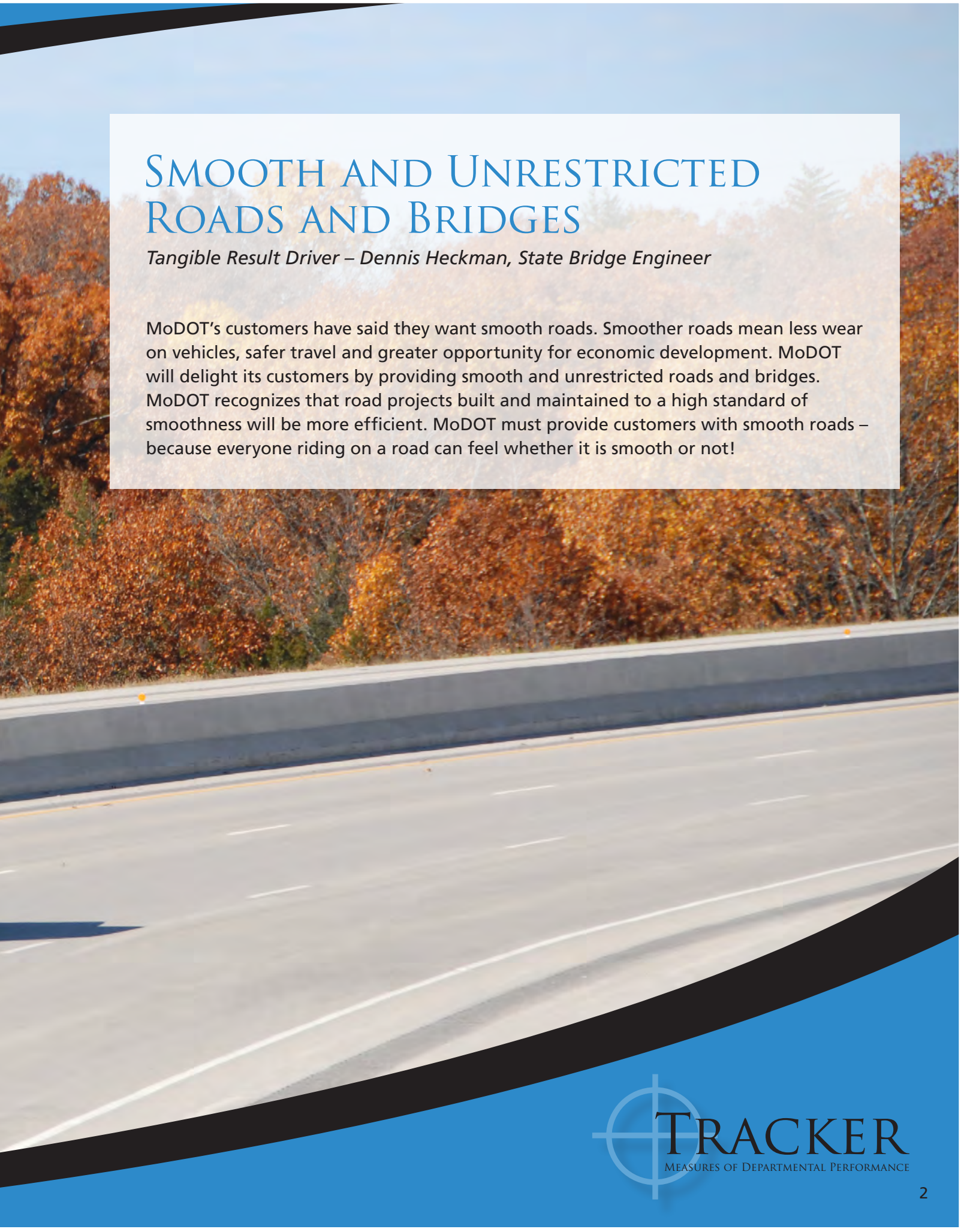


Smooth and Unrestricted Roads and Bridges

Tangible Result Driver – Dennis Heckman, State Bridge 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!

Percent of major highways in good condition-2a

Result Driver: Dennis Heckman, State Bridge Engineer
Measurement Driver: Brian Reagan, 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 condition (PASER) rating is used in combination with the smoothness component.

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 updated in January to reflect the prior calendar-year ratings.

Improvement Status:

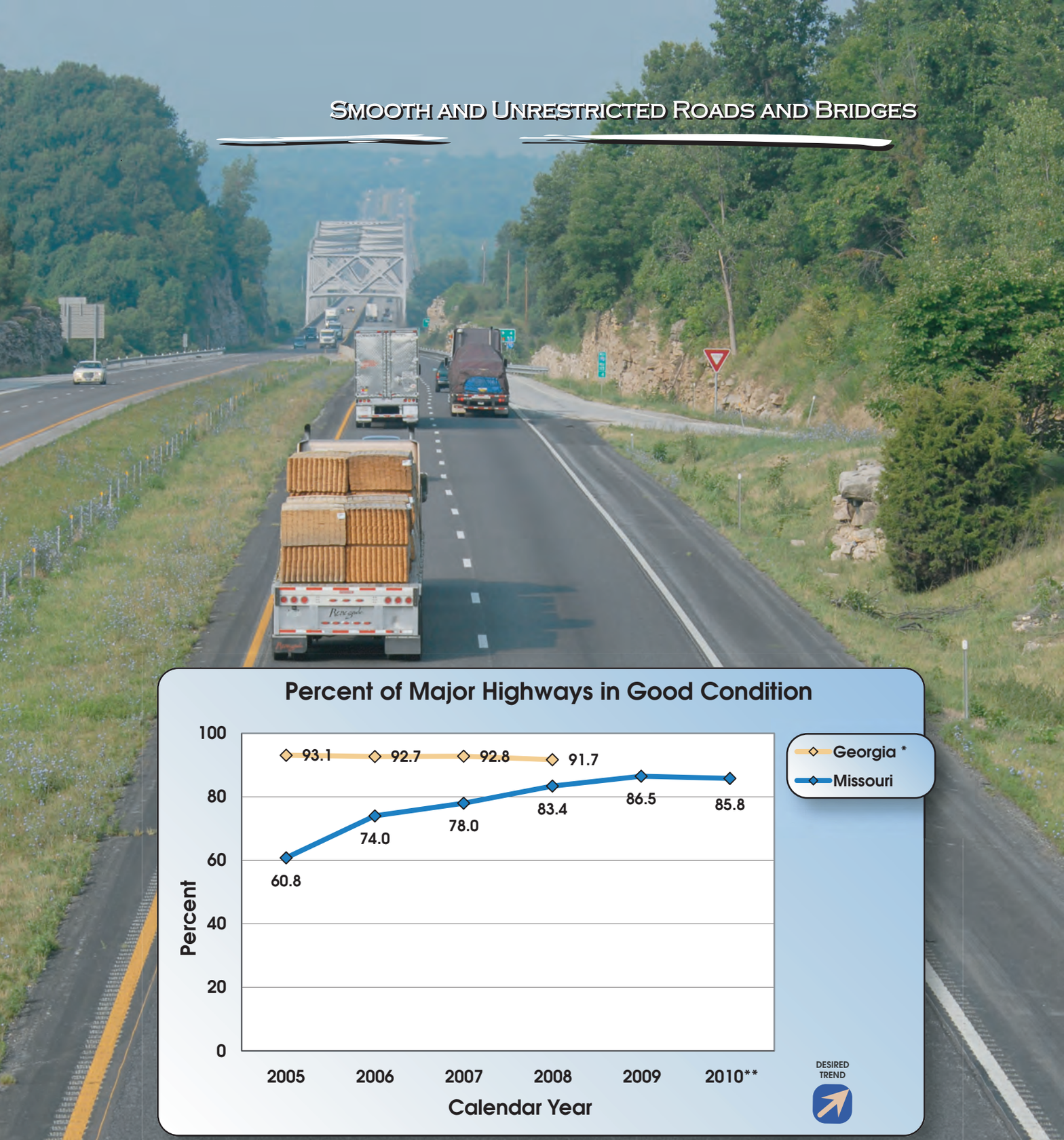
At the beginning of Better Roads, Brighter Futures (BRBF) in January 2007, 74 percent of major highways were in good condition. By January 1, 2010, one full year ahead of schedule, the goal of 85 percent of major roads in good condition had been achieved. Nearly 86 percent of major highways are currently rated in good condition. The slight decline in condition from 2009 is due in part to those miles improved under the Smooth Road Initiative nearing the end of their expected life.

MoDOT will continue to emphasize maintenance of the miles improved through the Smooth Roads Initiative and BRBF. Over time, all 5,573 miles will benefit from improved safety features such as shouldering, wider striping and brighter signing. There are currently more than 170 projects in the 2011-2015 STIP that will address more than 1,500 major highway miles.

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 vehicle miles traveled. The increased emphasis on maintenance and operation of interstate highways that began in 2008 will continue into the future. The Interstate Maintenance Plan sets specific goals, standards and responsibilities for the condition of these vital highways.

More than $435 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.

Smooth and Unrestricted Roads and Bridges



Percent of Major Highways in Good Condition

* Source data for Georgia is "Highway Statistics" published by FHWA. Data for 2009 is not available at the time of publication. Georgia data is based only on pavement smoothness (IRI) submitted as part of the Highway Performance Monitoring System.

Percent of minor highways in good condition-2b

Result Driver: Dennis Heckman, State Bridge Engineer
Measurement Driver: Brian Reagan, 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. Smoothness is evaluated using the International Roughness Index (IRI). Pavements below the prescribed threshold are considered good. However, public surveys have shown that physical condition is more important than ride on lower speed, lower volume roadways. A condition rating of visual distress (PASER) is also evaluated and if those criteria are met, the roadway is considered good.

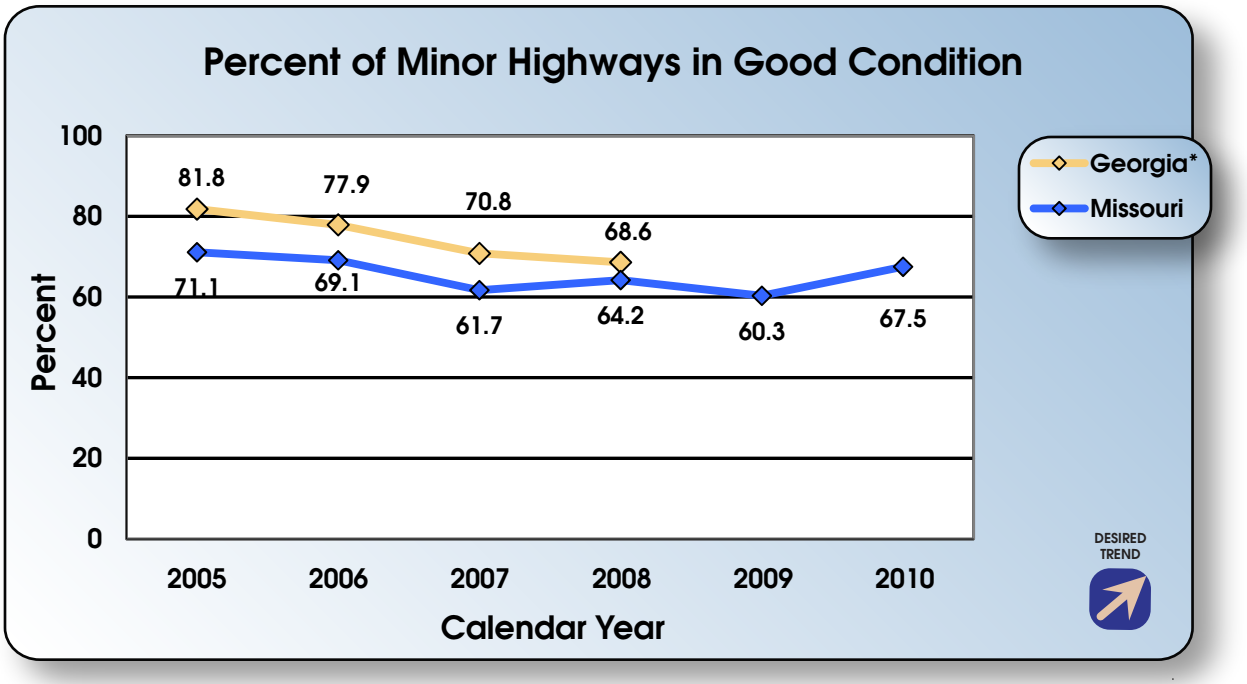
Direct comparison to other states is difficult because of differences in measurement methodologies. However, a general order-of-magnitude comparison is possible given certain assumptions. For example, there are six states that report mileage for minor highways within 10 percent of that maintained by 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. The 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 updated in January to reflect the prior calendar-year ratings.

Improvement Status:

MoDOT's five year direction provides for improvement of the minor roads condition. Work on the minor highway system will emphasize the use of MoDOT maintenance forces and some contractual work. Treatments primarily consist of routine patching, crack sealing and chip seals.

2010 did see an increased effort on minor highways. The American Recovery and Reinvestment Act (ARRA) allowed additional funds to be applied to "Taking Care of the System" (TCOS) activities. In addition, approximately $34 million was applied to minor roads from internal operational savings.

Some of the increase shown in 2010 is assumed due to a change in rating methods. A switch to a more general, less technical method was adopted during this survey year. In addition, 2010 was the first year that the entire minor road system was collected by automated equipment. The percentages shown below may change over the next year as more input is gathered with respect to acceptable condition levels for low volume minor roads.



* Source data for Georgia is "Highway Statistics" published by the Federal Highway Administration. Georgia data for 2009 was not available at time of publication. Data is based on a combination of pavement smoothness – IRI or PSR – as submitted as part of the Highway Performance Monitoring System.

Percent of vehicle miles traveled on major highways in good condition-2c

Result Driver: Dennis Heckman, State Bridge Engineer
Measurement Driver: Brian Reagan, 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.

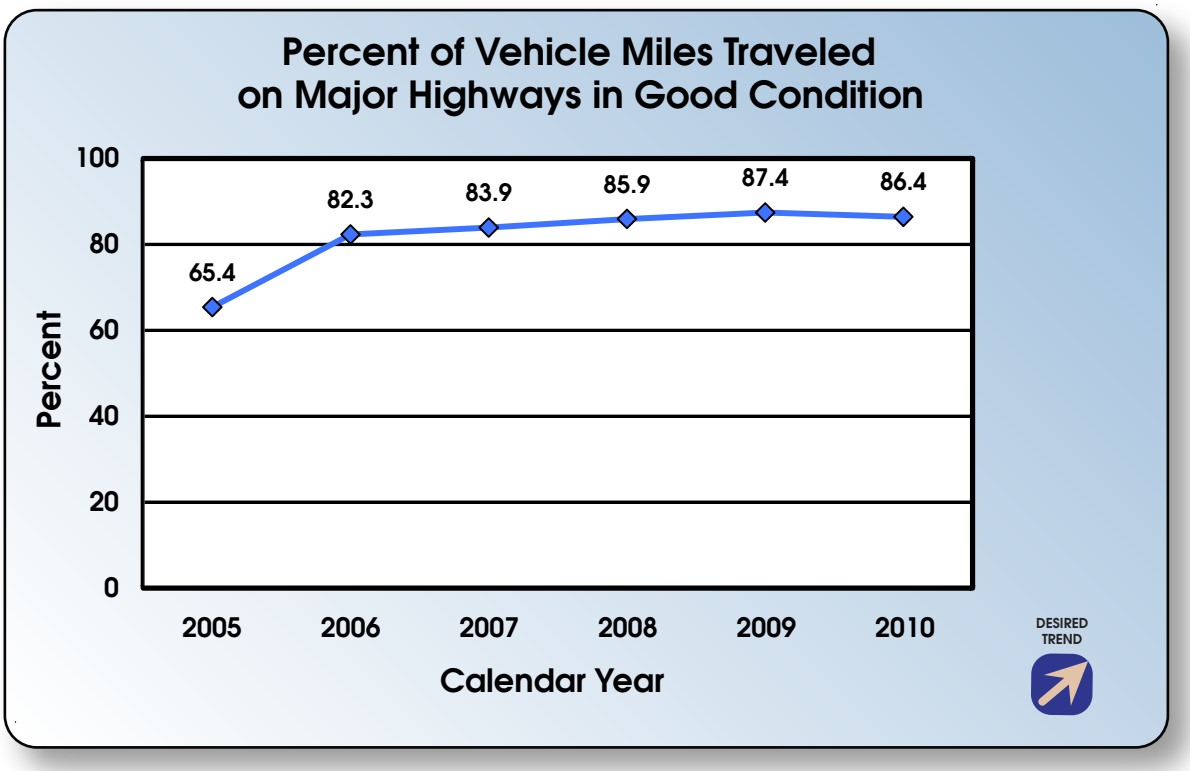
The major roads in Missouri total approximately 5,573 centerline miles. Good condition is defined using a combination of criteria. On high-speed routes (speed limits greater than 50 mph) the International Roughness Index (IRI) is used. For lower-speed routes (mostly urban areas) where smoothness is less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

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 comprises 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 updated each January.

Improvement Status:

Completion of the Smooth Roads Initiative resulted in a significant improvement in pavement condition. At the beginning of Better Roads, Brighter Futures (BRBF) in 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 1, 2010, one full year ahead of schedule, the goal of 85 percent of major roads in good condition had been achieved. Nearly 86 percent of major highways are currently rated in good condition. The slight decline in condition from 2009 is due in part to those miles improved under the Smooth Road Initiative nearing the end of their expected life.

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


Percent of Vehicle Miles Traveled
on Major Highways in Good Condition
100
80
60
40
20
0
Percent
65.4
82.3
83.9
85.9
87.4
86.4
2005
2006
2007
2008
2009
2010
Calendar Year
DESIRED TREND

Percent of bridges on major highways in good condition-2d

Result Driver: Dennis Heckman, State Bridge Engineer
Measurement Driver: David Koenig, Structural Services 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.

Measurement and Data Collection:

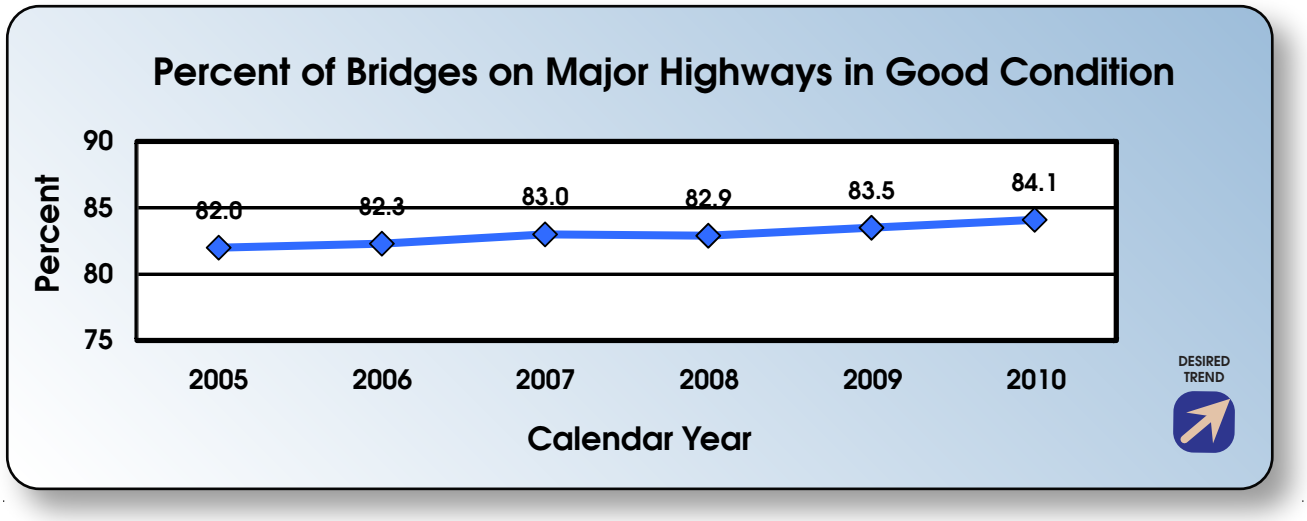
The major highway system is defined as all routes functionally classified as principal arterials. By definition, the principal arterial system provides for statewide or interstate movement of traffic. Examples include the Interstate System and most U.S. routes such as 63, 54 or 36.

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

A bridge is considered "good" if it is not deficient. Deficient means 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 3,589 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 taken a solid step forward over the last two years. The improvement in this measure is attributable to the significant amount of bridge work in the STIP over the last several years. The Safe & Sound program has also had an impact on the improvement in this measure over the last two years, even though this program is primarily focused on the minor highway system.



Percent of bridges on minor highways in good condition-2e

Result Driver: Dennis Heckman, State Bridge Engineer
Measurement Driver: David Koenig, Structural Services Engineer

Purpose of the Measure:

This measure tracks progress toward improving the condition of Missouri's bridges on minor highways. The public has indicated the condition of Missouri's existing roadway system should be one of the state's highest priorities.

Measurement and Data Collection:

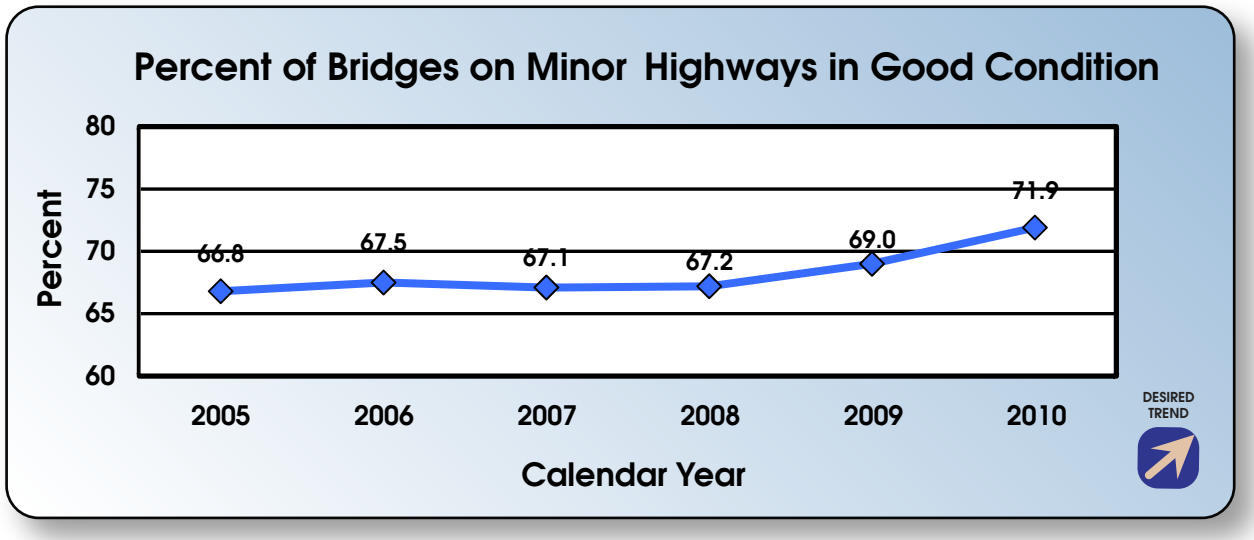
The minor highway system consists of all routes functionally classified as minor arterials or collectors. These routes serve more local transportation needs and include highways commonly referred to as lettered routes, such as Route A, Route C and Route DD. The public sometimes refers to these routes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

A bridge is considered "good" if it is not deficient. Deficient means 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 6,816 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 shown a very large improvement over the last two years, with the measure increasing 4.7 percentage points. The majority of the recent improvement in this measure is directly attributable to the Safe & Sound program, which is entering its third full year of construction. Additional impacts on the improvement of this measure have resulted from normal STIP activity on bridges.



Number of deficient bridges on the state system (major and minor highways)-2f

Result Driver: Dennis Heckman, State Bridge Engineer
Measurement Driver: David Koenig, Structural Services 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.

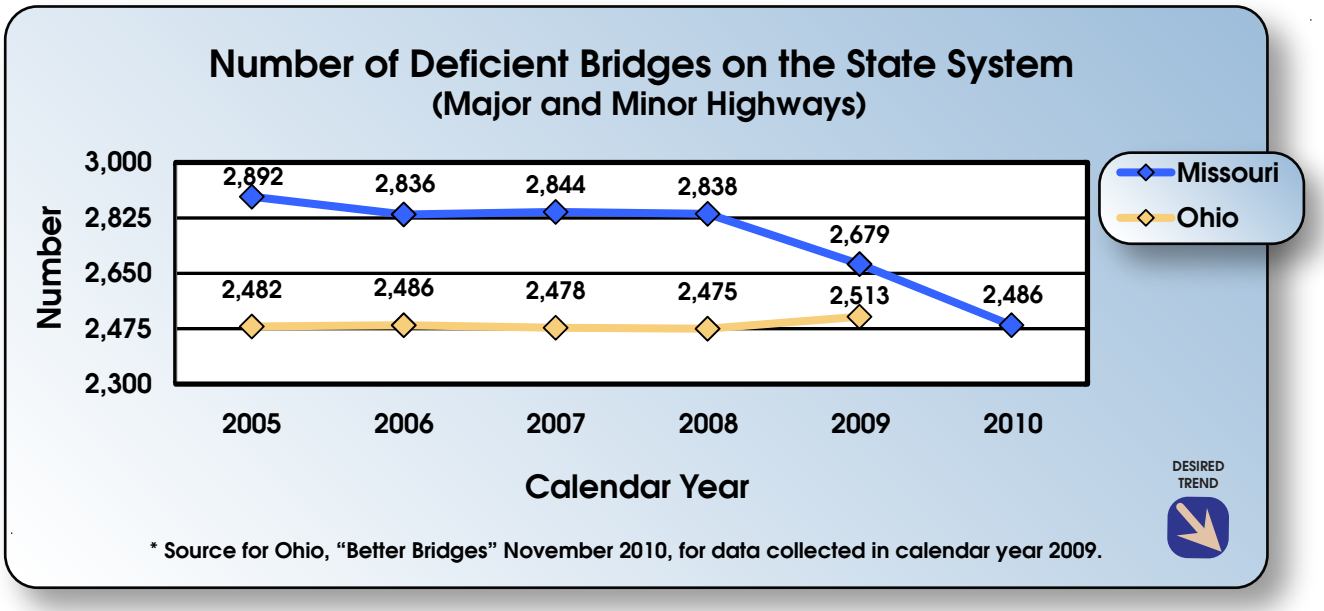
Measurement and Data Collection:

A bridge is considered deficient if it is either structurally deficient (SD) or functionally obsolete (FO) as defined using Federal Highway Administration (FHWA) 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 10,405 bridges on the state highway system.

This is an annual measure and data is taken from FHWA's 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 made a big leap forward over the last two years. The long-term trend on this measure has been a steady downward reduction with some leveling off from 2006 thru 2008. Over the last two years, this measure has made a sharp downward turn. This downward turn predominately resulted from the efforts of the Safe & Sound program, but was also impacted by other STIP activity. Of the 2,486 deficient bridges, 1,028 are functionally obsolete and 1,458 are structurally deficient.



Percent of major bridges in good condition-2g

Result Driver: Dennis Heckman, State Bridge Engineer
Measurement Driver: David Koenig, Structural Services Engineer

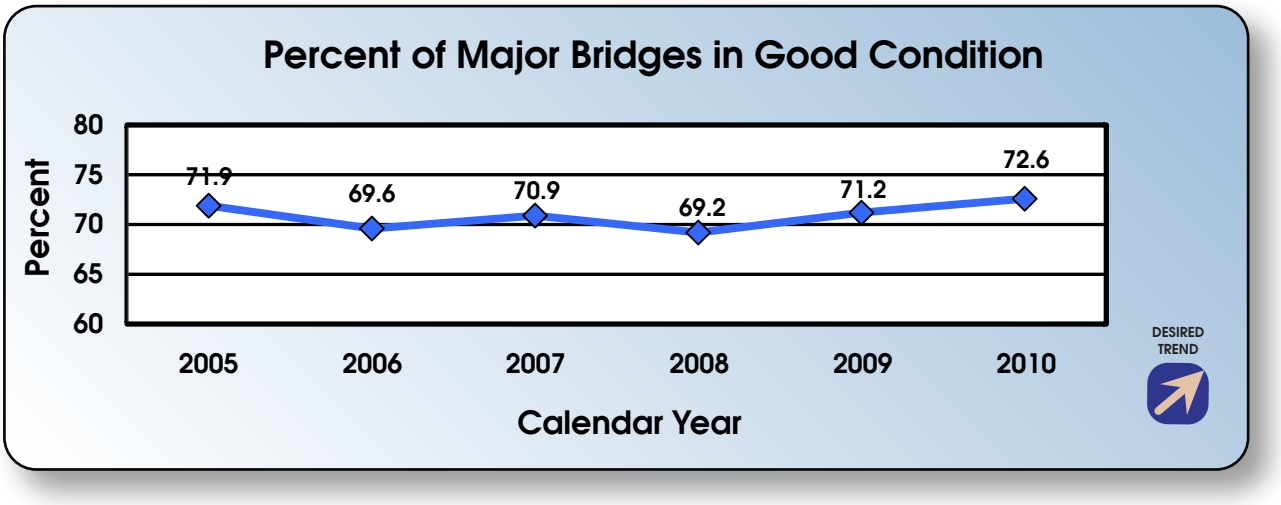
Purpose of the Measure:

This measure tracks the percent of major bridges that are in good condition. The public has indicated the condition of Missouri's existing roadway system should be one of the state's highest priorities.

Measurement and Data Collection:

A major bridge is defined as any structure with a length greater than 1,000 feet. There are currently 212 such structures on the MoDOT system. While they make up only 2 percent of the number of bridges, they represent 25 percent of our bridge deck area.

A bridge is considered in good condition if it is not deficient. Deficient means 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. This is an annual measure and data is updated each April based on the prior year's inspections.

Improvement Status:

Major bridges in good condition have increased 3.4 percentage points over the last two years. This increase is primarily due to a one-time infusion of $26.4 million in special money received from Congress as well as ARRA money used for major bridges.