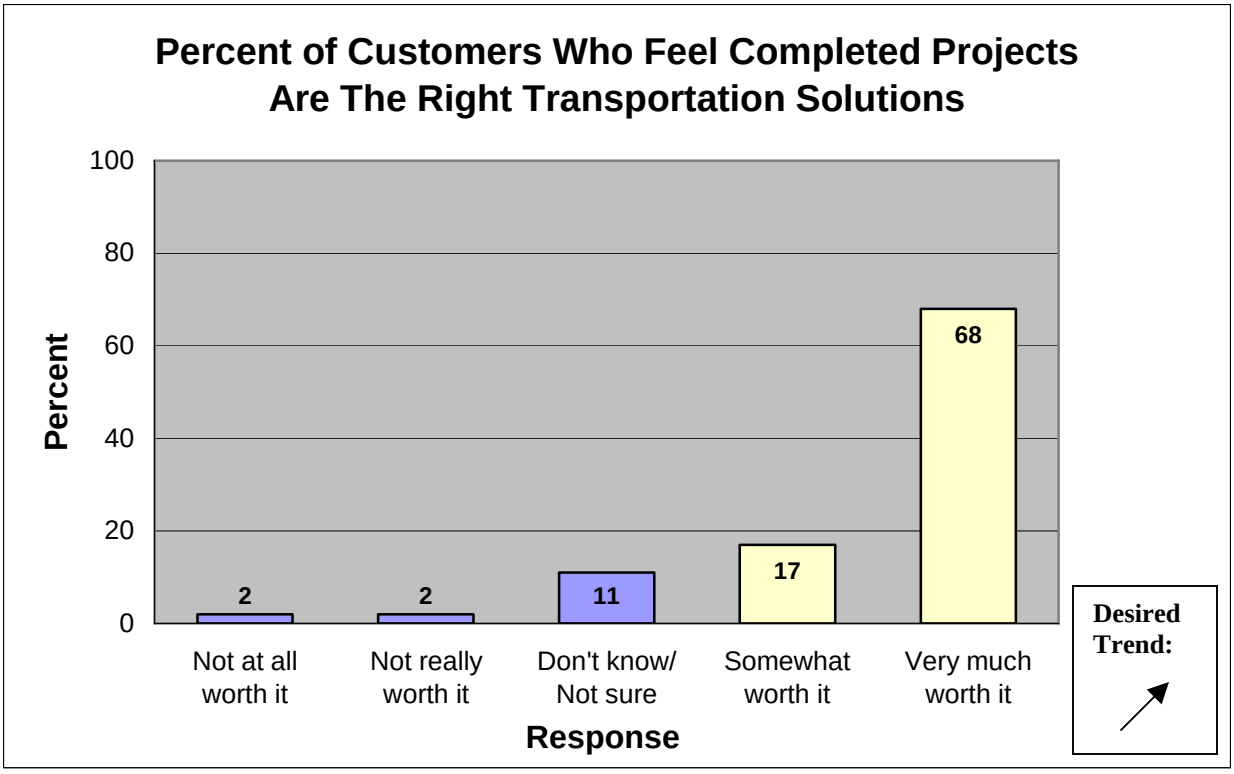
This measure will be reported annually. Districts will continue to identify one project in each of the three categories to be surveyed, although it is recognized that in the future it might not be possible for every district to have three projects that meet the criteria each year.

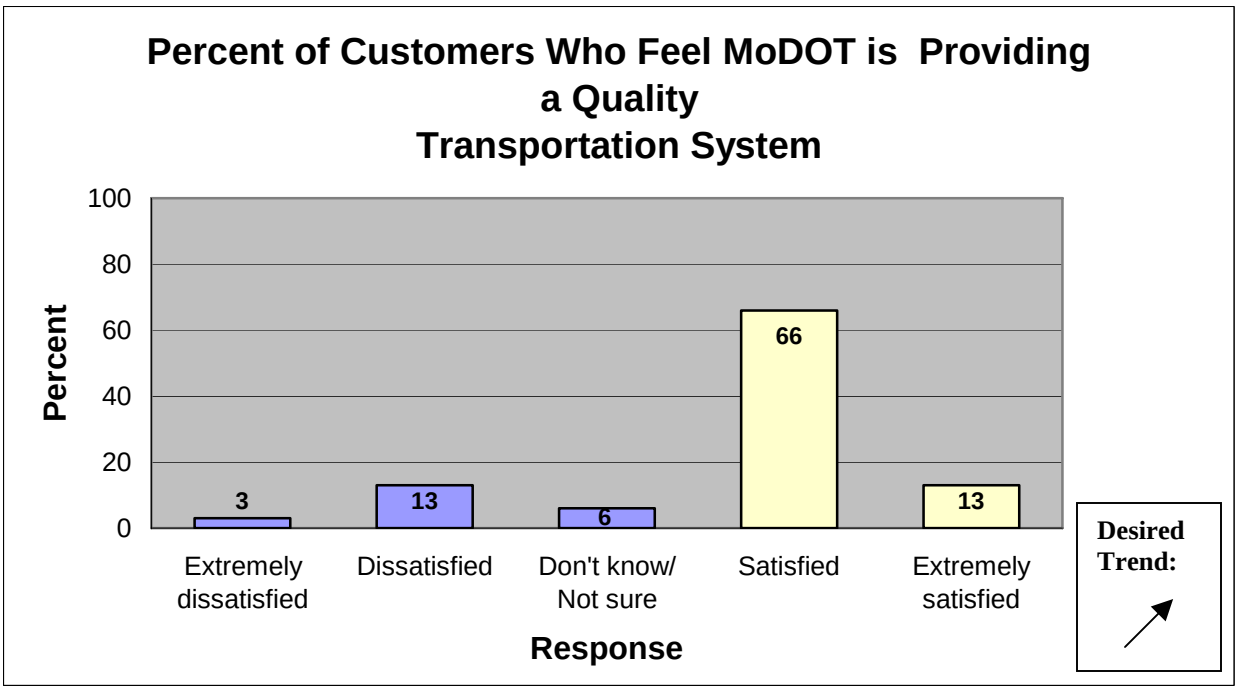
Improvement Status:
A battery of project-specific questions were asked of MoDOT customers and each showed a high level of satisfaction with important goals such as safety, convenience, less congestion, handles traffic efficiently, easy to navigate, easy to understand, and well marked. The lowest percent on the favorable side of any question was less congestion, and yet about 70 percent either agreed or strongly agreed that the road now has less congestion.

However, an important component of the tangible result in the Tracker system is the concept of "great value." Clearly, customers may enjoy the fine features of an expensive luxury vehicle, but not consider it a great value. Likewise, it is important to assess whether the Missourians, who appear to see many great features of the projects, also see them as the right transportation solution. Therefore, the questionnaire asked the respondent whether it was the right transportation solution, and it offered a set of responses from "not at all worth it" to "very much worth it."

The overall perception of the projects in this survey is extremely positive. More than two-thirds of Missourians said the local project was "very much worth it," and an additional 17 percent said it was "somewhat worth it." The two positive responses combined for a value of about 85 percent of respondents who felt that the project in their area was the right transportation solution. About 11 percent were not sure, but less than five percent felt that the project was "not really worth it" or "not at all worth it."

Overall, 79 percent of the respondents said they were satisfied with the quality of the system, but only 13 percent said they were extremely satisfied. This was virtually the reverse of the opinions expressed about their local projects, although the overall percentage was about the same. This strongly supports the long-held notion that people are most interested in the projects that benefit them directly.





Note: Numbers in the charts are rounded to the nearest whole percent.