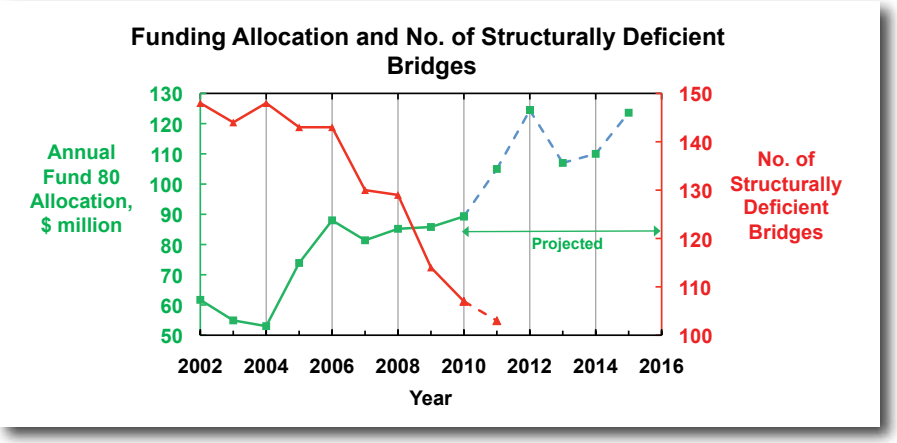
Using Data-Based Bridge Performance Measures

CREATING DETAILED PERFORMANCE MEASURES THAT SHOW THE IMPACT OF BRIDGE FUNDING CAN SWAY STATE ADMINISTRATORS AND ELECTED OFFICIALS

by Robert Healy, Maryland State Highway Administration

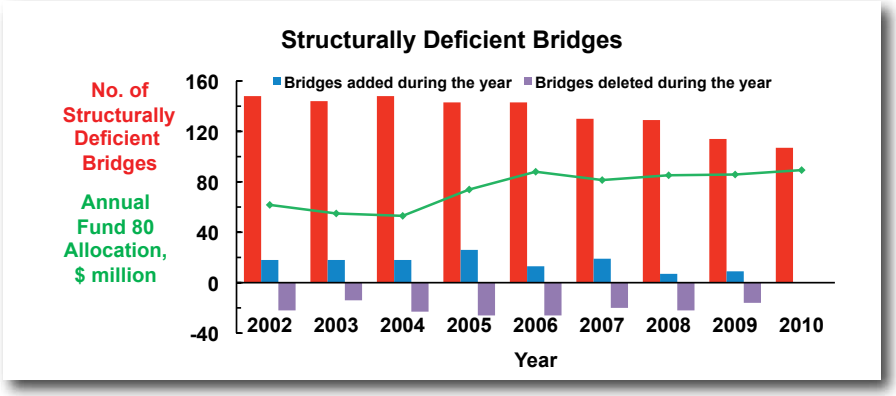
Ask any elected or state official if bridge preservation is important, and they'll agree that it absolutely is. No one wants to face the ultimate disaster of a bridge collapse due to lack of preservation. But when the time comes to allocate funds, the array of competing "important" programs often expands beyond the state's available resources, leaving bridge repairs and replacements underfunded. To ensure that bridge projects receive the money they deserve—and that they can hang onto it as budgets tighten during the year—engineers need to be confident that fund allocators understand the impact the money will have on citizens' lives.

In Maryland, we meet this need with a series of data-based performance measures with illustrative charts that show that funding added to the department's budget will directly impact the number of structurally deficient bridges that we operate. This effort has proven successful, securing even more data points that help show the cause-and-effect relationship that makes a compelling case.



The key chart in Maryland's presentation for funding allocations uses performance data produced for StateStat showing funding allocations each year compared to the number of structurally deficient bridges. The chart visually demonstrates the value that added funding can provide.

As a result of this effort and more focus by state officials in general on bridge rehabilitation, funding for bridge projects in the state has risen significantly, from $53 million in 2004 to $89.3 million in 2010. The total is expected to continue to rise, reaching a projected $124.4 million in 2012. Over the same period, the number of bridges maintained by the State Highway Administration that are "structurally deficient" has dropped from 148 in 2004 to 107 in 2010.



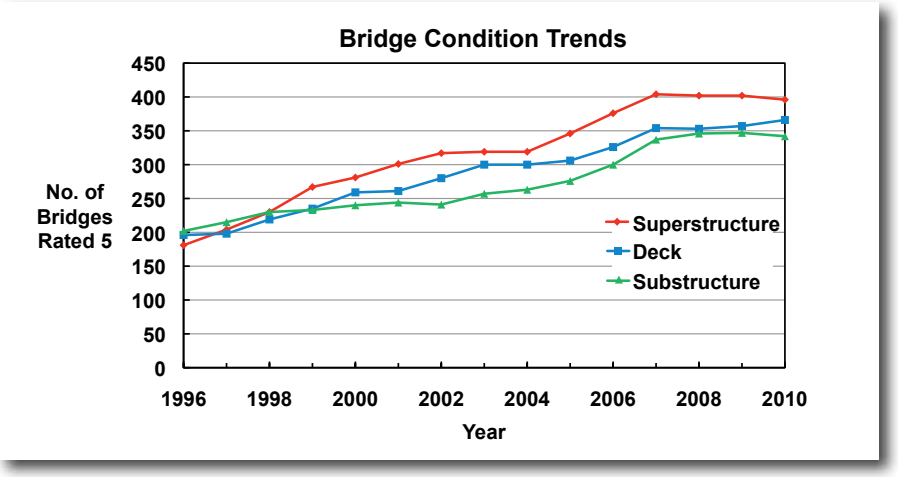
This chart shows the number of structurally deficient bridges on the State Highway Administration system per year, along with the amount of increase or decrease compared to the amount of yearly funding.

Showing the Relationship

The intensive data-tracking and presentation process began in earnest 5 years ago, as we focused more attention on the relationship between the level of funding received and the condition of bridges. The critical element is proving that money spent on projects has a payoff. We focus on that point specifically in our presentation. Intuitively, this cause-and-effect relationship makes sense, but showing quantitative data makes it stand out from other highway programs competing for funds.

The program solidified in 2006 thanks to the direction of Governor Martin O'Malley, the former mayor of Baltimore. As mayor, O'Malley instituted a reporting mechanism for department performance, called CityStat. When he moved into the governor's mansion, he expanded the concept to all of Maryland. The StateStat data gathering process encouraged us to compile as much information as necessary to explain the department's performance accomplishments and goals.

This chart shows the growing number of bridges that are rated 5 and in danger of falling into the structurally deficient category (rating of 4 or less). It also shows the beginning of a trend that preventative maintenance on nondeficient bridges is beginning to pay off. The information can help persuade officials that money allocated for this purpose will help prevent more bridges from falling into the category of structurally deficient.



The information is used to create the presentation on which funding requests to the state Department of Transportation and other funding groups are based. It also forms the basis for presentations given to other bridge groups and association meetings.

As noted, the dramatic cause-and-effect relationship became apparent between 2004 and 2006, when funding rose from $53 million in 2004 to $73 million in 2005 and $88 million in 2006. That growth was charted against the number of structurally deficient, state-operated bridges, which fell from 143 in 2006 to 130 in 2007, 129 in 2008, and 114 in 2009. Maintaining high levels of funding in 2007 through 2009 resulted in the number of structurally deficient bridges to continue falling.

Showing this slightly delayed response (which is expected as the funding is put into use) not only aids in securing necessary funding each year, but it helps retain it as budgets get squeezed for various reasons as the year unfolds. During the recent recession, when funds became scarce as motor-vehicle titling fees and other revenues declined, many departments and programs were cut back. However, the bridge department kept its funding intact, helped by the emphasis placed on bridge preservation by senior officials and because we could demonstrate that the allocated funds produced measurable performance to benefit our citizens.

New Data Added

The performance data, which previously required only a few pages, continues to be expanded as new charts and relationships are found to help explain how well the budget is leveraged. The data now are produced in an annual report that includes historical information and contextual data in addition to the performance statistics.

The next challenge is to convince allocators to continue funding projects so structures can be addressed before they reach the structurally deficient stage. None of the existing bridges are improving on their own, and our goal is to gain enough funding that we can prevent more from falling into this category.

Preventing bridges from falling into the structurally deficient category will require a new type of measurement to show how the money has produced a return on the investment. Our goal is to use performance data to establish sustainable funding levels that support aggressive preventative maintenance and extended bridge life while minimizing life-cycle costs.

All states have access to this basic bridge information because it is required in annual reports to the federal government. The key to gaining the necessary funding is presenting it in a performance-based model to show that bridge expenditures create a significant bang for the buck.

Non-Funded Bridge Projects with Costs in Excess of $5 Million Ranked by Priority Needs

System Preservation Costs and Capacity Improvement Costs

Priority	Project Description	County	System Preservation Cost 2010	Capacity Improvement Cost 2010	Total Improvement Cost 2010
1	MD 272/AMTRAK	Cecil	$6,000,000	$4,000,000	$10,000,000
2	Frederick Road over I-695	Baltimore	$5,000,000	$20,000,000	$25,000,000
		Priorities 3-13			
14	I-70/MD 63	Washington	$11,000,000	$3,000,000	$14,000,000
15	Crosby Road over I-695	Baltimore	$3,000,000	$3,000,000	$6,000,000
16	I-81 over Potomac River	Washington	$6,500,000*	$22,500,000*	$29,000,000*
		Totals	$98,700,000	$98,300,000	$197,000,000

*Maryland's share of the costs

To ensure officials understand that problems loom on the horizon, the department produces a list of upcoming nonfunded bridge projects in excess of $5 million to repair, ranked by needs. This chart is also useful in showing that much of the cost associated with large bridge preservation projects is not related to bridge condition, but nevertheless frequently must utilize precious bridge preservation funds in order to proceed.