

Research Results

Maintenance

JANUARY 2022

Project Title: Avalanche Research Pooled Fund TPF-5(337)

Task Number: 3229

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Avalanche Research Pooled Fund TPF-5(337)

A collaborative research effort in the field of avalanche hazard assessment and mitigation, with the goal of improving the safety.

WHAT WAS THE NEED?

Reducing the avalanche hazard to transportation corridors is crucial to winter operations of Department of Transportation's (DOTs) in many western states, and, as such, are large budgetary items to these DOTs. Much of the research done by each DOT is relevant and useful to the efforts in other states, but there is not any official, long-term collaboration effort currently in place. Because of this, money can often be spent on the same research efforts in multiple different states. DOTs associated with the Avalanche Artillery Users of North America Committee (AAUNAC) currently have an annual meeting in Seattle and have been meeting since 2012 to discuss avalanche mitigation efforts, but this covers only a small portion of total avalanche related control and research activity. It's clear that a national effort to collaborate on avalanche related issues was needed. This pooled fund satisfied the need by gathering DOTs from across the country to pool knowledge and resources for maximum benefit.

A coalition of transportation related groups with interest in avalanche control research provided a single source of funding for unified research efforts that benefited all contributing parties.

This allowed for larger and more significant research projects to be undertaken and lead to an overall cost savings by consolidating many different DOTs research efforts in the same field.

WHAT WAS OUR GOAL?

The goal of this research was to partner with other DOTs to investigate new technologies and equipment that help improve the California Department of Transportation (Caltrans)



DRISI provides solutions and knowledge that improves California's transportation system.

avalanche hazard assessment and mitigation efforts.

WHAT DID WE DO?

The study's mission was to support collaborative research efforts in the field of avalanche hazard assessment and mitigation, with the goal of improving the safety, efficiency, and quality of control efforts, along with providing better information gathering and analysis techniques and seamless integration of new technologies to further these goals.

A task force committee was formed that included people from each of the participating DOTs. This task force met eight to 10 times a year to vote on new research projects and update the task force on the progress of each research project.

The projects that were completed under this pooled fund included:

- **Infrasonic Sensing and Mapping.** This project was a partnership with Boise State University and Snowbound Solutions LCC. The work focused on testing infrasound sensor technology and deployment optimization of infrasound stations for monitoring of snow avalanches in Little Cottonwood Canyon (LCC), Utah. The project concluded with a successful transfer of research and development to an applied system suitable for commercial purposes.
- **Assessing Gazex Avalanche Control Effectiveness with Terrestrial Laser Scanning.** This project used a ground-based laser scanner to map avalanche path snow depths to support an effective assessment of recently installed Gazex avalanche control systems in the Loveland Pass (Seven Sisters) and Berthoud Pass (Stanley) highway corridors. The maps generated in this project provided an unprecedented look at snow accumulation and avalanche dynamics at these sites. The data from this research will support future investigations when combined with observations of weather and control activity.

- **Use and Design of Snow Sheds to Protect Transportation Corridors Against Avalanches.**

This project documented the use and design of snow sheds to protect transportation corridors against avalanches. The project produced a report that documented snow shed designs that are currently in use on transportation corridors in North America.

There are a couple of active projects that were not completed that will be continued under a new pooled fund titled Transportation Avalanche Research Pool (TARP) 2.0 under the pooled fund solicitation number 1565.

WHAT WAS THE OUTCOME?

The research for this task was continued under a new pooled fund project titled Avalanche Research Pooled Fund 2.0 TPF-5(497). The avalanche mitigation product evaluations will continue under the new research task. All the project reports for this research are available on the Transportation Pooled Fund Website.

WHAT IS THE BENEFIT?

Caltrans benefited from this research by receiving the most up to date avalanche mitigation strategies for use in avalanche control operations. These projects help to increase motorist and worker safety and help with reducing avalanche control costs, and travel delays to the travelling public.

LEARN MORE

Final reports for projects completed under this pooled fund are posted on a Google Drive account that participating states have access to.