

Chapter 30

The Challenges of Obtaining Credible Data for Transportation Security Modeling

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ABSTRACT

The National Transportation Security Center of Excellence (NTSCOE) was established in August 2007 to develop new approaches to defend, protect, and increase the resilience of the nation's multi-modal transportation infrastructure, and to create education and training programs for transportation security. The Center for Transportation Safety, Security, and Risk (CTSSR) at Rutgers University, an NTSCOE institution, developed models that address multi-modal resilience of freight and transit transportation networks. Data collection processes for each project presented significant hurdles for the research team in developing credible and accurate modeling tools. For any given data need, the potential exists for data gaps, collection, and processing errors, publication and use restrictions, and the need to obtain the most timely information. These challenges must be foreseen by researchers and practitioners in order to better accommodate potential restrictions on both data collection and dissemination while still providing users with a tool that improves decision making.

INTRODUCTION

The United States Department of Homeland Security (2007b) defines the NTSCOE as a consortium of seven different universities with goals that include the development of new technologies, tools and advanced methods to defend, protect

and increase the resilience of the multimodal transportation infrastructure in the United States. University members included:

1. Connecticut Transportation Institute at the University of Connecticut,
2. Tougaloo College,

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3. Texas Southern University,
4. Center for Transportation Safety, Security and Risk (CTSSR) at Rutgers, the State University of New Jersey,
5. Homeland Security Management Institute at Long Island University,
6. Mack Blackwell National Rural Transportation Study Center at the University of Arkansas,
7. Mineta Transportation Institute at San José State University.

As part of this Center of Excellence, CTSSR undertook the development of resilience modeling tools for use by transportation related agencies and stakeholders, in addition to the development of front-line employee training videos and associated training products. Two of these tools, each of which contains several simulation models, will be discussed herein, Supporting Secure and Resilient Inland Waterways and the Rail Security Model.

The Supporting Secure and Resilient Inland Waterways (SSRIW) project sought to develop a Web-based prototype decision support system that could integrate geographic information systems and optimization models to assist in planning support for offloading barge cargo during a sudden catastrophic closure of an inland waterway. A project goal is to assist the United States Coast Guard (USCG), United States Army Corps of Engineers (USACE), and other waterway security stakeholders in understanding the resiliency of inland waterway transportation system components and to create a planning tool that will allow public and private parties to plan and collaborate on emergency freight movement decisions.

The Rail Security Model developed by CTSSR brought together three complementary simulation models to offer insights into events that can cause cascading impacts in rail and connected transportation systems, explore the consequences of those events, and identify investments that could increase system resilience after accidents and attacks. The models work together to examine how a terror-

ist event would affect passenger flows and train movements, visualize and quantify contaminant exposure, and estimate regional economic impacts of these events. To obtain data and validate assumptions, the CTSSR team worked with planning and security personnel from NJ Transit, Amtrak, the New Jersey Office of Homeland Security and Preparedness, and the U.S. Department of Defense (DOD).

In this chapter, the authors will illustrate several data challenges through the discussion of model development for the aforementioned projects. First, the authors will discuss the constituent stakeholder groups for each research product, illustrating the difficulty in developing a good understanding of the complicated relationships required to develop and analyze system resilience. Next, the authors present a discussion of the stated needs for these modeling tools and the potential value derived from the development of such tools from both the public and private sector. Following that discussion, the cases and development of both tools will be presented, with a particular focus on data collection and the relationships and methods needed to identify and use the appropriate data sets. The cases are followed by a consolidated discussion of the issues and challenges faced in the modeling research, seeking to draw comparisons and illustrate common barriers and leading practices in working on detailed modeling projects. The chapter will end with solutions and recommendations for those involved in or considering embarking on research or modeling projects related to transportation security.

Overview of Inland Waterway Security and Resilience

The DHS has developed a series of sector-specific plans for specific components of built infrastructure defined as critical infrastructure and key resources. The Transportation Systems sector includes the inland waterways system, in particular the locks and dams that support the

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