



Bridge Collapse May Be Warning Signal of U.S. Infrastructure

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With the collapse of the Interstate 35W bridge in Minnesota, transportation regulators and civil engineers are examining the systems that build and inspect the hundreds of thousands of bridges across the country.

The eight-lane Interstate 35W bridge in Minneapolis collapsed Aug. 1 during evening rush hour traffic, falling more than 60 feet into the Mississippi River. Five people are known dead, nearly 100 were injured and eight people remain missing nearly a week later.

Officials at the National Transportation and Safety Board, the federal agency charged with regulating America's civil transportation safety issues, have not determined the cause of the collapse and the investigation could take up to 18 months.

Constructed between 1964-1967, the I-35W bridge is considered a truss arch bridge. The truss is a simple skeletal structure with no piers built into the river bed and a single steel arch over the 390-foot wide expanse of water. Before the collapse, up to 144,000 vehicles used the bridge each day.

Rating bridges

The I-35W bridge, along with other U.S. bridges, had been inspected and rated by transportation officials. The Minneapolis bridge had been rated "structurally deficient" in 1990.

According to the Department of Transportation, such bridges need "significant maintenance attention, rehabilitation or replacement." But the agency considers them safe for use. Over 70,000 other U.S. bridges have this classification.

The National Bridge Inspection Program rates bridges so that states can prioritize money for bridge repair and replacement.

However, states often use transportation funds to build highways and bridges instead of fixing the ones they have.

According to Minnesota transportation officials, the I-35W's low rating was due to corrosion in the bridge's bearings and steel end joints as well as fatigue cracks, but that recent inspections, in 2005 and 2006, had not shown an increase in any of the cracks.

"We thought we had done all we could, but obviously something went terribly wrong," said Dan Dorgan, state bridge engineer for the Minnesota Department of Transportation.

Evaluating the inspection system

Last week's collapse has called into question the inspection system itself.

"They may well have been doing everything that has been prescribed in the national bridge inspection program. That may well not be enough," Mark Rosenker, NTSB chairman told reporters last week, TwinCities.com-Pioneer Press reported.

"There may be some failures in the reporting system that was done here in Minneapolis."

Federal officials have said the program will be reviewed, "top-to-bottom."

But, Rosenker added, Americans should be confident that U.S. bridges are safe.

"I don't believe that they should be worried at all," said Rosenker, the Associated Press reported.

The way we build bridges

Changes may occur in bridge inspection but some civil engineers, like Stephen Kurtz, assistant professor at Lafayette College in Pennsylvania, don't believe that the tragic accident in Minnesota will radically change the way we build bridges.

Structural design, since 1967 when the I-35W opened, has not changed much, Kurtz said, but computers have radically changed the ways engineers analyze the impact of traffic, snow, wind and other factors.

"Before you had hand calculations and approximations. Now, using a computer, you have fewer approximations," Kurtz said.

Kurtz has also said that new technologies, such as ultrasonic sound waves to detect fatigue cracks, are improving bridge inspections.

Not all civil engineers agree with Kurtz.

Duke University professor Henry Petroski argues that the computers still use the same formulas.

"Mostly the analytical tools that are used and the way the stresses and strains are calculated are really old. We may use computers that seem to be doing things better, but they're really only doing the old stuff faster," Petroski told Discover Magazine.

But the biggest change in bridge design, according to Kurtz, is economics. Complicated designs, like those seen in truss bridges, are often too expensive to build now with the rising cost of labor in the United States.

"Every bridge in the 1930s was a truss bridge and it was economics. Metal was expensive then and they are very efficient in terms of materials. Materials have gotten cheaper adjusted for inflation but that's not the case for labor costs, which have gone up, even adjusted for inflation," Kurtz said.

So now, many U.S. bridges are designed to be more efficient to build, such as box girder bridges, whose supports are shaped like hollow boxes, and cable bridges such as suspension and cable-stayed bridges.

-- *Compiled by Annie Schleicher for NewsHour Extra*

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