

Thirty-two percent of North Carolina’s 17,803 highway bridges are considered structurally deficient or functionally obsolete, which contributes significantly to traffic congestion and places local communities at risk by forcing ambulances, fire trucks and school buses to take lengthy detours because of weight limitations. The cost to replace these deficient structures is estimated to be approximately \$8 billion. **As a result, the State’s bridge infrastructure has been given a grade of C-.**

## BACKGROUND

All bridges in North Carolina are inspected every 24 months using federal inspection criteria, and all inspectors are required to attend training to assure bridge conditions are properly coded and recorded. Numeric ratings are assigned to various parts of the structure and these codes are used to develop the structure’s sufficiency rating (SR). The SR indicates the overall condition of the structure and how critical its need for rehabilitation and/or replacement is.

While not necessarily unsafe for all vehicles, traffic on some bridges must be limited through weight and speed restrictions. In some cases, deteriorated structural components can lead to traffic on a bridge being restricted. In others, older design features that cannot safely accommodate current traffic volumes, vehicle sizes and weights will make a bridge

functionally obsolete, thus requiring a restriction on its traffic flow.

Another reason for classifying a bridge as structurally deficient or functionally obsolete is a change in the legal truck load limit. Some of the State’s older bridges were designed for a much lower truck load than is applied to highways today. Even if a bridge has not significantly deteriorated, an increase in the standard allowable truck weight can cause an older bridge to become weight restricted.

Restricting a bridge to less than the standard allowable weight and posted speed is a major contributing factor to traffic congestion and poses serious risks and inconveniences for school buses and emergency response vehicles.

## CONDITIONS

In May 2006, the North Carolina Board of Transportation awarded \$8.7 million for five bridge replacement projects. At that monthly spending rate, it will be 2083 before all the State’s deficient bridges are replaced. However, this assumes no additional bridges will become deficient in the next 77 years, which, considering the current bridge design life is assumed to be just 75 years, is very unlikely.

SRs from the 2005 Deficient Bridge List, compiled by the North Carolina Department of Transportation–Bridge Maintenance Unit, are as follows:

*Sufficiency Rating	Number of Bridges
Less than 10	130
10-20	250
20-30	490
30-40	620
40-50	1,160

A total of 2,650 bridges have an SR of less than 50.

*\* SRs range from zero to 100—with a lower SR indicating a more deficient structure.*

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The age of North Carolina's bridges is also a critical factor. Over 40 percent of deficient bridges were constructed in or before 1956, making nearly 2,300 of the State's bridges more than 50 years old. Structures constructed between 1957 and 1961 include an additional 1,300 deficient bridges, all of which will turn 50-years-old in the next 5 years.

While pedestrian bridges were not evaluated in this report, the tragic collapse of the Lowe's Motor Speedway pedestrian bridge placed these structures in the spotlight. This event prompted the state of North Carolina to require all pedestrian bridges built over highways to undergo the same testing methods and schedule as highway bridges carrying vehicular traffic. However, existing pedestrian bridges and those that do not cross highways are exempt from this requirement. All pedestrian bridges located on greenways, golf courses, etc., are exempt from the requirement,

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## POLICY OPTIONS

Solutions intended to ease increasing demands on the State's transportation system, and to improve bridge conditions, capacity and safety, are complex and do not always mean building more infrastructure. America must change its transportation behavior, increase investment at all levels of government and

and not subject to inspection by trained professionals.

The state of North Carolina also has many railroad bridges. These structures are inspected once a year using federal guidelines, but are not required to undergo inspection by the State and thus are excluded from this evaluation.

Grades were assigned to the bridges category in three areas. A grade of D was given to funding, due to the expected 75 years (at 2006 funding level) it will take to replace all the substandard bridges in the State. A grade of B was given to inspections, due to the exclusion of most pedestrian bridges from inspection requirements. And finally, a grade of D+ was given to condition because 32 percent of the State's bridges are considered substandard. Those three areas combined for an overall grade of C- for North Carolina's bridges.

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## RECOMMENDATIONS

- By 2020, the state and local governments of North Carolina should ensure that fewer than 10 percent of the State's bridges are classified as structurally deficient or functionally obsolete;
- Use of the Highway Trust Fund for non-transportation related projects must cease;
- Life-cycle cost analysis principles should be used to evaluate the total cost of bridge replacement projects;

make use of the latest technologies. Cities and communities must be better planned to reduce dependence on personal vehicles, and businesses must encourage more flexible schedules and telecommuting. Local governments should also have the option to raise bridge replacement funds with local option sales taxes.

- Environmental streamlining should be supported for bridge replacement projects;
- All pedestrian bridges should be required to be inspected every twenty-four months; and
- Funding for bridge replacement projects should be increased.

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## SOURCES

North Carolina Department of Transportation, Bridge Maintenance Unit: Deficient Bridge List 2005

ASCE, National Infrastructure Report Card 2005

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