Smooth and Unrestricted Roads and Bridges

Tangible Result Driver – Kevin Keith, Chief Engineer

MoDOT's customers have said they want smooth roads. Smoother roads mean less wear on vehicles, safer travel and greater opportunity for economic development. MoDOT will delight its customers by providing smooth and unrestricted roads and bridges. MoDOT recognizes that road projects built and maintained to a high standard of smoothness will be more efficient. MoDOT must provide customers with smooth roads – because everyone riding on a road can feel whether it is smooth or not!

Smooth and Unrestricted Roads and Bridges

Projects that contribute to the Better Roads, Brighter Future program goal

Result Driver: Kevin Keith, Chief Engineer
Measurement Driver: Jay Bledsoe, Transportation System Analysis Engineer

Purpose of the Measure:
This measure tracks annually the miles of major highways in good condition compared to that required to reach the goal of 85 percent in good condition by the end of 2011 and the miles programmed in the STIP that contribute to this goal. In addition to the pavement goals, MoDOT has made improvements to the overall safety and appearance of these routes a priority. Therefore, in addition to pavement condition, this measure tracks miles of major highways that have a minimum 4-foot paved shoulder, an edge-line rumble stripe and a centerline rumble stripe where appropriate.

The Better Roads, Brighter Future (BRBF) program follows the 2005 completion of the Smooth Roads Initiative (SRI). BRBF will result in 85 percent of these major highways in good condition by the end of 2011.

Measurement and Data Collection:
The major highway system is defined as all routes functionally classified as principal arterials. By definition, the principal arterial system provides for statewide or interstate movement of traffic. Examples include the Interstate System and most U.S. routes such as 63, 54 or 36.

In urban areas, principal arterials carry traffic entering or leaving the urban area and serve movement of vehicles between central business districts and suburban residential areas. Examples include Business 50 (Missouri Blvd.) in Jefferson City, MO 740 (Stadium Blvd.) in Columbia and Route D (Page Ave.) in St. Louis.

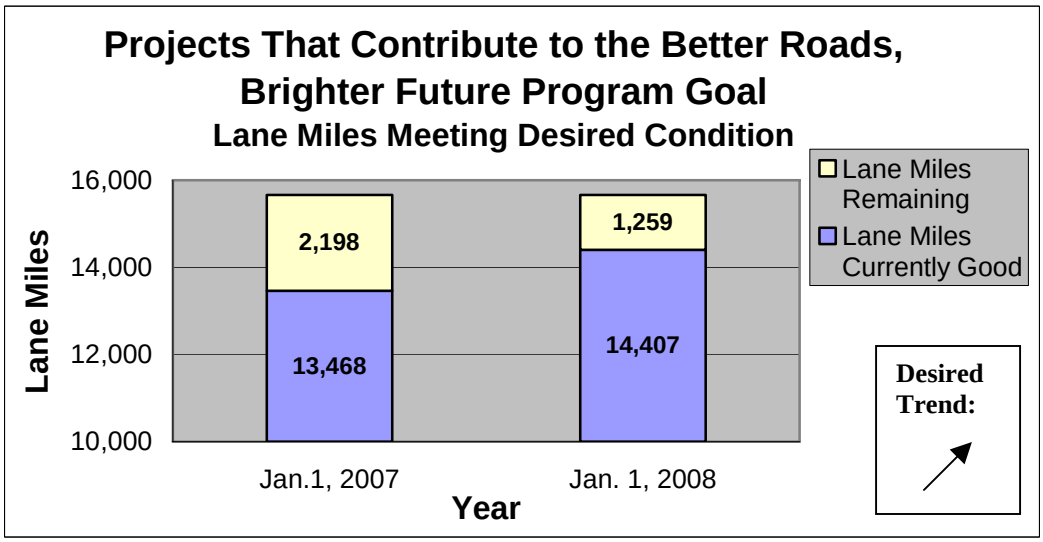
The major roads in Missouri total approximately 5,573 centerline miles. This revised figure reflects additional mileage based on statewide review of the highway system. Good condition is defined using a combination of criteria. On high-speed routes (speed limits greater than 50 mph), the International Roughness Index (IRI) is used. For lower-speed routes (mostly urban areas) where smoothness is less critical, a Present Serviceability Rating (PSR) is used. While smoothness is a factor in PSR, physical condition is also a factor.

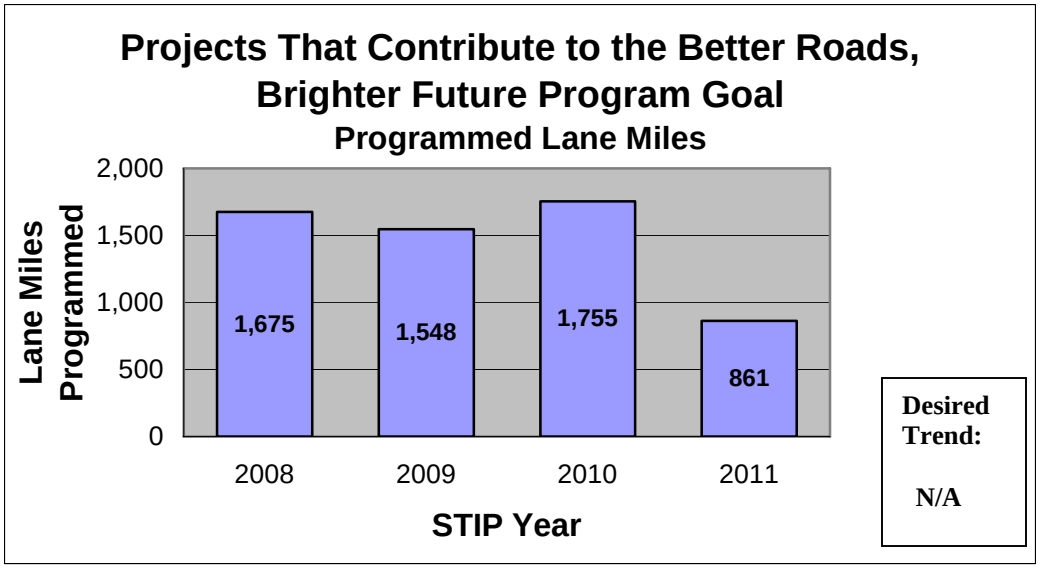
The overall progress and programmed work will be reported annually. Semi-annual updates of miles opened to traffic will be reported.

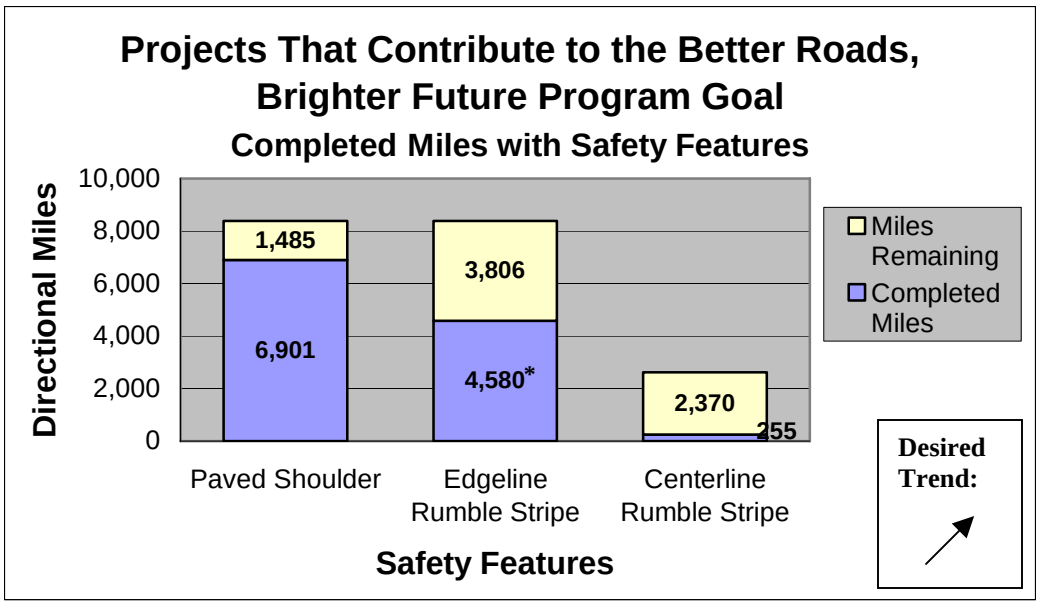
Improvement Status:
Completion of SRI resulted in a significant improvement in pavement condition. At the beginning of BRBF (January 2007), 74 percent of major highways were in good condition (as shown in 2b, Percent of major highways that are in good condition). By January 2008, 78 percent of major highways were in good condition.

Through the BRBF program, MoDOT will emphasize maintenance of the miles improved through SRI while making major improvements to the remainder of the 5,573 miles in the major highway system. By the end of 2011, a total of 85 percent of the major highways will have improved surfaces along with new or improved shoulders and rumble stripes. However, all 5,573 miles will benefit from safety features such as wider striping and brighter signing. There are currently more than 200 BRBF projects in the 2008-2012 Statewide Transportation Improvement Program that will address more than 1,900 major highway miles.

Funding for the BRBF program will come from existing Taking Care of System funds in accordance with the current funding allocation directed by the Missouri Highways and Transportation Commission. More than $430 million per year is dedicated to taking care of the existing highway system.


Projects That Contribute to the Better Roads, Brighter Future Program Goal
Lane Miles Meeting Desired Condition
Lane Miles
16,000
14,000
12,000
10,000
2,198
13,468
1,259
14,407
Jan.1, 2007
Jan. 1, 2008
Year
Lane Miles Remaining
Lane Miles Currently Good
Desired Trend:


Projects That Contribute to the Better Roads, Brighter Future Program Goal
Programmed Lane Miles
Lane Miles Programmed
2,000
1,500
1,000
500
0
1,675
1,548
1,755
861
2008
2009
2010
2011
STIP Year
Desired Trend:
N/A


Projects That Contribute to the Better Roads, Brighter Future Program Goal
Completed Miles with Safety Features
Directional Miles
10,000
8,000
6,000
4,000
2,000
0
1,485
6,901
3,806
4,580*
2,370
255
Paved Shoulder
Edgeline Rumble Stripe
Centerline Rumble Stripe
Safety Features
Miles Remaining
Completed Miles
Desired Trend:

Smooth and Unrestricted Roads and Bridges

Percent of major highways that are in good condition

Result Driver: Kevin Keith, Chief Engineer
Measurement Driver: Jay Bledsoe, Transportation System Analysis Engineer

Purpose of the Measure:
This measure tracks the condition of Missouri's major highway road surfaces. The public has indicated the condition of Missouri's existing state roadway system should be one of the state's highest priorities. MoDOT places a high priority on improving the condition of state highways.

Measurement and Data Collection:
The major highway system is defined as all routes functionally classified as principal arterials. By definition, the principal arterial system provides for statewide or interstate movement of traffic. Examples include the Interstate System and most U.S. routes such as 63, 54 or 36.

In urban areas, principal arterials carry traffic entering or leaving the urban area and serve movement of vehicles between central business districts and suburban residential areas. Examples include Business 50 (Missouri Blvd.) in Jefferson City, MO 740 (Stadium Blvd.) in Columbia and Route D (Page Ave.) in St. Louis.

The major roads in Missouri total approximately 5,573 centerline miles. This figure reflects mileage based on statewide review of the highway system. Good condition is defined using a combination of criteria. On high-speed routes (speed limits greater than 50 mph), the International Roughness Index (IRI) is used. For lower-speed routes (mostly urban areas) where smoothness is less critical, a Present Serviceability Rating (PSR) is used. While smoothness is a factor in PSR, physical condition is also a factor.

Direct comparison to other states is difficult because of differences in measurement methodologies. However, a general order-of-magnitude comparison is possible given certain assumptions. For example, there are five states that report mileage for major highways within 10 percent of that maintained by MoDOT. Of these five, Georgia, with 5,875 miles, currently has the highest percentage of these highways classified in good condition based on smoothness only. The Missouri definition of good uses smoothness as one factor; however, it also includes other condition factors such as physical distress to determine quality. While the comparison is not exact, it does indicate the level of performance possible on a system of Missouri's size.

This is an annual measure. Missouri data is updated in January to reflect prior calendar-year ratings.

Improvement Status:
Completion of the Smooth Roads Initiative (SRI) has resulted in a significant improvement in pavement condition. Currently, 78 percent of the major highways are in good condition, up from 46 percent at the beginning of SRI in 2004.

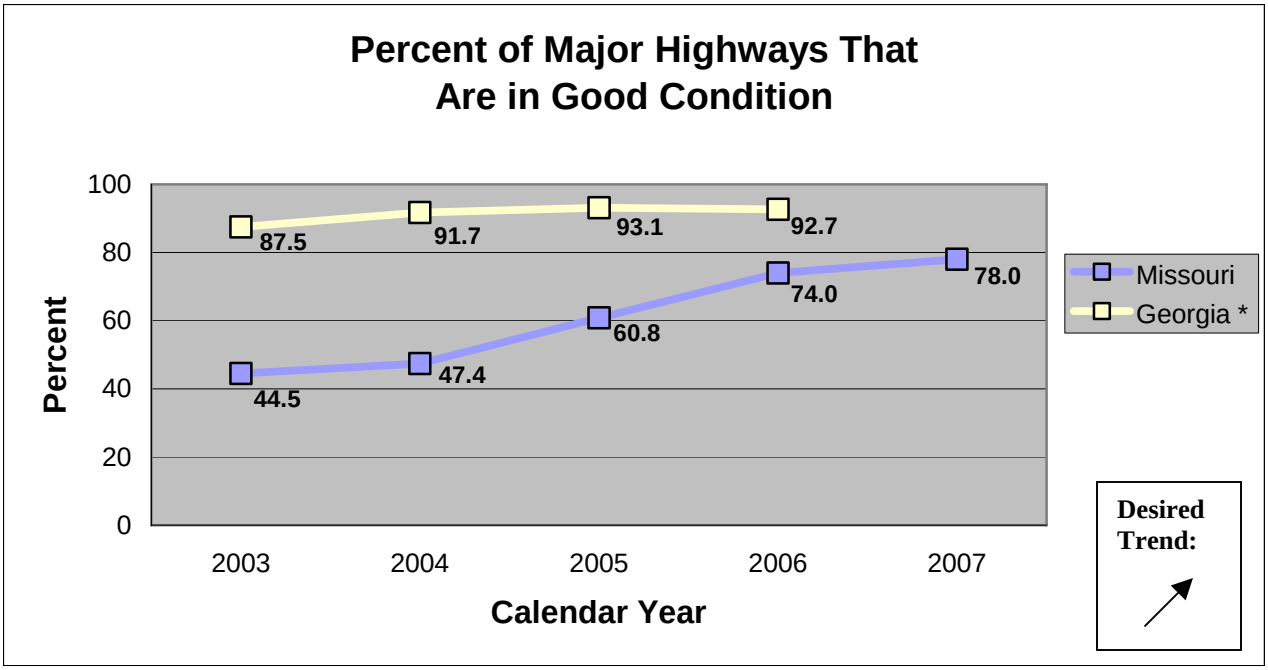
Through the Better Roads, Brighter Future (BRBF) program, MoDOT will emphasize maintenance of the miles improved through SRI while making major improvements to the remainder of the 5,573 miles in the major highway system. By the end of 2011, a total of 85 percent of the major highways will have improved surfaces along with new or improved shoulders and rumble stripes. However, all 5,573 miles will benefit from safety features such as wider striping and brighter signing. There are currently more than 200 BRBF projects in the 2007-2011 Statewide Transportation Improvement Program that will address more than 1,700 major highway miles.

Funding for BRBF will come from existing Taking Care of System funds in accordance with the current funding allocation directed by the Missouri Highways and Transportation Commission.

The Interstate System is the backbone of the major highway network. While it includes only about 7 percent of the state highway mileage, it accounts for more than half the total state vehicles miles traveled. During 2008, there is an

increased emphasis on maintenance and operation of interstate highways. The Interstate Maintenance Plan sets specific goals, standards and responsibilities for the condition of these vital highways.

More than $430 million per year is dedicated to taking care of the existing highway system. Of this total, $125 million is reserved for work on the Interstate System and major bridges.



* Source data for Georgia is "Highway Statistics " published by FHWA. Data for 2007 not available at time of publication. Georgia data is based only on pavement smoothness (IRI) submitted as part of the Highway Performance Monitoring System.

Smooth and Unrestricted Roads and Bridges

Percent of minor highways that are in good condition

Result Driver: Kevin Keith, Chief Engineer
Measurement Driver: Jay Bledsoe, Transportation System Analysis Engineer

Purpose of the Measure:
This measure tracks the condition of Missouri's minor highway road surfaces. The public has indicated the condition of Missouri's existing state roadway system should be one of the state's highest priorities. MoDOT places a high priority on improving the condition of highways in the state system.

Measurement and Data Collection:
The minor highway system consists of all routes functionally classified as minor arterials or collectors. These routes mainly serve local transportation needs and include highways commonly referred to as lettered routes, such as Route A, Route C and Route DD. The public sometimes refers to these routes as farm-to-market roads. The minor roads in Missouri total approximately 27,000 centerline miles.

Good condition is defined using a combination of criteria. Where available, on high-speed routes (speed limits greater than 50 mph) the International Roughness Index (IRI) is used. For lower-speed routes where smoothness is less critical, a Present Serviceability Rating (PSR) or IRI is used. While smoothness is a factor in PSR, physical condition is also a factor.

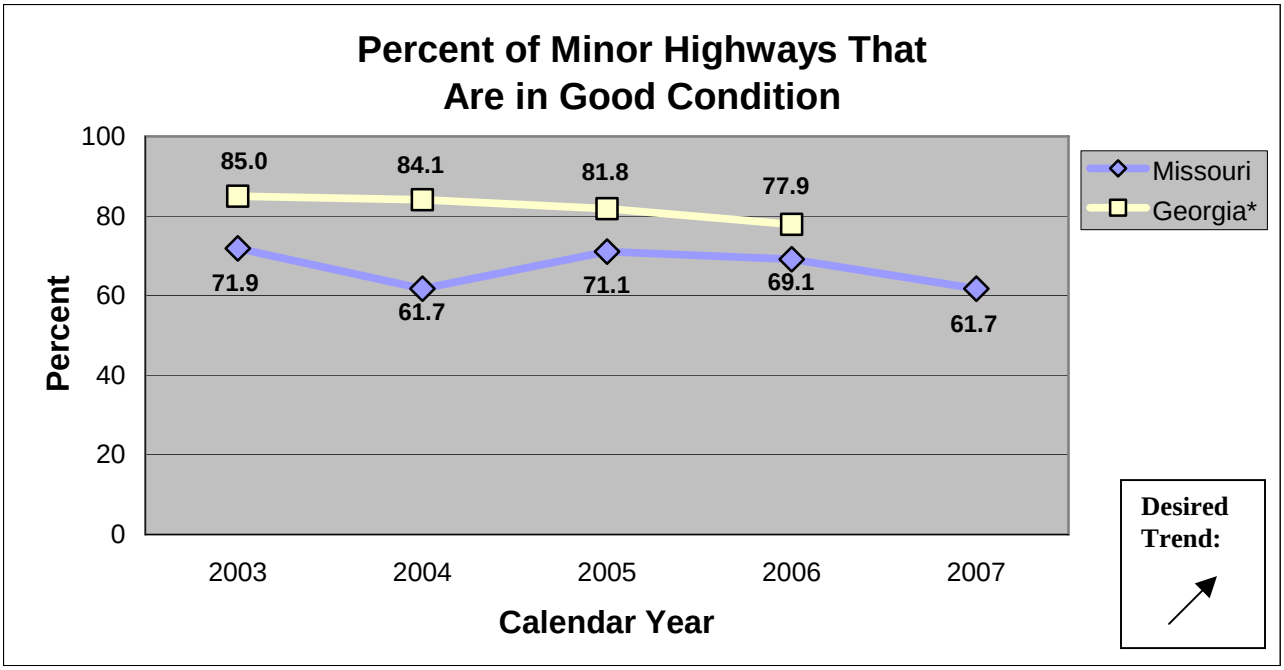
Direct comparison to other states is difficult because of differences in measurement methodologies. However, a general order-of-magnitude comparison is possible given certain assumptions. For example, there are six states that report mileage for minor highways within 10 percent of that maintained by MoDOT. Of these six, Georgia, with 24,707 miles, currently has the highest percentage of these highways classified in good condition. The ratings reported by states as part of the Highway Performance Monitoring System for roads classified as minor more closely relate to Missouri's rating system.

Federal Highway Administration allows conditions on minor highways to be reported on either IRI or Present Serviceability Index (PSI). PSI includes an assessment of physical distress similar to Missouri's definition. The Missouri definition of good uses smoothness as one factor. However, it also includes other condition factors such as physical distress to determine quality.

This is an annual measure. Missouri data is updated in January to reflect prior calendar-year ratings.

Improvement Status:
Through the Better Roads, Brighter Future program, MoDOT has identified the major highway system as a priority for the next five years. Efforts on the minor highways will emphasize maintenance of this system at or near the current levels. Work on minor highways will emphasize the use of MoDOT maintenance forces and will consist of treatments that include routine patching, crack sealing and chip seals.

Minor highways have shown a marked decline in condition in the last two years. Some of this is due to the change from a subjective rating method to an automated procedure. However, some of the decrease is due to a change in treatments used on minor roads. The chip seal program is designed to stabilize and maintain pavements in good condition, rather than improve pavements in poor condition. While this slows the deterioration of good minor roads, it does not provide a substantial decrease in miles of poor pavement. An issue with the current method of measurement has also been identified. While a road treated with a chip seal and improved striping may look good, smoothness is not necessarily improved. Smoothness is currently a major factor in the determination of good condition.



* Source data for Georgia is "Highway Statistics" published by the Federal Highway Administration. Georgia data for 2007 was not available at time of publication. Data is based on a combination of pavement smoothness – IRI or PSI – as submitted as part of the Highway Performance Monitoring System.

.

Smooth and Unrestricted Roads and Bridges

Percent of vehicle miles traveled on major highways in good condition

Result Driver: Kevin Keith, Chief Engineer
Measurement Driver: Jay Bledsoe, Transportation System Analysis Engineer

Purpose of the Measure:
This measure tracks the percent of vehicle miles traveled (VMT) on Missouri's major highway system that take place on highways in good condition. The public has indicated the condition of Missouri's existing state roadway system should be one of the state's highest priorities. Emphasizing work on the major highway system insures that the majority of travel takes place on highways in good condition.

Measurement and Data Collection:
The major highway system is defined as all routes functionally classified as principal arterials. By definition, the principal arterial system provides for statewide or interstate movement of traffic. Examples include the interstate system and most U.S. routes such as 63, 54 or 36.

In urban areas, principal arterials carry traffic entering or leaving the urban area and serve movement of vehicles between central business districts and suburban residential areas. Examples include Business 50 (Missouri Blvd.) in Jefferson City, MO 740 (Stadium Blvd.) in Columbia and Route D (Page Ave.) in St. Louis.

The major roads in Missouri total approximately 5,573 centerline miles. Good condition is defined using a combination of criteria. On high-speed routes (speed limits greater than 50 mph) the International Roughness Index (IRI) is used. For lower-speed routes (mostly urban areas) where smoothness is less critical, a Present Serviceability Rating (PSR) is used. While smoothness is a factor in PSR, physical condition is also a factor.

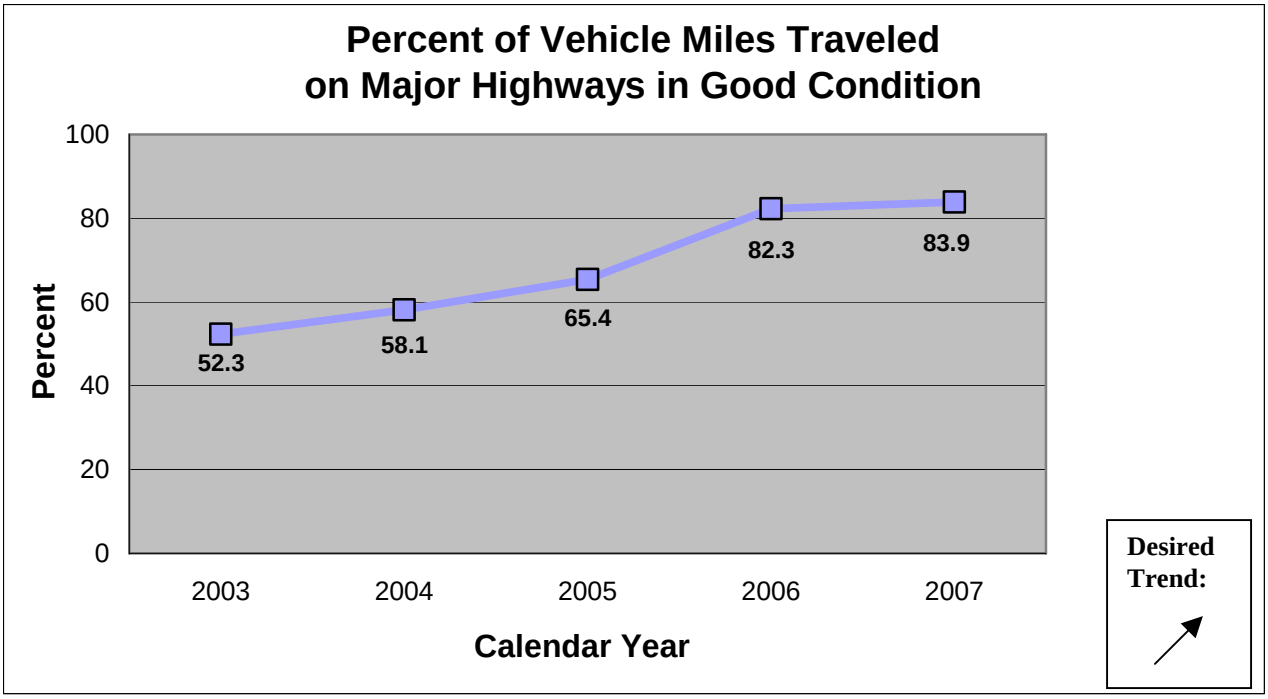
VMT is determined by multiplying the traffic volume on a given route by the route length. For this measure, the VMT is calculated on those routes in good condition and then divided by the total VMT for major routes to determine the percentage shown below. While the system of major highways in Missouri comprise only about 17 percent of the total system mileage, it carries more than 75 percent of all traffic on the state highway system.

This is an annual measure that is updated each January.

Improvement Status:
Completion of the Smooth Roads Initiative (SRI) has resulted in a significant improvement in pavement condition. Through the Better Roads, Brighter Future program, MoDOT will continue maintenance of the miles improved through SRI while making major improvements to the remainder of the 5,573 miles in the major highway system.

The condition of the major roads has continued to improve. Seventy-eight percent of major roads are presently in good condition. VMT has shown slight growth in the past several years. At this time, nearly 84 percent of all travel on major highways takes place on highways in good condition. Continuing to emphasize work on the major highway system ensures that the majority of public travel takes place on highways in good condition.

More than $430 million per year is dedicated to taking care of the existing highway system. Funding for the Better Roads, Brighter Future program will come from existing Taking Care of System (TCOS) funds in accordance with the current funding allocation directed by the Missouri Highways and Transportation Commission.


Percent of Vehicle Miles Traveled
on Major Highways in Good Condition
100
80
60
40
20
0
Percent
52.3
58.1
65.4
82.3
83.9
2003
2004
2005
2006
2007
Calendar Year
Desired
Trend:

Smooth and Unrestricted Roads and Bridges

Percent of deficient bridges on major highways

Result Driver: Kevin Keith, Chief Engineer
Measurement Driver: Dennis Heckman, State Bridge Engineer

Purpose of the Measure:
This measure tracks progress toward improving the condition of Missouri's bridges on major highways. The public has indicated the condition of Missouri's existing roadway system should be one of the state's highest priorities. MoDOT places a high priority on increasing the quality of bridges on the state system.

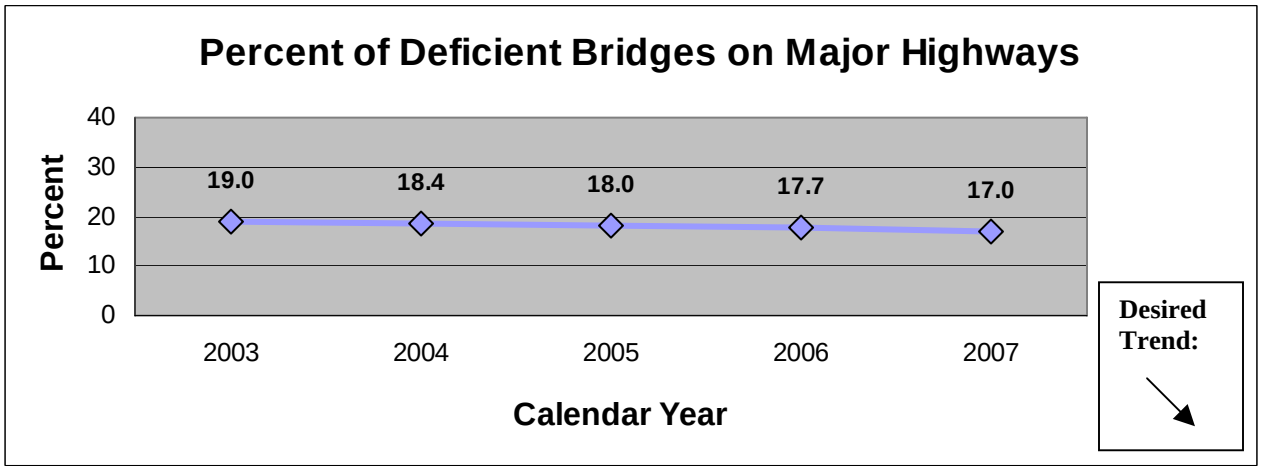
Measurement and Data Collection:
The major highway system is defined as all routes functionally classified as principal arterials. By definition, the principal arterial system provides for statewide or interstate movement of traffic. Examples include the Interstate System or most U.S. routes such as 63, 54 or 36.

In urban areas, principal arterials carry traffic entering or leaving the urban area and serve movement of vehicles between central business districts and suburban residential areas. Examples include Business 50 (Missouri Blvd.) in Jefferson City, MO 740 (Stadium Blvd.) in Columbia and Route D (Page Ave.) in St. Louis.

A bridge is considered deficient if it is either structurally deficient (SD) or functionally obsolete (FO) as defined using Federal Highway Administration criteria. A SD bridge is in poor condition or has insufficient load capacity when compared to modern design standards. A FO bridge has poor roadway alignment or has clearance or width restrictions that no longer meet the usual criteria for the system it serves. MoDOT staff inspects all state-owned bridges. There are currently 3,364 bridges on major highways. This is an annual measure and data is updated each April based on the prior year's inspections.

Improvement Status:
Bridge conditions on major highways have shown a moderate improvement. The percentage of deficient bridges has been reduced from 19 percent to 17 percent over the last five years as a result of increased funds directed to care for the existing highway system.

The Safe & Sound bridge improvement program will address more than 800 of the state's most critical structures. This program will repair or replace these bridges over a five-year period and emphasize their maintenance at an acceptable level for an additional 25 years. While most of these bridges are located on the minor highway system, a small benefit to bridges on major highways is also anticipated (0.5 percent drop in this measure).



Smooth and Unrestricted Roads and Bridges

Percent of deficient bridges on minor highways

Result Driver: Kevin Keith, Chief Engineer
Measurement Driver: Dennis Heckman, State Bridge Engineer

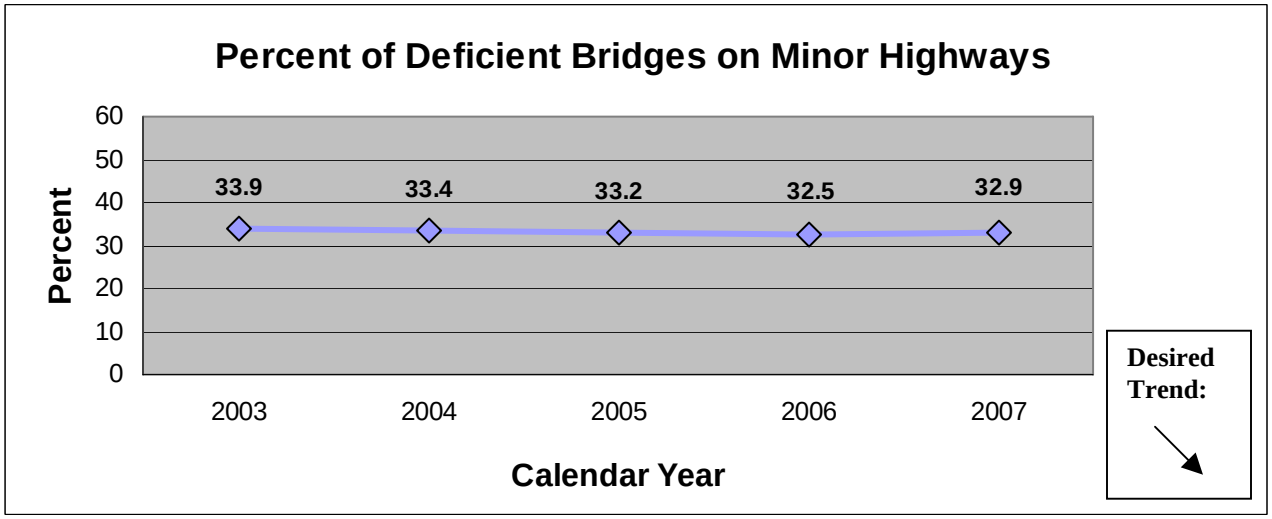
Purpose of the Measure:
This measure tracks progress toward improving the condition of Missouri's minor highway bridges. The public has indicated the condition of Missouri's existing roadway system should be one of the state's highest priorities. MoDOT places a high priority on increasing the quality of bridges on the state system.

Measurement and Data Collection:
The minor highway system consists of all routes functionally classified as minor arterials or collectors. These routes serve more local transportation needs and include highways commonly referred to as lettered routes, such as Route A, Route C and Route DD. The public sometimes refers to these routes as farm-to-market roads.

A bridge is considered deficient if it is either structurally deficient (SD) or functionally obsolete (FO) as defined using Federal Highway Administration criteria. A SD bridge is in poor condition or has insufficient load capacity when compared to modern design standards. A FO bridge has poor roadway alignment or has clearance or width restrictions that no longer meet the usual criteria for the system it serves. MoDOT staff inspects all state-owned bridges. There are currently 6,912 bridges on minor highways. This is an annual measure and data is updated each April based on the prior year's inspections.

Improvement Status:
Bridge conditions on minor highways have taken a small step backward. While the percentage of deficient bridges has been reduced from 33.9 percent to 32.9 percent over the last five years, this percentage actually increased slightly from 2006 to 2007.

The strategy to improve this measure is the Safe & Sound bridge improvement program, which has been in an active procurement process for the last year-and-a-half. This program will repair or replace over 800 bridges over a five-year period and emphasize their maintenance at an acceptable level for an additional 25 years. Most of these bridges are located on the minor highway system. A decrease in the number of deficient bridges is expected to occur with the completion of this program. However, due to the accelerating rate of bridges becoming deficient, there still will be a sizable number of deficient bridges on the system. It is projected that this measure will drop to 30.0 percent at the completion of the Safe & Sound bridge improvement program.



Smooth and Unrestricted Roads and Bridges

Number of deficient bridges on the state system (major and minor highways)

Result Driver: Kevin Keith, Chief Engineer
Measurement Driver: Dennis Heckman, State Bridge Engineer

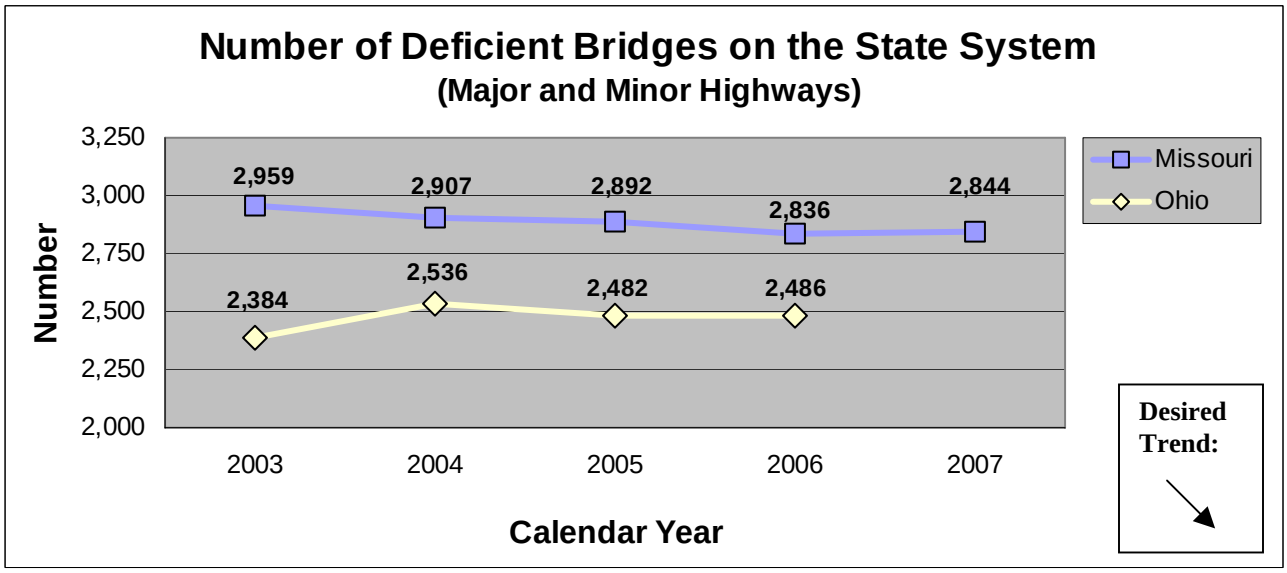
Purpose of the Measure:
This measure tracks progress toward improving the condition of Missouri's bridges. The public has indicated the condition of Missouri's existing roadway system should be one of the state's highest priorities. MoDOT places a high priority on increasing the quality of bridges on the state system.

Measurement and Data Collection:
A bridge is considered deficient if it is either structurally deficient (SD) or functionally obsolete (FO) as defined using Federal Highway Administration criteria. A SD bridge is in poor condition or has insufficient load capacity when compared to modern design standards. A FO bridge has poor roadway alignment or has clearance or width restrictions that no longer meet the usual criteria for the system it serves. MoDOT staff inspects all state-owned bridges. There are currently a total of 10,276 bridges on the state highway system.

This is an annual measure and data is taken from the National Bridge Inventory. Missouri data is available in April of each calendar year and is updated in the April Tracker. The data for other states is not published until the following year.

Improvement Status:
Bridge conditions on Missouri highways have taken a small step backward. While the number of deficient bridges on the state system has been reduced from 2,959 to 2,844 over the last five years, this number actually increased slightly from 2006 to 2007. Of the 2,844 deficient bridges, 1,179 are FO and 1,665 are SD.

The strategy to improve this measure is the Safe & Sound bridge improvement program that will repair or replace more than 800 of the state's most critical structures over a five-year period and emphasize their maintenance at an acceptable level for an additional 25 years. A decrease in the number of deficient bridges is expected with the completion of this program. However, due to the accelerating rate of bridges becoming deficient, there still will be a sizable number of deficient bridges on the system. It is projected that this measure will drop to 2,500 at the completion of the Safe & Sound bridge improvement program.



* Source for Ohio, "Better Bridges" November 2007, for data collected in calendar year 2006.