

Department of Civil Engineering and Engineering Mechanics  
Columbia University

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**644 Mudd**



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## **Security of Bridges and Tunnels**

Bridges and tunnels constitute a very important component of the national transportation system, providing the support for more than 20% of the gross national product (GNP). Therefore, they require special protection measures to reduce the exposure to risk. Until recently, bridge and tunnel owners (government agencies) have focused on natural disasters such as earthquakes, collisions (vessels and vehicles), floods and major storms. It is now clear that bridges and tunnels are vulnerable to hazards like negligence and improper maintenance, intentional acts of vandalism, and terrorist attacks.

Safeguarding against terrorism is a new and challenging task. Objective of the presentation is to present the current risk analysis procedures, results of computations for selected bridge structures, load models including extreme events and their combinations, as well as risk control methodology. Advanced computer simulation techniques allow for identification of the most vulnerable structural components and connections and verification of strengthening procedures. Special protective design approach can efficiently control risk of failure due to extreme events, including a terrorist attack.