

**PAVEMENT CONDITION DISCUSSION**

**DESCRIPTION:**

Department staff has researched a multi-tier management system and proposes that such an approach be discussed to replace the current, single-tier, 90% 'Good' or better statewide goal and a change in the Category 1 funding formula.

**ISSUES:**

- Analysis shows that the 90% 'Good' or better statewide pavement condition goal can not be achieved and that pavement conditions will continue to deteriorate. This is due to federal rescissions, reduced revenue and increased construction costs.
- Twenty-one other DOTs have implemented multi-tier pavement condition goals. More effective use of limited funds and improved or stabilized pavement conditions have been reported.

**REFERENCES:**

None.

**DESIRED RESULTS:**

Staff wishes to receive general direction on an approach to developing a multi-tier pavement condition goal system.

**FURTHER ACTIONS**

.Staff anticipates that this will be a continuing dialogue.

**OTHER:**

None.

# Multi-Tier Pavement Condition Goals



**White Paper**

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Texas Department of Transportation  
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## Multi-Tier Pavement Condition Goals

### DESCRIPTION:

TxDOT maintains 194,000 lane miles of pavement which is the largest State maintained highway system in the U.S. The current statewide pavement condition goal, set by the Texas Transportation Commission in 2002, is to achieve 90 percent of State-maintained lane miles in “Good” or better condition by 2012. This is a “one size fits all” goal: high-traffic metro Interstates are treated the same as low-traffic rural FM roads.

Funding for pavement preservation (routine maintenance, preventive maintenance, and rehabilitation) is becoming increasingly limited. Available pavement preservation funds have been reduced by: Federal rescissions; construction cost inflation; reduced fuel tax revenue receipts (and projected receipts) due to reduced travel and increased vehicle fuel efficiency; debt service; and increased competition to address mobility, bridge, and safety issues.

During the August, 2009 Commission meeting, it was noted that the TRENDS revenue assessment computer program predicted pavement funding allocations from FY 2010 to FY 2030 that are well below the 2030 Committee’s pavement needs estimate to achieve and maintain 80 percent ‘Good’ or better pavement Conditions. Based on this observation, TxDOT Administration requested an analysis of predicted future pavement Condition Scores using the same methodology and assumptions as was used in the 2030 Pavement Needs study, but based on the current and future projected funding allocations.

The analysis showed that the 90% ‘Good’ or better goal can not be achieved and system conditions will deteriorate to unacceptable levels as shown in Figure 1.

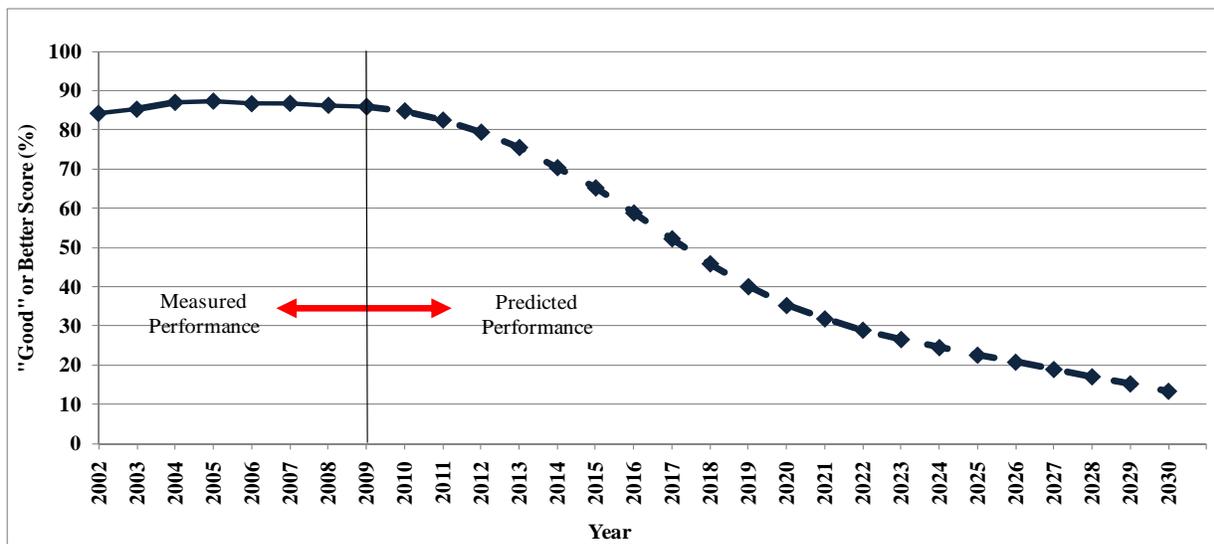


Figure 1. Predicted Pavement Performance Trend for FY 2009-2030  
[Center for Transportation Research (CTR), Zhang et al 2009]

In response to this finding, the Administration directed TxDOT personnel and University researchers to investigate alternate pavement condition goal systems and a funding allocation formula that preserves the State pavement network under a constrained budget. In addition, the group was directed to assess potential risks and consequences associated with these goals.

## Multi-Tier Pavement Condition Goals

### ISSUES:

The investigators are exploring several questions.

- What are the most effective strategies to preserve the system and provide the highest achievable pavement conditions for the greatest number of Texans?
- How do we manage risk as pavement system conditions deteriorate due to limited pavement preservation funding?
- What are the consequences in terms of road user costs and other factors of allowing portions of the state network to deteriorate?
- How should the Category 1 Pavement funding allocation formula change?
- How are other State DOTs facing the challenges of a constrained budget?

### *The Approach*

A survey of other State DOT pavement condition goal systems, first conducted in July, 2008 and updated in January, 2010, indicates that at least 20 DOTs have used multi-tier pavement condition goals for the past 10 – 20 years. Additional State DOTs are currently considering a multi-tier goal approach in view of limited resources. Each ‘Tier’ includes a portion of the highway network with pavement condition goals that are in line with the importance of the Tier to the overall Statewide Transportation System. Discussions with other DOT Administrators and pavement managers have identified several benefits to the multi-tier management approach:

**Ohio:** *Statewide (pavement) conditions have improved since multi-tiered goals were implemented. Multi-tiered goals did impact regional funding distributions; this meant that districts that primarily managed (rural roads) had to craft solutions to address their roadways and needs which are different than in urban areas or on the Interstate.*

**Mississippi:** *We’ve had a 3-tier system in place for 10 years. Multi-tier Goals have helped direct funds based on statewide needs rather than specific districts.*

**Kansas:** *We set 85/3 on the Interstate and 80/5 on non-Interstate. The first number is the percentage ‘Good’ or better goal, the second number is percentage ‘Poor’ or ‘Very Poor’ goal (not to exceed). Setting different Goals for the IH and non-IH routes definitely resulted in the improvement of our IH system condition and better performance. Higher goals raised the importance of the IH system.*

**Florida:** *Multi-tiered Goals have helped keep the Interstate and turnpike systems in better condition. However, we do not allow other portions of our arterial system to deteriorate. We maintain goals for each Tier as well as a Statewide standard to achieve 80% Good or better conditions based on Florida Statute.*

## **Multi-Tier Pavement Condition Goals**

In conjunction with the DOT survey, an analysis is underway to evaluate the TxDOT pavement system using a multi-tier pavement condition goal approach. A preliminary assessment of the TxDOT highway network was conducted based on different Tier configurations with associated lane miles; truck traffic levels; vehicle miles traveled and other factors.

### **DESIRED RESULTS:**

Based on this preliminary assessment, a proposed three-Tier system was developed as shown in Table 1. It is proposed to set goal percentages for ‘Good’ or better conditions and goal percentages (not to exceed) for ‘Poor’ and very poor conditions for each Tier.

Table 1. Preliminary Proposed Three-Tier System With Tier Descriptions and Statistics.

Category	Description	Lane Miles	Percentages of...		
			Lane Miles	VMT	Truck VMT
<b>Tier 1</b>	High-traffic major corridors (such as IH and US)	47,106.6	24.22	64.68	70.40
<b>Tier 2</b>	Intermediate-traffic routes, including state and local corridors important to the economy	30,463.2	15.67	18.07	15.01
<b>Tier 3</b>	Low-traffic routes (mainly FM, but some SH and US).	116,890.6	60.11	17.25	14.58

### *Scenarios Analyzed So Far*

The Center for Transportation Research has analyzed five Goal Scenarios identified by the TxDOT Project Monitoring Committee. The five Scenarios include different % ‘Good’ or better goals for the 3 Tiers. Please note that there is no longer a statewide goal for percentage of lane miles in ‘Good’ or better condition. Table 2 shows the goals for the five Scenarios.

Table 2. Five Potential Goal Scenarios.

	Current (2009)	Scenario 1	Scenario 2	Scenario 3	Scenario 4 A (with current UTP Funding)	Scenario 4 B (with current UTP Funding)
Tier 1	85.69/ 2.72	90/1*	90/1*	80/1*	70/1*	80/1*
Tier 2	80.99/ 3.85	90/3*	80/3*	70/3*	70/3*	50/3*
Tier 3	87.31/ 1.74	90/5*	70/5*	50/5*	28/5*	25/5*

Table 3. Estimated M&R Needs Based on the Five Potential Goal Scenarios.

	Current (2009)	Scenario 1	Scenario 2	Scenario 3	Scenario 4 A (with current UTP Funding)	Scenario 4 B (with current UTP Funding)
Tier 1	85.69/ 2.72	\$11.02	\$10.88	\$8.46	\$6.28	\$8.46
Tier 2	80.99/ 3.85	\$4.61	\$3.76	\$3.11	\$2.85	\$1.89
Tier 3	87.31/ 1.74	\$25.28	\$14.79	\$9.01	\$2.28	\$1.06
Total	85.94/ 2.30	\$40.90	\$29.43	\$20.58	\$11.41	\$11.41

Table 3 shows the estimated needs (in Billions of dollars) to achieve and maintain each of the five Table 2 Scenarios over the next 10 years. These estimates only address preservation of the existing highway system and do not include treatment costs for added capacity, mobility lane miles that might be constructed between FY 2010 and FY 2020.

## **Multi-Tier Pavement Condition Goals**

In addition, these costs do not reflect vehicle operating cost increases that will occur due to lower pavement condition goals for Scenarios 2 and 3. Based on an analyses conducted for TxDOT Administration, the increase in vehicle operating costs exceeds the reduction in M&R needs. There are no cost savings for either TxDOT or taxpayers by allowing the system to deteriorate.

### **FURTHER ACTIONS:**

Additional analyses are planned to evaluate other Scenarios and to determine the percentages of lane miles in the 'Good' or better and 'Poor' or 'Very Poor' categories using different funding allocations.

Additional work is also underway to review the Category 1 Funding allocation formula and to determine changes that may be needed to ensure funding is allocated statewide in the most effective manner.

It is anticipated that funding allocations may change from district to district in order to achieve statewide Condition Goals and to ensure that the IH System and principal arterials important to the region and the state are maintained in a manner acceptable to Texas' motorists and to meet freight movement needs. This work will consider safety as a key priority and will consider providing funding which allows districts to craft treatment solutions that meet local needs.

### **OTHER:**

The Administration will be prepared to present preliminary findings on the following topics to the Commission at the February 24, 2010 workshop:

- Proposed Multi-tier Pavement Condition Goal Scenarios and associated needs estimates;
- Projected 'Good' or better and 'Poor' or 'Very Poor' percentages for each Scenario;
- A preliminary new Category 1 Funding Allocation formula process which incorporates the multi-tier pavement condition goal approach;
- Evaluate risks and consequences associated with each multi-tier goal Scenario.