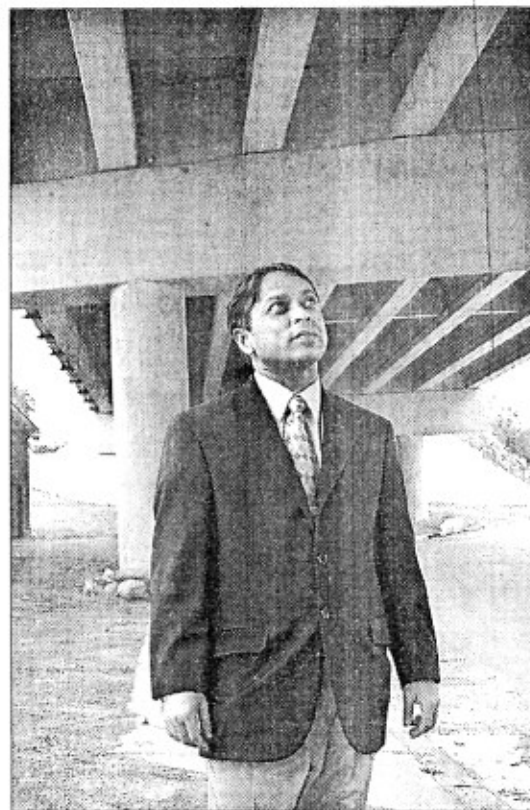


# School

*"Our lives are frittered away with detail ...simplify! simplify! simplify!"*  
Henry Thoreau



Special to The Vindicator

**BRIDGES VULNERABLE:** Dr. Anwarul Islam, assistant professor of engineering at Youngstown State University, says highway bridges such as this Oak Street span in Youngstown are particularly vulnerable to terrorist attack. His studies show the concrete girder bridges won't survive a direct explosion from a car or truck bomb.

YSU

## Study reveals vulnerability of bridges to terror attacks

*The average terrorist car bomb would take out most concrete girder bridges.*

By HAROLD GWIN  
VINDICATOR EDUCATION WRITER

YOUNGSTOWN — Much of America's highway system could be easily disabled by terrorist bombs, says a study done by Dr. Anwarul Islam, assistant professor of engineering at Youngstown State University.

Islam did his doctoral dissertation on the vulnerability of the typical American Association of State Highway and Transportation Officials concrete girder bridge and is continuing his studies on the subject at YSU.

There are 680,000 bridges in the United States and most of them are the typical concrete girder variety. There is no practical way to design a blast-resistant bridge, he said.

As part of his research, Islam built a computer model of a two-lane, 160-foot-long girder bridge and tested the impact of an average terrorist car or truck bomb as identified by the Federal Highway Administration.

The results weren't good, he said, explaining that he tested his model at five crit-

ical blast points, both on and below the structure.

"I found that the bridge does not survive this explosion. That concerned me," he said.

### 9/11 sparked study

Islam said he was sparked to look at bridge design in relation to terrorist attacks after the Sept. 11, 2001, attacks by terrorists against this country and resulting discussions that said structures such as the Golden Gate Bridge and Brooklyn Bridge could be targets.

"My area of expertise is bridge design and construction," he said, recalling asking himself, "What can I do to improve the safety of our bridges?"

Maybe there wasn't much he could do to protect the very important bridges, but the smaller highway bridges that the country drives on every day might be a different story, he said.

The Department of Homeland Security was interested, too, and provided some of the initial funding for his study, Islam said.

His studies with his computer model showed that, while a blast on or directly below the bridge resulted in the structure's destruction, moving the blast away a distance of just 16 feet gives the bridge a chance of surviving the explosion.

That may provide a key to help protect

highway bridges, he said, suggesting that a series of barricades to keep vehicles from getting beneath bridges and the passage of laws making it illegal to stop on a bridge might be beneficial.

Government authorities also could consider continuous televised monitoring of bridges of major importance as a deterrent as well, noting that it will be up to someone else to determine the best way to keep terrorists away from the structures, Islam said.

He presented his findings at the American Society of Civil Engineers' 4th Forensic Congress in Cleveland this fall, but his work isn't over.

His goal is to find a way to make bridges more blast-resistant, he said. There's a lot more research to be done on the subject, Islam said, noting that he is looking for funding to continue his study.

People don't think about the importance of a single highway bridge, but look at the disruption that would be caused with the destruction of just a single span along a road such as Interstate 80, a key east-west transportation route in the nation, Islam said.

"When we drive, we don't think about it. As an engineer, I think we need to protect our infrastructure," he said.

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