Tools to Assess Transportation Resiliency with Respect to Investment & Operations

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Abstract

The paper will present a workable definition for transportation resiliency across various planning horizons, and will address the use of conventional planning tools in order to assess said resiliency.

A literature review was conducted to identify common definitions for resiliency across a variety of industries, such as nuclear power generation, healthcare, and communications. Based on these findings, a definition for transportation resiliency was formulated, and the various components of this definition were discussed. Particularly, this definition considers transportation resiliency in the context of long-term investment and short-term operations, and details various differentiating factors between the two planning horizons. Next, various events, such as natural disasters, terrorist attacks, etc. were envisioned for both investment and operations effects, and the potential responses to each event type were theorized. A review of real-life critical events that have impacted and defined transportation resiliency were then described, along with a discussion of ways in which existing and future transportation infrastructure can be better prepared for such occasions.

Once the review of transportation resiliency was complete, several case studies of hypothetical transportation events were considered. Conventional software tools, such as TRAGIS and CARVER², analyzed these events in order to rank the relative infrastructure resiliencies in each case. The resulting resiliency “scores” were then evaluated for strengths and weakness, with the end result being a discussion of items for improvement among different network links.

Finally, the paper will discuss how this consideration of transportation resiliency fits into the broader context of national transportation and energy policy. The end result will be a succinct and implementable process for considering transportation resiliency, as well as a review of the tools available to public and private agencies to identify weaknesses in current systems.

Key Words: resiliency-interdependency-operations-investment

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