



AMERICAN COUNCIL OF ENGINEERING COMPANIES

**Testimony of Ray McCabe, PE,
HNTB Senior Vice President and National Director of Bridges and Tunnels
Before the Committee on Transportation and Infrastructure Subcommittee on
Highways and Transit**

**Hearing on Structurally Deficient Bridges in the United States
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Mr. Chairman and members of the committee, good afternoon. I am Ray McCabe, National Director of Bridge and Tunnel Design for HNTB. HNTB is one of the nation's leading engineering and architecture firms, with particular expertise in the planning and design of transportation infrastructure. I am a licensed professional engineer with over 30 years of experience in bridge planning, design and inspection of all bridge types. I have been involved in designing some of the nation's most significant bridges and have incorporated the latest technologies when appropriate.

HNTB is also a member of ACEC, the American Council of Engineering Companies, the business association of America's engineering industry representing over 5,500 member firms across the country. On behalf of ACEC and the industry, we appreciate the opportunity to testify before you today to discuss issues that contribute to bridge safety.

Bridges are the vital link allowing our transportation system to operate seamlessly across the country. Over half of our nation's bridges were built prior to 1964. Of the 600,000 public road bridges in the country, 74,000, roughly 12 percent, are classified as

structurally deficient. While this percentage has declined since the early 90's, progress has been slow and the magnitude of structurally deficient bridges is still clearly unacceptable even understanding that deficient does not imply unsafe.

The I-35 bridge collapse in Minneapolis was a national tragedy and a wake up call on how we invest in our nation's bridges. While we do not know the cause of the I-35 bridge collapse in Minneapolis, we do know that the bridge was inspected according to federal standards. The engineering community anxiously awaits the findings of the NTSB to determine what corrections need to be made to our design, construction, inspection and maintenance practices.

Clearly, we need to make improvements to the bridge inspection program. Improving inspection procedures and techniques will allow us to better allocate available resources. However, it is important to remember that the information gathered from inspections must be applied to a well funded and focused program of bridge repair and replacement to prevent future disasters.

Maintaining our nation's bridges in a cost-effective manner and ultimately ensuring the safety of the people who travel them requires adequate funding combined with three components:

1. Improvements to the bridge inspection and ratings system.

The National Bridge Inspection Standards enacted in 1971 have served us extremely well. FHWA has diligently updated the standards to meet changing issues, needs and technology. Nonetheless, we know that the process is not perfect. Bridge inspections are generally visual which leads to subjective determinations of bridge conditions. An FHWA study indicated that “in depth inspections” are unlikely to identify many of the specific defects for which they are prescribed. The study found that less than 8% of the inspections successfully located weld cracks and other implanted defects in test bridges. Furthermore the study revealed that inspection ratings were highly variable and dependent on such things as; bridge inspectors’ condition and training, inspection site conditions and accessibility, structure complexity and available funding. Many factors go into the calculation for sufficiency rating and thus a bridge that is rated structurally deficient may still be completely safe. Visual inspection practices must be supported by rigorous training, certification and quality assurance programs, and supplemented with testing techniques to ensure reliable results. Additionally, the emerging field of Structure Health Monitoring holds much promise for real-time evaluation of structures and objective evaluation of bridge conditions. Providing more quantitative data to bridge program managers enables them to more accurately rate bridges which will allow states to effectively allocate bridge rehabilitation dollars.

2. A dedicated methodology to allocate funding for structurally deficient bridges.

More money is a necessary part of the solution. However, any money targeted to fix our nation’s structurally deficient bridges needs to be spent based on safety and prioritized

using a rational approach. Funding must be established based on accurate and consistent data, used strategically and stretched over as many deficient bridges as practical. This can be accomplished only by prioritizing our bridges and the individual repairs necessary to advance the most critical bridges out of the deficient category. As indicated earlier, improved inspection techniques will facilitate this approach. Such a system may have focused more resources on non-redundant welded bridges. These bridges must be given special attention because we know that non-redundant bridges pose a high risk of sudden bridge collapse from failure of an individual member. We have the technology to analyze failure scenarios and use the resulting data to determine bridge inspection methodology and retrofit techniques to reduce risk of bridge collapse.

3. Apply advanced technologies, techniques and materials.

New bridge designs and rehabilitation of existing bridges must make full use of innovative technologies and more durable materials. Resiliency is the key. Today's bridges need to diffuse loads and absorb stresses more effectively. They need to be able to withstand abrupt forces more readily and with less resultant damage. We need to incorporate high-performance concretes and steel into new spans and into structural renovations. Innovative rapid construction techniques should also be considered to minimize inconvenience to the traveling public.

The probability of a bridge failure is extremely low, but it is not zero. It should be, except for failure due to an extreme event. The way to insure the safety of our nation's aging bridge infrastructure is not just additional funding or rigorous inspection or

advanced technologies. It is all three put to concerted use. Let's not wait for the next failure.

Thank you for the opportunity to provide testimony. I look forward to taking your questions.