

## BRIDGES

### Grade: D+

#### Overview

Thirty-four percent of Maine's bridges subject to federal inspection requirements are deficient, compared to a national average of 25 percent. Though the 2008 Legislature approved an additional \$160 million in funding over 4 years for MaineDOT bridges, it will not have any impact on other agency bridges. The 10-year need for MaineDOT bridges is \$1.3 billion, resulting in a \$440 million funding gap.

#### Introduction and Background

There are 2,387 known bridges, defined as spans greater than 20 feet long, in Maine, and an additional 1,453 minor spans, measuring 10 to 20 feet long. In this brief, the term "bridges" generally refers to both categories. Maine's bridge inventory is primarily comprised of 2,705 Maine Department of Transportation (MaineDOT) bridges, 812 municipal bridges and 182 bridges owned by the Maine Turnpike Authority (MTA). An additional 141 bridges are owned by other government and private agencies.

In terms of route importance, Maine's bridge inventory includes 448 bridges located on the National Highway System (NHS). The NHS includes the Interstate Highway System, as well as other roads vital to the nation's economy, defense and mobility. While reviewing the condition and ratings of bridges, Maine's NHS bridges will be evaluated separately since they are an integral part of the national transportation system.

According to MaineDOT data, nearly half of the state's bridges (49 percent) were constructed more than 50 years ago. Many of these bridges were only designed to last approximately 50 years before requiring significant repairs or replacement. Historic funding levels have not permitted Maine bridges to be replaced before reaching their design life.

#### Inspection Frequency and Methods

All Maine bridges are regularly inspected in accordance with the Federal Highway Administration's (FHWA) National Bridge Inspection Standards (NBIS). MaineDOT inspects most bridges every two years. MTA bridges are inspected annually. Inspection data for bridges with spans of at least 20 feet are submitted to FHWA for inclusion in the National Bridge Inventory (NBI). NBIS inspection data, supplemented with data from MaineDOT and MTA, was used as the basis for the evaluation of Maine bridges.

#### NBIS Rating System

The NBIS established by FHWA and the American Association of State Highway and Transportation Officials (AASHTO), defines the scope of bridge inspections and provides guidelines for rating and documenting the condition and general attributes of bridges. Standard condition evaluations are documented and functional aspects of the bridge are rated. NBIS provides criteria to define a bridge as either structurally deficient or functionally obsolete.

*Structurally Deficient (SD):* A bridge is structurally deficient if there is significant deterioration to the bridge deck, bridge supports or other major components. Although bridges classified as structurally deficient are safe for continued use, they may be posted for lower weight limits or closed if their conditions warrant such action. In a worst case scenario, a structurally deficient bridge may be closed to traffic.

*Functionally Obsolete (FO):* A bridge that is functionally obsolete is safe to carry traffic, but has less than desirable geometric conditions required by current design standards. Bridges that are functionally obsolete often have narrow lanes, inadequate clearances or poor alignments.

Bridges that qualify as both structurally deficient and functionally obsolete are categorized only as structurally deficient.

**Condition and Adequacy**

The breakdown of Maine bridges listed as either structurally deficient or functionally obsolete is shown in Table 1. In addition to statewide averages, percentages of structurally deficient and functionally obsolete bridges are listed by owner and by span length. Given that minor spans are not included in NBI data and, therefore, cannot be easily compared to national averages, structurally deficient and functionally obsolete counts for these bridges are listed separately.

In 2007, 34 percent of Maine bridges 20 feet or longer in length were classified as deficient, including 15 percent classified as structurally deficient and 19 percent classified as functionally obsolete. For the same period, NBI data indicates that 25 percent of bridges nationally were deficient, including 12 percent classified as structurally deficient and 13 percent classified as functionally obsolete.

When Maine's NHS bridges are considered separately, the percentage of deficient bridges 20 feet or greater in length drops to 25 percent, including six percent structurally deficient and 19 percent functionally obsolete. The smaller percentage of structurally deficient and functionally obsolete bridges on Maine's NHS roadways indicate these vital structures are generally in better condition than the average Maine bridge. For the same period, NBI data indicates that 20 percent of NHS bridges nationally are deficient, including five percent classified structurally deficient and 15 percent classified as functionally obsolete.

Maine's minor span bridges are in a similar condition with 17 percent classified as structurally deficient. Although only one percent are classified as functionally obsolete, it should be noted that a large percentage of pipe structures comprise the minor span category. Culverts do not have rating criteria that can classify them as functionally obsolete.

**Table 1 – Deficient MaineDOT, Municipal, and MTA bridges by owner and span length<sup>1</sup>**

**Bridges Reported to the National Bridge Inventory** (*Spans ≥ 20' in length*)

Owner	# Bridges	# SD	% SD	# FO	% FO	# SD or FO	% SD or FO
MaineDOT	1952	234	12.0%	360	18.4%	594	30.4%
Municipal	208	89	42.8%	26	12.5%	115	55.3%
MTA	162	17	10.5%	65	40.1%	82	50.6%
<b>Total</b>	<b>2322</b>	<b>340</b>	<b>14.6%</b>	<b>451</b>	<b>19.4%</b>	<b>791</b>	<b>34.1%</b>

**Minor Spans not reported to the National Bridge Inventory** (*spans 10' to 20' in length*)

Owner	# Bridges	# SD	% SD	# FO	% FO	# SD or FO	% SD or FO
MaineDOT	753	84	11.2%	7	0.9%	91	12.1%
Municipal	604	152	25.2%	5	0.8%	157	26.0%
MTA	20	0	0.0%	0	0.0%	0	0.0%
<b>Total</b>	<b>1377</b>	<b>236</b>	<b>17.1%</b>	<b>12</b>	<b>0.9%</b>	<b>248</b>	<b>18.0%</b>

**All Maine Bridges** (*spans ≥ 10' in length*)

Owner	# Bridges	# SD	% SD	# FO	% FO	# SD or FO	% SD or FO
MaineDOT	2705	318	11.8%	367	13.6%	685	25.3%
Municipal	812	241	29.7%	31	3.8%	272	33.5%
MTA	182	17	9.3%	65	35.7%	82	45.1%
<b>Total</b>	<b>3699</b>	<b>576</b>	<b>15.6%</b>	<b>463</b>	<b>12.5%</b>	<b>1039</b>	<b>28.1%</b>

Furthermore, Maine's bridge inventory includes 63 non-redundant bridges. A bridge is non-redundant if a failure in any major component could potentially lead to a collapse of the bridge. As of 2007, 49 percent of Maine's non-redundant bridges were classified as structurally deficient. An additional 27 percent were classified as functionally obsolete.

<sup>1</sup> The 141 bridges owned by federal government and others are not included in this table.

Based on bridge inspection data, MaineDOT developed a watch list including 386 bridges that are in jeopardy of being closed or weight-restricted if they are not repaired or replaced in 10 years. Eighty-two Maine bridges are already weight restricted or closed.

### Investment Needs

In a November 2007 report to the governor, *Keeping Our Bridges Safe*, MaineDOT estimated the minimum investment to maintain MaineDOT's bridge infrastructure is between \$120 million and \$130 million per year. In 2008, the Maine Legislature approved an additional \$160 million over four years (or \$40 million per year), totaling an annual investment of \$110 million.

In spite of this step in the right direction, the current funding level continues to fall short of demand. In late 2007, MaineDOT released its statewide long-range transportation plan, *Connecting Maine*, which documents a 10-year funding gap for the entire transportation system of \$3.3 billion out of a total system-wide need of \$6.5 billion. Included in that total is \$440 million gap for MaineDOT bridges, out of a total \$1.3 billion need.

Furthermore, the four-year, \$160 million MaineDOT funding increase approved by the Legislature in 2008 will have little effect on the state's 812 municipally owned bridges. With nearly 30 percent of municipal bridges categorized as structurally deficient, many of these structures are either already posted or are in danger of being posted or removed from service.

Similarly, MTA has not met revenue needs during the past five years, while construction costs for highway and bridge projects have far exceeded forecasted amounts. Funding for MTA's 10-year, \$559 million capital improvement program, which includes \$230 million for bridge replacement, rehabilitation and repairs, is critical to maintaining the MTA's infrastructure. In October 2008, MTA announced that a toll increase is likely in 2009 to accommodate this need.

### Conclusions and Recommendations

Bridge conditions in Maine are significantly below desirable standards and the national average. Based on 2007 inspection data, 34 percent of the state's bridges 20 feet or greater in length are structurally deficient or functionally obsolete, compared to a national average of 25 percent. Additionally, bridge funding continues to fall below levels necessary to maintain our existing infrastructure. Maine ASCE gives Maine's bridge inventory a grade of **D+**.

Successfully and efficiently addressing Maine's bridge infrastructure will require a long-term, comprehensive strategy, including identifying potential financing methods and investment requirements. Continued neglect and lack of adequate maintenance will ultimately result in higher annual bridge life-cycle costs due to shortened service life. Increasing investment levels now to improve the condition and functionality of Maine's bridges will significantly reduce the required investment in the future.

For the continued safety of bridges, Maine ASCE makes the following recommendations:

- Fully fund the bridge program outlined in MaineDOT's *Keeping Our Bridges Safe* report;
- Establish a state funding mechanism for municipal bridges and encourage municipalities to establish capital reserve funds for the repair of important municipally-owned bridges;
- Develop, implement and consistently operate a systematic approach for the repair, rehabilitation and replacement of deficient Maine bridges. At a minimum, the approach should prioritize bridge investments considering public safety, route importance and bridge redundancy; and
- Reduce the percentage of structurally deficient bridges in Maine to 10 percent or below the national average, whichever is less.



**Report Card**  
FOR MAINE'S  
**Infrastructure**

Issued December 10, 2008

**Sources**

Information for this report was obtained from a number of sources including the MaineDOT, Federal Highway Administration (FHWA), the Maine Turnpike Authority, TRIP, and the Maine Better Transportation Association.

1. "Keeping Our Bridges Safe, A report on Maine's bridge inspection and improvement programs", November 26, 2007, MaineDOT
2. FHWA website, Bridge Technology Section, National Bridge Inventory, highway bridges by owner, 2007 inspection data
3. "Losing Ground, A Report on the State of Maine's Highway Fund", July 2005, Maine Better Transportation Association
4. "Future Mobility in Maine: Meeting the State's Need for Safe and Efficient Mobility", June 2007, TRIP
5. August 2008 Maine Turnpike Authority Board of Directors Meeting Minutes
6. Maine Turnpike Authority 10 year plan, Updated 2008
7. "MaineDOT Bridge Watch List", November 21, 2007, MaineDOT
8. "Testimony of The American Society of Civil Engineers Before the Senate Environment and Public Works Committee On Improving the Federal Bridge Program: an Assessment of S. 3338 and H.R. 3999", September 10, 2008.