JERSEY DOT'S

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Tech Brief

SIMPLE BRIDGE SECURITY INSPECTION

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Think Jersey DOT

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WHY WE ARE DOING THIS…

Bridges are among the most visible targets for terrorists since their destruction will have an immediate impact on the nation with long-term economical and psychological impacts. The attacks on September 11th, 2001 crippled the PATH commuter rail that carried 67,000 passengers each weekday for two years resulting in relocation of office space and jobs to New Jersey. Since then funding for homeland security has increased by approximately 8.6 percent for the fiscal year 2006, in which 38.6 percent are allocated for Border and Transportation Security. Bridge security is important enough to be a matter of state and national security. Bridges are lifeline structures for the state and the federal transportation system that need to be protected against terrorist threats.

As the nation's most densely populated state and a hub for the nation's transportation, agricultural, petrochemical and other critical infrastructures, and a neighbor of the major cities New York and Philadelphia, New Jersey is both vulnerable to terrorism and an ideal test bed for new methods and tools in security assessment of bridges and other type of structures. The need for efficient (accurate, inexpensive, non-obstructive to occupants or users) security assessment checklist is obvious. Various organizations are supporting major initiatives in the area of homeland security and vulnerability assessment for various infrastructure applications. The basis for these decisions should be based on an accurate assessment of the actual needs and status of various bridge structures.

Despite the details contained in various published literature, there is insufficient information for what bridge inspectors should be looking for and what a bridge security checklist should include. There is a need for a simple checklist for security inspection based upon which vulnerability assessment as well as mitigation plans can be planned. A review of the literature of bridge security showed that there is a need to develop methods to identify critical bridges for security hazards, to provide engineering standards and guidelines for bridge security design in order to reduce their vulnerability to attacks, and to better understand the structural response of key components of a bridge to mitigate collapse, loss of life, and disruption of traffic. A simple security checklist was developed to provide on-site assessment of bridge security and a Tablet PC-based checklist was also provided. The developed checklist was applied to a bridge case study.

OBJECTIVES

The objective of this project was to establish a simple security checklist that can provide security assessment for bridge. The objective is implemented by developing a Tablet PC-based checklist that could be downloaded into a bridge security database.

HERE IS WHAT WE DID…

A simple bridge security checklist has been presented in this research to provide identification of critical bridges through out New Jersey. After evaluating all bridges using this simple checklist, security measures and hardening of the structure. Based upon the analysis of bridges evaluated in this case study, the methodology has proven very useful and provided consistent and reliable results. The use of the security checklist in a spreadsheet format makes it easy and timely efficient for engineers and inspectors to evaluate the bridges. The checklist is enhanced by links to help type functions that provide images or explanations to provide the bridge inspector with unambiguous directions. The tablet PC is a lightweight device where the answers to the questions and the calculated risks could automatically be transferred and stored in a database file at the State DOT even while still at the field.

FINDINGS……

Various NJ bridge inspectors were invited to visit a bridge structure and apply the checklist. The experienced inspectors provided some important feedback on the applicability of the checklist. A number of the questions were modified and/or eliminated. They found no difficulty in answering the checklist questions because the various applicable answers ("Yes" or "No" type of answers) were provided in a drop down list format.

For future work, the inspectors will be trained in a classroom workshop on the use of the checklist. They will learn where to look on the bridge and easily identify the critical components. Inspectors will be asked to provide detailed comments on the ease of use, applicability, and changes needed to improve the checklist or on the PC programming. The comments will be compiled and reported to the NJDOT Project Manager for further refinement and/or development.

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A final report is available online at
http://www.state.nj.us/transportation/refdata/research/

If you would like a copy of the full report, please FAX the NJDOT, Bureau of Research, Technology Transfer Group at (609) 530-3722 or send an e-mail to Research.Bureau@dot.state.nj.us and ask for:

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