

**GENERALIZED ASSESSMENT OF BRIDGE VULNERABILITY TO
TERRORIST THREATS: A PROBABILISTIC STRUCTURAL ANALYSIS
BASED APPROACH**

by

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A thesis submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Master of Applied Sciences.

Spring 2006

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ABSTRACT

Recent events, including the attacks of September 11, 2001, have brought into the light the need to understand and assess the vulnerability of civil infrastructure systems to terrorist threats. It has been acknowledged that the vulnerability of the nation's transportation infrastructure is of particular concern to the public, planners, and administrators. An attack on a strategic link such as a critical bridge has the potential to cause substantial casualties, economic disruption, and social upheaval. While infrastructure vulnerability is acknowledged, it is not feasible to fortify, protect, or otherwise mitigate the threats posed to transportation infrastructure. Thus, infrastructure owners must make decisions regarding how to best distribute their limited resources across their inventories. The overall objective of this thesis is to provide guidance to transportation infrastructure, specifically bridge owners, who must make these important decisions.

This thesis begins with a discussion of the state-of-the-art and a critique of existing literature. Subsequently, this thesis presents a rational methodology for assessing the vulnerability of bridges to terrorist attacks. The methodology involves a probabilistic structural analysis based approach that seeks to fill several voids in the existing literature. However, analysis of both the structural response of bridges to terrorist attacks and the myriad of associated consequences are rapidly evolving fields. To account for the changes in this growing field the methodology is non-prescriptive and remains adaptable to account for advancements.