



A RAI of Data: Generalizing the Data-driven Rockfall Activity Index (RAI) based on Long-term Observations of Well Characterized Slopes

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Background

Transportation corridors that wind through the mountainous regions of the Pacific Northwest (PNW) are subject to rockfalls, which are a significant hazard to the traveling public. Recent PacTrans-supported research documents the significant mobility and economic impacts

rockfall has on major roads across the PNW, including road closures for a month or more and emergency repair costs of over \$1 million for large events. With the support of PacTrans, our research team developed the Rockfall Activity Index system (RAI), a point cloud-derived, high-resolution, morphology-based approach for identifying, assessing, and mapping rockfall hazards at a high resolution across the entire surface of the slope. The activity rates directly control the RAI mapping of rockfall “hotspots.” Our team’s verification and accuracy studies of the RAI suggest that the activity rates are not always consistent, generic values, but instead vary as a function of geology and rock material properties and local climate conditions. Improving the accuracy of hotspot mapping will lead to more widespread adoption of the RAI by practitioners in the PNW and other parts of the country.



Research Project

For this project, the research team will develop a new procedure to estimate the RAI activity rate based on in situ rock strength testing with a Schmidt Hammer and assessing yearly weather conditions. The Schmidt Hammer is a well-established, widely-adopted, and easy-to-use field instrument for assessing rock strength in the field. We will develop our activity rate assessment procedure using data from a series of approximately 20 thoroughly-characterized test sites across a range of geologic and climate settings in Alaska and Oregon. The team previously developed high-resolution, multi-year change detection data for each of these sites, which are among the best-documented rock slopes in the United States. We will collect additional datasets, and incorporate all of these data to analyze time-series of rockfall rates. Finally, we will develop a practice-oriented activity rate selection methodology, and perform mobility analysis based on activity rates. The practical tools that will be developed from analysis and interpretation will be useful for DOTs to plan for additional maintenance needs. These planning tools also will enable planners, already spread thin with resources, to leverage data-driven solutions to enhance mobility and safety for highway users.

ABOUT THE AUTHORS

The research team consisted of Margaret Darrow of the University of Alaska Fairbanks, Ben Leshchinsky and Michael Olsen of Oregon State University, and Joseph Wartman of the University of Washington.

ABOUT THE FUNDERS

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EXPECTED DATE OF COMPLETION

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FOR MORE INFORMATION

<https://depts.washington.edu/pactrans/research/projects/a-rai-of-data-generalizing-the-data-driven-rockfall-activity-index-rai-based-on-long-term-observations-of-well-characterized-slopes/>