



# 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, 740 (Stadium Blvd.) in Columbia, and Route D (Page Ave.) in St. Louis.

The major roads in Missouri total approximately 5,500 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 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 April to reflect the prior calendar-year ratings.

### **Improvement Status:**

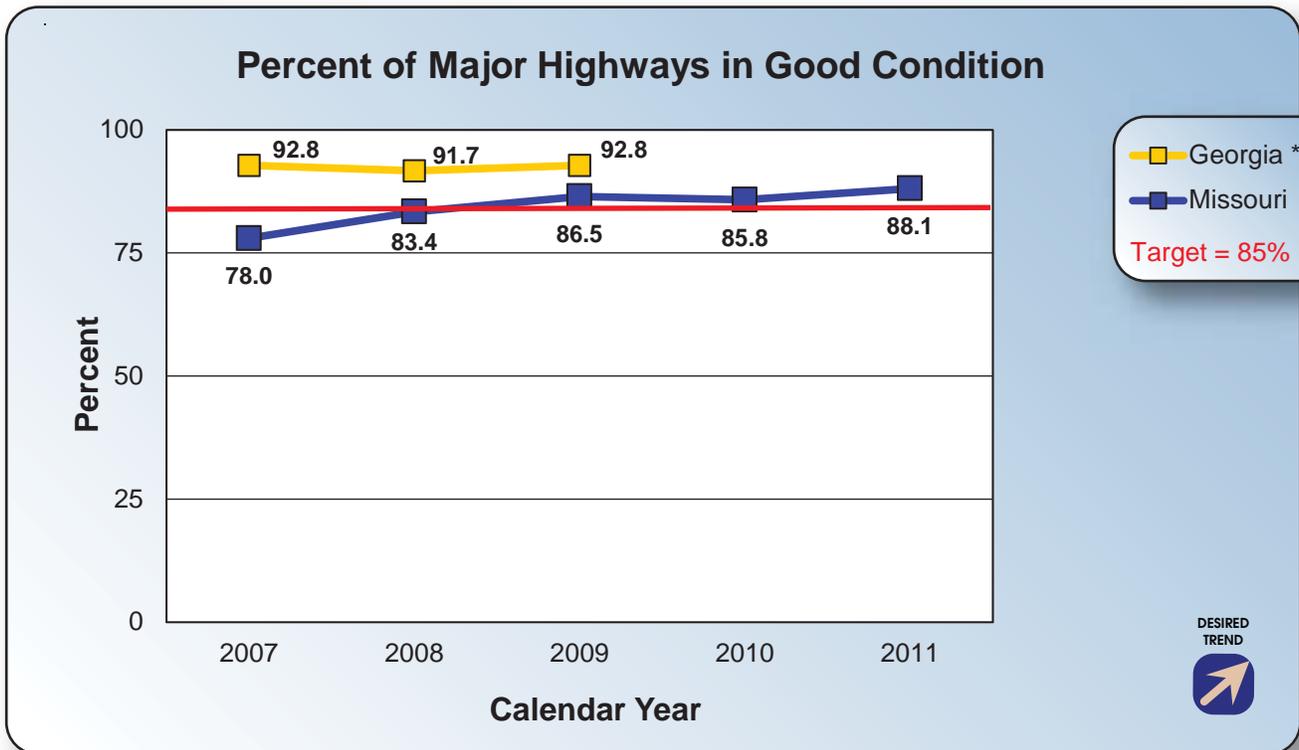
More than 88 percent of major highways are currently rated in good condition. The slight increase in condition from 2011 was due to a continued effort to keep the major roads in good condition.

MoDOT will continue to emphasize maintenance of the miles improved through the Smooth Roads Initiative. Over time, all 5,500 miles will benefit from improved safety features such as shouldering, wider striping and brighter signing. There are currently 139 projects in the 2012-2016 STIP that will address almost 1,200 major highway miles.

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.

With static transportation funding and increasing costs, MoDOT's ability to adequately maintain good pavement conditions on major highways in the long term is unlikely.

# SMOOTH AND UNRESTRICTED ROADS AND BRIDGES



\* Source data for Georgia is "Highway Statistics" published by FHWA. Data for 2010 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 28,200 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 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,

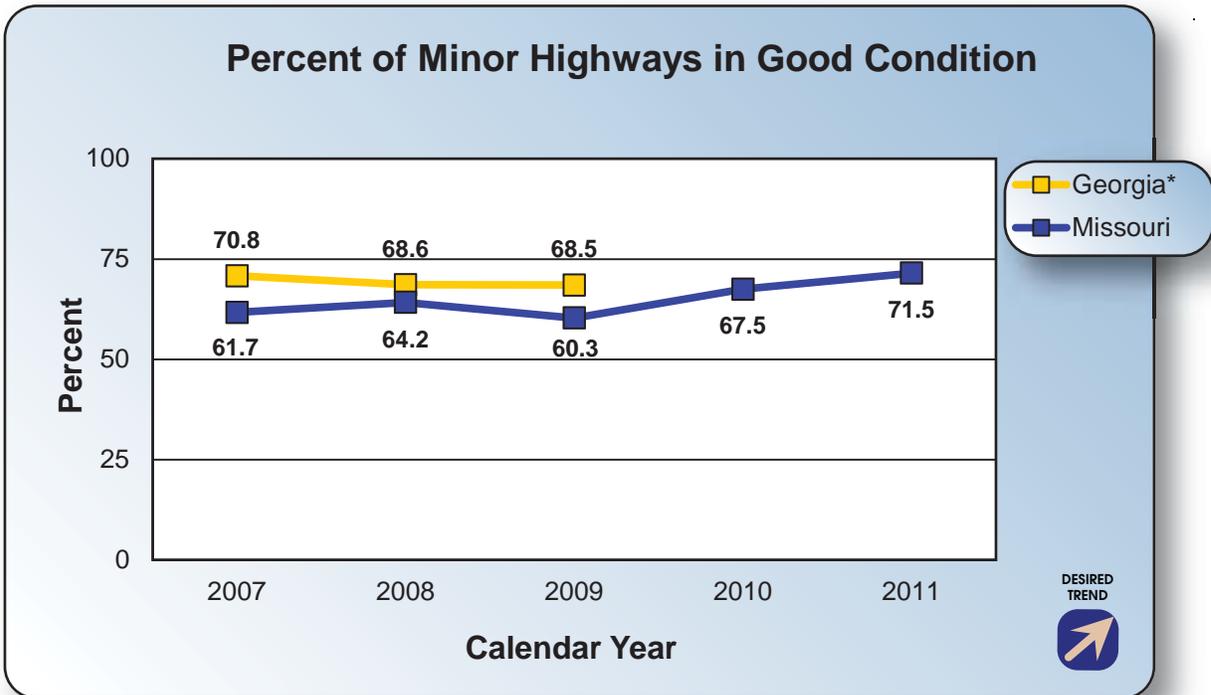
currently has the highest percentage of these highways classified in good condition. The ratings reported by states as part of the Highway Performance Monitoring System for roads classified as minor closely relate to Missouri's rating system. The Federal Highway Administration allows conditions on minor 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 April to reflect the prior calendar-year ratings.

#### **Improvement Status:**

MoDOT's Bolder 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. Pavement treatments primarily consist of routine patching, crack sealing, chip seals, cold-mix overlays, and thin-lift overlays.

There was an increased effort on minor highways in 2011. Over \$140 million was directed to improving minor roads in 2011. This includes both STIP projects and operational monies directed at minor roads. However, once operational savings from the Bolder Five-Year Direction are expended, MoDOT's ability to adequately maintain good pavement conditions on minor highways in the long term is unlikely.

## SMOOTH AND UNRESTRICTED ROADS AND BRIDGES



\* Source data for Georgia is "Highway Statistics" published by the Federal Highway Administration. Georgia data for 2010 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 5,500 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 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 April.

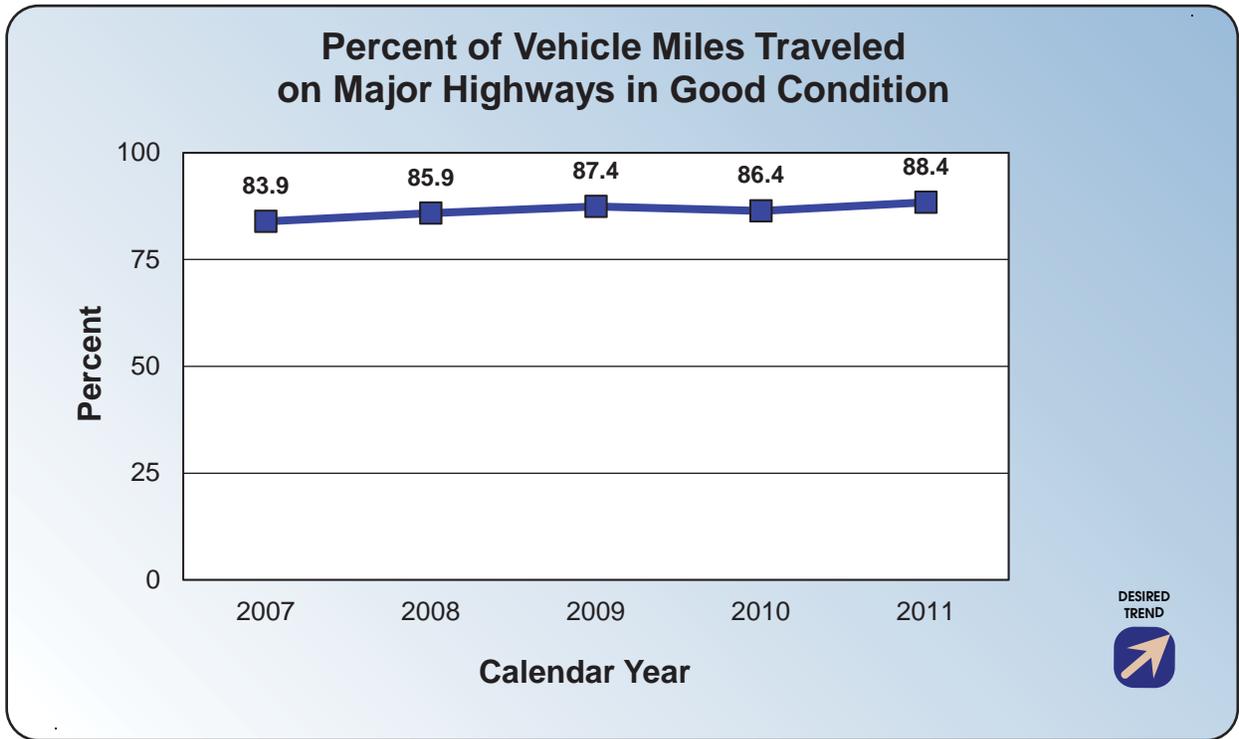
#### **Improvement Status:**

Over 88 percent of vehicle miles traveled on major highways are on pavement in good condition. The increase in condition from 2010 is due to continued efforts to keep the major roads in good condition.

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.

With static transportation funding and increasing costs, MoDOT's ability to adequately maintain good pavement conditions on major highways in the long term is unlikely.

# SMOOTH AND UNRESTRICTED ROADS AND BRIDGES



## SMOOTH AND UNRESTRICTED ROADS AND BRIDGES

### Percent of bridges in good condition-2d New!

**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 "good" if it is not deficient. Deficient means it is either "structurally deficient" or "functionally obsolete" as defined using Federal Highway Administration criteria. An SD bridge is in poor condition or has insufficient load capacity when compared to modern design standards. An 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 10,405 bridges on state highways with 8,197 of these being good bridges. This is an annual measure updated each April based on the prior year's inspections.

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 and provides for movement of traffic between business

districts and suburban residential areas. Examples include the Interstate System and most U.S. routes such as 63, 54 or 36. Examples in urban areas include Business Route 50 (Missouri Blvd.) in Jefferson City, Route 740 (Stadium Blvd.) in Columbia, and Route D (Page Ave.) in St. Louis. There are currently 3,588 bridges on major highways.

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. There are currently 6,817 bridges on minor highways.

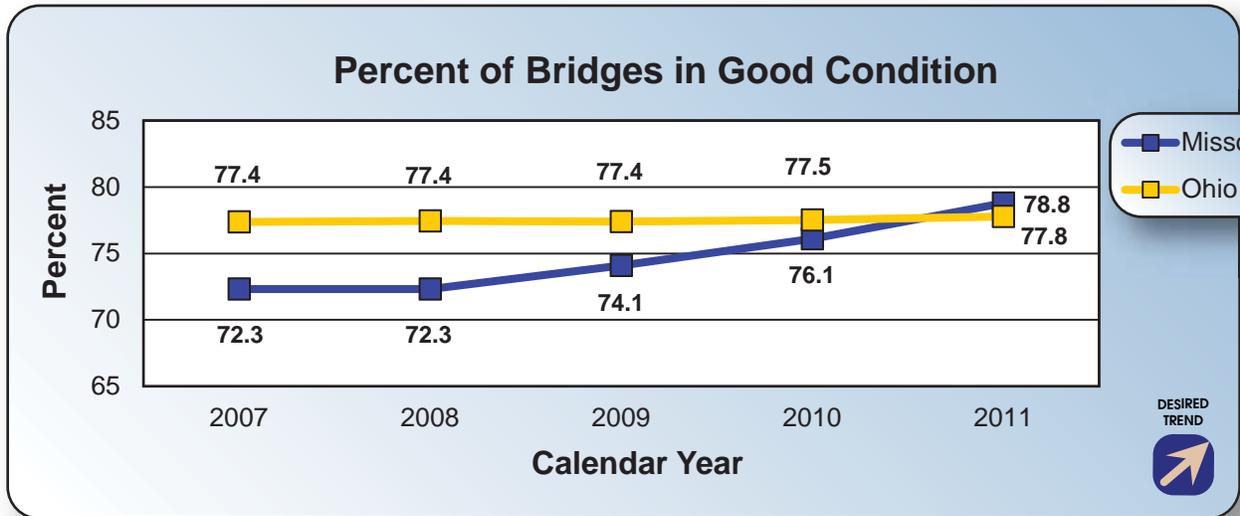
#### **Improvement Status:**

Bridge conditions have been steadily improving over the last four years. The improvement in this measure has been heavily impacted by the Safe & Sound program but has also been significantly impacted by other bridge work that was in the STIP.

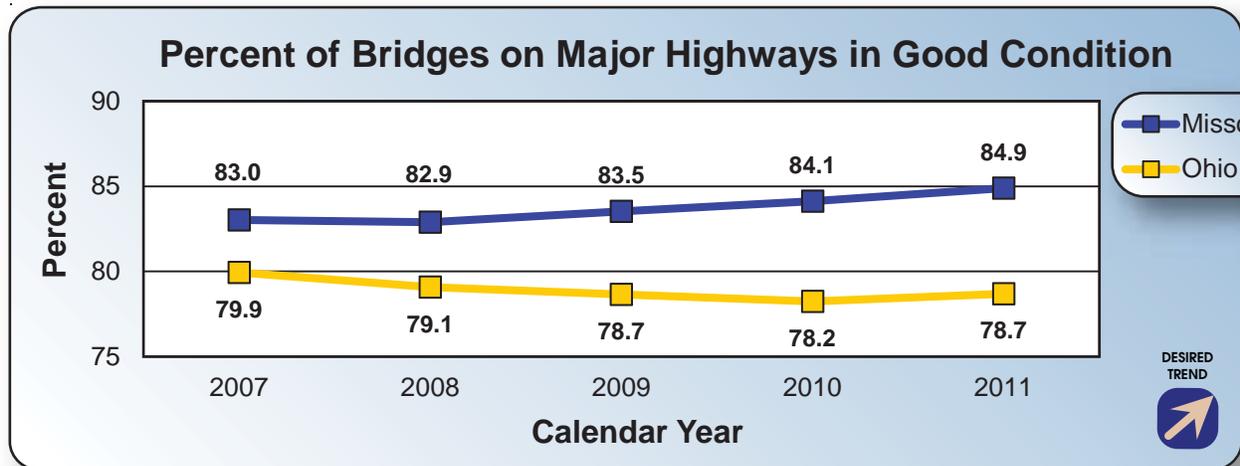
With static transportation funding and increasing costs, MoDOT's ability to adequately maintain bridges in good condition in the long term is unlikely.



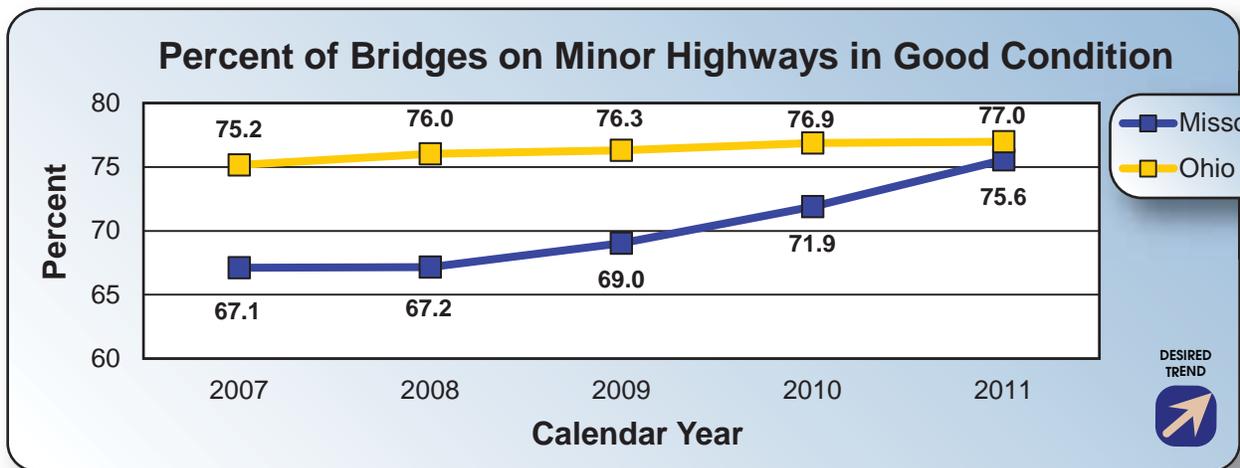
# SMOOTH AND UNRESTRICTED ROADS AND BRIDGES



\* Source for Ohio, Corresponding NBI data files for each year from FHWA website, once available.



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\* Source for Ohio, Corresponding NBI data files for each year from FHWA website, once available.

## Percent of major bridges 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 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:

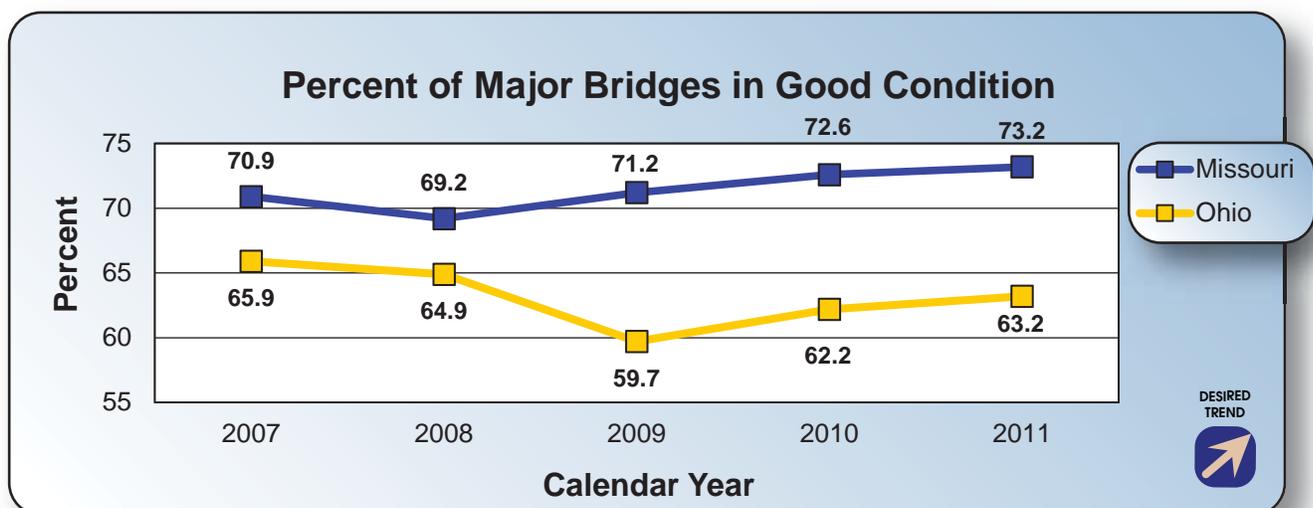
A major bridge is defined as any structure with a length greater than 1,000 feet. There are currently 213 such structures on the MoDOT system. While they make up only 2 percent of the total number of structures, they represent 28 percent of our bridge deck area.

A bridge is considered in good condition if it is not deficient. Deficient means it is either “structurally deficient” or “functionally obsolete” as defined using Federal Highway Administration criteria. An SD bridge is in poor condition or has insufficient load capacity when compared to modern design standards. An 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 4.0 percentage points over the last four years. This increase has resulted primarily from a one-time infusion of \$26.4 million in special money received from Congress, ARRA money, and normal STIP projects.

With static transportation funding and increasing costs, MoDOT’s ability to adequately maintain bridges in good condition in the long term is unlikely.



\* Source for Ohio, Corresponding NBI data files for each year from FHWA website, once available.

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