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## Engineers See Dangers in Aging Infrastructure

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A steam pipe explodes near Grand Central Terminal, a levee fails and floods New Orleans, a bridge collapses in Minneapolis.

These disasters are an indication that this country is not investing enough in keeping its vital infrastructure in good repair, engineering experts warn.

"Governments do not want to pay for maintenance because it is not sexy," said John Ochsendorf, a structural engineer and an associate professor at [Massachusetts Institute of Technology](#).

He said the bulk of the nation's highway system was built in the 1950s and 1960s and is ageing. Referring to the collapse in Minneapolis, he said "This type of event could become more common."

"We have a major infrastructure problem in this country," said Maureen L. McAvey, an executive vice president with the Urban Land Institute, which recently published a report on global infrastructure issues. "The civil engineers have estimated that we have a \$1.7 trillion shortfall in this country alone"

But other factors come into play, as in 1982, when a bridge inspector looked at the Mianus River Bridge in Greenwich, Conn., and did not see the metal fatigue in a pin that would break nine months later, collapsing three lanes of Interstate 95 and killing three people.

In 1987, a New York Thruway bridge near Amsterdam, N.Y., also had a clean bill of health, but inspectors had never gone underwater into the Schoharie Creek to look at the bridge's footings, where flood waters had scoured the concrete base. When the footings slipped, the bridge fell. Ten died.

"The American Society of Civil Engineers issues annual rankings of the state of the nation's infrastructure and most of the grades are C and D," said Michael J. O'Rourke, a professor of civil and environmental engineering at Rensselaer Polytechnic Institute.

But he said it was likely the renovations the Minneapolis bridge was undergoing, rather than general decrepitude was the cause of the collapse. "It is more common for a bridge to have problems during renovations than before or after," he said. "Two or three things have to happen simultaneously for that to happen."

Kumares Sinha, a civil engineering professor at [Purdue University](#), also thinks the renovation may be the key to the collapse. "You have a lot of contractors working there, and somebody probably cut something critical," he said.

But he said the heavily used bridge was difficult to inspect and the constant pounding of traffic could have

caused fatigue in the steel supports.

Nevertheless, the Federal Highway Administration issued a report last year that rated 13.1 percent of highway bridges as “structurally deficient.” It said these bridges have “deteriorated conditions of significant bridge elements and reduced load carrying capacity.”

In addition, the agency reported that an additional 13.6 percent of bridges were “functionally obsolete,” meaning they do not beat current design standards.

Transportation officials know many of the nation’s 600,000 bridges are in need of repair or replacement. About one in eight has been deemed “structurally deficient,” a term that typically means a component of the bridge’s structure has been rated poor or worse, but does not necessarily warn of imminent collapse.

Most deficient bridges, which included the span of Interstate 35W over the Mississippi River in Minneapolis, remain open to traffic.

Finding money to maintain infrastructure has become increasingly difficult as public officials keep pledges not to raise taxes., said Robert Dunphy, a senior resident fellow at the Urban Land Institute. “We have an impending crisis with infrastructure, but it is easy to ignore until you have a catastrophe.”

With public money for infrastructure likely to remain short, some authorities have been seeking to attract private capital by leasing toll roads, for example, said Chris Lawton, a partner in Ernst & Young, the accounting and consulting firm that collaborated with the land institute in the infrastructure report.

Highways have been leased in Chicago and Indiana, but proposals in other areas, including New Jersey, have produced uproars. “There is a lot of public skepticism about private investment in infrastructure,” Mr. Lawton said.

States improved their inspection procedures after the Mianus and thruway bridge collapses, and federal statistics show a steady decline in the percentage of deficient bridges, from 18.7 percent in 1994 to 13.1 percent in 2004.

Still, a study by the Federal Highway Administration found that visual inspections, the primary method used by bridge inspectors, only rarely detect cracks from metal fatigue.

In the study, completed in 2001, 49 bridge inspectors from across the country examined test bridges in Virginia and Pennsylvania. Only 4 percent correctly identified a fatigue crack. Worse, many inspectors identified nonexistent problems, suggesting that bridges sometimes undergo unnecessary repairs while some serious conditions are not detected.

Inspectors now sometimes employ tools like ultrasound, but those add time and cost to their work.

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