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Mark Stewart

Visiting Scholar

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Education

Ph.D., Civil Engineering, University of Newcastle, Australia (1988)

M.A., Monash University (1984)

Background

Stewart is professor of civil engineering and director of the Centre for Infrastructure Performance and Reliability at University of Newcastle, Australia. He has more than 25 years of experience in probabilistic risk assessment of infrastructure systems, subject to man-made and natural hazards. Stewart is the author with R.E. Melchers of *Probabilistic Risk Assessment of Engineering Systems* (Chapman & Hall, 1997), as well as more than 300 technical papers and reports. Since 2004, Stewart has received Australian Research Council grants worth more than \$500,000 to develop probabilistic terrorism risk-modeling techniques for buildings subject to explosive blast load, and cost-benefit assessments of counter-terrorism protective measures for critical infrastructure.

Mershon Project

Stewart visited the Mershon Center in January 2008 to work with John Mueller on "Assessing the Risks, Costs and Benefits of United States Aviation Security Measures." The project found that while the Federal Air Marshal Service is not cost effective, other solutions such as hardening of cockpit doors are more effective.

In October 2009, Stewart will continue his collaboration with Mueller on "Assessing the Vulnerability and Protection of Critical Infrastructure and Key Assets to Terrorist Attack." While the Department of Homeland Security uses risk-based approaches to focus mainly on vulnerabilities, Stewart argues that equal attention needs to be given to threat probability as well as to the impact of and recovery from a terrorist attack.

The project will describe a terrorism risk assessment that considers threat scenarios and probabilities. Factors such as the value of human life, physical/direct damages, indirect damages, risk reduction, and protective measure costs will be assessed. Stewart will also demonstrate how a probabilistic terrorism risk assessment can better quantify the costs and benefits of protecting buildings and airport infrastructure.



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Stewart will present evidence to show that most counter-terrorism protective measures are not cost-effective unless the terrorist threat probability is very high. Many infrastructure systems are highly resilient, as are individuals and institutions. In his presentation, Stewart will address the differences between vulnerability and resilience in infrastructure systems.

Selected Publications

"A Risk and Cost-Benefit Assessment of U.S. Aviation Security Measures," with John Mueller (*Journal of Transportation Security*, 2008)

Probabilistic Risk Assessment of Engineering Systems, with R.E. Melchers (Chapman & Hall, 1997)

"Spatial Time-Dependant Reliability Analysis of Corroding Pretension Prestressed Concrete Bridge Girders," with M.S. Darmawan (*Structural Safety*, 2007)

"Risk Assessment and Optimization of Blast Mitigation Strategies for Design and Strengthening of Built Infrastructure" (*Transactions of Tianjin University*, 2006)

"Terrorism Risks and Blast Damage to Built Infrastructure," with M.D. Netherton and D.V. Rosowsky (*Natural Hazards Review*, 2006)

"Risk Assessment as a Decision-Making Tool to Mitigate Blast Damage to Built Infrastructure" (*Australian Journal of Multi-disciplinary Engineering: Engineering a Secure Australia*, 2004)

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