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Blueprint America

August 14, 2009

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The No. 13 line -- August 14th, 2009

I-35W Two Years Later: Lessons Unlearned

By Barry B. LePatner and Samuel I. Schwartz

Two years ago, during the Wednesday evening rush hour in Minneapolis on August 1, the I-35W bridge over the Mississippi River collapsed, killing 13 people and injuring 145.

Have we learned any lessons from this tragedy that help make us safer today?

Regrettably, the answer is no.

Built in 1967, the I-35W bridge is one of more than 12,800 bridges standing today designed as “fracture-critical” structures. Built for cost and construction efficiency, these bridges lacked redundancies. That means that the failure of any single structural component from corrosion, excess weight, or design or construction error, could cause the entire bridge to collapse.

In November, 2008, a National Transportation Safety Board report placed primary responsibility for the failure on improperly thin gusset plates, the steel plates fastening two or more beams together.

However, the report failed to explain the lack of action after photographs taken in 1999 and 2003 showed that these gusset plates had bent.

The state transportation department had used federal remediation funds received for the bridge in 1991 and had rated I-35W “poor” from a structural standpoint since 1993. Nonetheless, on the day of the collapse, state engineers had permitted construction crews to pile more than 587,000 pounds of roadbed material on a portion of the bridge positioned over the damaged gusset plates.

Lingering questions extend beyond the four-decade-long puzzle of why a fracture-critical bridge — with steel plates that were apparently too thin — did not fail for 40 years after it was built.

Why did inspectors not flag the bent plates and the too-thin plates and urge action? When consultants in 2006 recommended that the bridge needed to be repaired or replaced, why was the project designated a “budget buster” by state transportation officials and scheduled for replacement in 2020?

And what about new engineering reports that differ dramatically with the NTSB findings? These reports indicate that the failure was not triggered by faulty gusset plates but by frozen bearings that did not allow the bridge to expand in the summer heat.

Nationwide, inspection programs are largely visual and typically subjective. And while technology exists that can measure subtle, unusual movements in bridges, spot cracks in steel before they are visible, and acoustically “listen” to bridges to identify changes in patterns and much more, few state transportation agencies employ these tools. These technologies cost relatively little and would save hundreds of millions of dollars annually if widely adopted. (Disclosure: One of the authors owns shares in a company that makes these instruments).

There are now 72,000 structurally deficient bridges nationwide, a figure inclusive of the 12,800 “fracture-critical” structures cited above. At the very least, the collapse should have spurred the NTSB to call upon every state with similarly designed bridges to take immediate steps to rectify their deficiencies.

Disturbingly, I-35W was not an isolated case: studies show that nearly 600 American bridges have failed since 1989.

Previous generations starved bridges of adequate maintenance funds. Today, that bill is coming due. America spends about two percent of our GDP on infrastructure. China spends 9 percent and most of Europe invests 4-5 percent.

According to House Appropriations Committee figures, the President’s stimulus-focused infrastructure program allocates \$52.7 billion toward transportation-related projects. But this is largely a job stimulus program that aims to do relatively little about infrastructure repair and maintenance.

We are nowhere near investing the amounts needed to address our ailing infrastructure. In 2005, the American Society of Civil Engineers estimated the cost of bringing America’s infrastructure up to standard at \$1.6 trillion. In 2009, the organization put the figure at \$2.2 trillion. The longer the delay, the higher the cost — and the higher the chance of another calamity.

As we mark the second anniversary of the Minneapolis tragedy, our public officials ought to honor the memory of those who died by taking proper steps to prevent future such disasters.

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