



Caltrans Division of Research,
Innovation and System Information

Research

Notes

Planning, Policy &
Programming

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Project Title:
Statewide Risk Scale Across Multiple
Assets/Vulnerabilities

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Statewide Risk Scale Across Multiple Assets/Vulnerabilities

Caltrans needs to establish a comprehensive risk scoring methodology to rank all statewide assets and asset vulnerabilities using a normalized risk score.

WHAT IS THE NEED?

California Department of Transportation (Caltrans) faces significant challenges in optimizing strategies and programs for preserving and improving its vast transportation network. As part of its business strategy to enhance transportation asset management (TAM), Caltrans needs to establish a comprehensive risk scoring methodology in order to rank all statewide assets and asset vulnerabilities using a normalized risk score.

The risk score is expected to be used in statewide prioritization, project selection, and investment planning. The risk scoring methodology shall take into consideration the asset vulnerability or combinations thereof, characteristics of the route impacted by the vulnerability, available detours, and traffic volumes. The methodology for combining risks shall also provide a means to incorporate risk tolerances for the asset/vulnerability paring.

WHAT ARE WE DOING?

The research team will:

- Review a subset of vulnerabilities to the State Highway System that are currently considered in Caltrans practices. These are: Bridge Seismic Hazards, Bridge Scour, Landslide and Rockfall Hazards, and Climate Change Vulnerability Assessments (focusing on Caltrans Districts 1 and 4).



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knowledge that improves
California's transportation system

- Develop a statewide risk assessment scale for this subset of vulnerabilities so that Caltrans can compare and prioritize them in a single scaling system. The scaling system shall include likelihood of occurrence, impact on the asset, and impact on the transportation system.
- Demonstrate how the proposed methodology works through an analytical tool, such as an Excel spreadsheet.
- Document how the framework and methodology can be applied to any risk and vulnerability. Document challenges associated with bringing these risks together for Asset Management.
- Identify any limitations in existing vulnerability information provided by Caltrans for this study.

WHAT IS OUR GOAL?

This research is important since Caltrans can establish a comprehensive risk scoring methodology in order to rank all statewide assets and asset vulnerabilities using a normalized risk score. The risk score is expected to be used for statewide prioritization, project selection, and investment planning.

WHAT IS THE BENEFIT?

To maintain and improve the condition of assets and also mitigate their vulnerabilities, Caltrans uses different maintenance, rehabilitation, and replacement strategies on these assets. There are different ways to assess the condition and vulnerability of the assets and prioritize the maintenance, rehabilitation, and replacement work on these assets. For example, Caltrans has seismic and scour vulnerability ranking system for bridges, quantifies and prioritizes the vulnerabilities on geotechnical assets, and has completed climate change vulnerability studies in several districts.

However, Caltrans does not have a methodology to prioritize all risks across various assets and asset vulnerabilities. Caltrans needs to develop an approach to normalize these different scores across different assets and asset vulnerabilities and bring them to a single risk scaling matrix, so that they can be compared and prioritized across the State Highway System. Having a uniform approach to score and prioritize risks will allow Caltrans to achieve a risk-based performance-driven asset management plan.

WHAT IS THE PROGRESS TO DATE?

As of May 29, 2020, the Spy Pond Partners consultant team has begun on Task 1 of the project. This is a review of the current risk and vulnerability assessments, focusing specifically on Caltrans Districts 1 and 4.

Caltrans staff held a kickoff meeting with the consultant team on June 9, 2020.