

BRIDGING THE FUTURE...

Professor's research focuses on protecting bridges

The typical concrete highway bridge in the United States could be made safer from terrorist attack if barricades and other traffic restrictions were implemented, according to research by a YSU engineering professor.

"There are thousands and thousands of highway bridges across the country, and there is no practical way to design a bridge that is blast resistant," said Dr. Anwarul Islam, YSU assistant professor. "What you can do is take steps to mitigate and minimize the impact."

Islam conceded that typical concrete interstate bridges are not likely to be high priority targets for terrorists, but he said destruction of certain bridges in the nation's highway system could cause major traffic disruptions.

The research, co-authored by Nur Yazdani, professor and chair of the Department of Civil and Environmental Engineering at the University of Texas at Arlington, was presented by Islam at the American Society of Civil Engineers' 4th Forensic Congress in October in Cleveland, and was published in the proceedings.

The paper examines the blast capacities of typical American Association of State Highway and Transportation Officials (AASHTO) girder bridges. AASHTO girder highway bridges are the most common type of concrete bridges on the nation's interstate highways, Islam said.

A structural engineer who designed dozens of bridges in his native Bangladesh and in Florida prior to joining the faculty of YSU a year ago, Islam's research started as part of his doctoral dissertation at Florida State University and carried over to YSU.

Islam developed a computer model of a typical two-

lane, 160-foot-long AASHTO girder bridge and tested the impact of a typical terrorist car or truck bomb as identified by the Federal Highway Administration. Islam tested the blast at five different locations on or under the bridge, and at every location the bridge was destroyed by the explosion.

The research also showed, however, that if the explosion occurred 16 feet or more away from the bridge, the force from the blast was not enough to make the bridge fail, Islam said. Therefore, developing regulations and possibly some type of barricade that prevents cars and trucks from stopping under, on or within at least 16 feet from bridges, may be one of the possible ways to deter catastrophic bombings of such structures, he said.

Islam said more research needs to be conducted on the 16-foot blast zone. He said, however, that he hopes his research will provide one additional piece of the puzzle as engineers work to develop safer highway bridges.

"People drive across these bridges every day," he continued, "and do they ever think about them being attacked by terrorists? No. But, as an engineer, you need to think of all of the possibilities, before they happen."

Islam, whose research also focuses on the effects of hurricanes on highway bridges, said it was the terrorist attacks of Sept. 11, 2001, that sparked his interest

in the vulnerability of the nation's highway bridges.

"Before Sept. 11, I never had thought about it," he said. "But, after Sept. 11, I felt I needed to do something. And, since I'm a civil engineer and since there has been a lot of focus on the major bridges in the country like the Golden Gate and Brooklyn bridges, I thought I could devote my energy to examining highway bridges."



Dr. Anwarul Islam, YSU assistant professor of engineering, stands under a girder bridge in Youngstown.