Vanderbilt Climate Change Initiative (VCCI)
Summary of Capabilities – Risk and Resilience

Overview

Risk is an inherent part of any society. Understanding and managing that risk in a complex, modern society takes sophisticated tools and experienced analytical capabilities; however, sometimes simple solutions can substantially reduce certain risks. VCCI specializes in helping businesses, cities, and other groups better assess, understand, and manage the risks they face. VCCI has helped organizations prioritize where risk management actions are warranted and develop appropriate strategies to address those risks that are cost effective and practical.

Capabilities and example projects

- Establish the current status and future direction of an organization’s enterprise risk management practices, including benchmarking the existing level of performance and develop practical and cost effective risk mitigation strategies.
- Developed an ERM protocol for identifying reasonably foreseeable risks and prioritizing among them. This protocol was subsequently applied it in a pilot application involving a major freight transportation carrier.
- Develop scenarios and risk scoring measures to estimate the effectiveness of risk mitigation strategies.
- Field-test methods for determining the cost-effectiveness of selected mitigation strategies.
- Application of Geographic Information Systems (GIS) and other data analysis and visualization tools to enable risk management and decision support related to transportation infrastructure systems and freight transport operations.
- Development of a web-based transportation risk assessment and strategy evaluation tool for a federal agency that allows “on-the-fly” evaluation of alternative freight modes and routes depending on user-specified variables.
- Completed an FHWA-sponsored pilot project with the Tennessee Department of Transportation to assess the risk of extreme weather events impacting Tennessee transportation assets. VCCI team members developed and implemented the state-wide methodology that involved identifying critical assets, assessing historical and projected weather and climate events, developing vulnerability scores, and mapping vulnerable assets.
- Flood scenario impact assessment using HazUS-MH, GIS, and other tools. Through modeling and scenario analysis, we can provide a detailed assessment of the impacts of future flood scenarios on selected assets.
- Assist local stakeholders near critical ports understand how specific actions and behaviors can impact the resiliency of waterborne commerce during extreme weather scenarios in order to preserve the economic livelihood of the target area and larger transportation network interdependencies.
- Data-driven Bayesian methods to predict the occurrence of disruptive events in infrastructure systems and stochastically model the recovery process of the physically disrupted system as well as other interdependent and indirectly impacted systems.
- Provide applied and theoretical research to support state and federal transportation agency programs.