Terror, Security and Money: Balancing the Risks, Benefits, and Costs of Critical Infrastructure Protection

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Abstract

The loading and response of structures to explosive blast loading is subject to uncertainty and variability. This uncertainty can be caused by variability of dimensions and material properties, model errors, environment, etc. Limit state and LRFD design codes for reinforced concrete and steel have been derived from probabilistic and structural reliability methods to ensure that new and existing structures satisfy an acceptable level of risk. These techniques can be applied to the area of structural response of structures subject to explosive blast loading. The use of decision theory to determine acceptability of risk is crucial to prioritise protective measures for built infrastructure. Government spending on homeland security will reach $141.6 billion worldwide in 2009 and is projected to reach $300 billion by 2016. The question is, is this or other expenditure necessary? Clearly, scientific rigour is needed when assessing the effectiveness and the need for protective measures to ensure that their benefits exceed the cost. The paper will assess terrorist threats to buildings, bridges and transportation infrastructure and the cost-effectiveness of protective and counter-terrorism measures. Structural reliability and probabilistic methods are used to assess risk reduction due to protective measures. The key innovation is incorporating uncertainty modelling in the decision analysis, which in this case will maximise net benefit. This analysis will then consider threat likelihood, cost of security measures, risk reduction and expected losses to compare the costs and benefits of security measures to decide which security measures are cost-effective, and those which are not.

For additional and wider-ranging assessments of the issues raised and the approaches used, see John Mueller and Mark G. Stewart, *Terror, Security, and Money: Balancing the Risks, Benefits, and Costs of Homeland Security*, Oxford University Press, forthcoming September 2011.