DRISI

CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION

TRANSFORMING IDEAS INTO SOLUTIONS

Research Notes

Improving the Quality of Highway Profile Measurements, TPF-5(537)

Enhancing Data Integrity and Measurement Accuracy in Highway Profiling.

Pavement

MONTH 20XX

Project Title:

Improving the Quality of Highway Profile Measurements, TPF-5(537)

Task Number: 4516

Start Date: July 1, 2025

Completion Date: July 31, 2029

Task Manager:

Somayeh Mafi
Senior Transportation Engineer
Somayeh.Mafi@dot.ca.gov

DRISI Division Chief:

Prakash Sah, PE
Prakash.Sah@dot.ca.gov

WHAT IS THE NEED?

Accurate pavement profile measurements are essential for evaluating roadway smoothness, supporting pavement management decisions, and ensuring consistency in performance reporting. However, agencies continue to face data integrity and quality issues related to both measurement and analysis. Variability in equipment performance, limitations in existing processing methods, and inconsistencies in data interpretation can lead to unreliable results. These challenges reduce confidence in the data and may impact maintenance planning, resource allocation, and overall network performance.

This research builds on prior pooled fund studies and ongoing national efforts led by FHWA and state DOTs to improve highway profiling practices. By identifying sources of error, evaluating equipment performance, and collaborating with industry partners to refine technologies and methodologies, the project aims to enhance measurement accuracy and consistency. For Caltrans, participation ensures alignment with national best practices and contributes to the development and deployment of practical solutions. The outcomes will support more reliable data collection, improved pavement condition assessments, and better-informed decision-making across the state.

WHAT ARE WE DOING?

This research continues and expands prior research focused on improving the accuracy and reliability of highway profile measurements. The effort begins with identifying and evaluating data integrity and quality issues associated with pavement profiling, including equipment performance, data collection practices, and analysis methods. This work builds on previous studies and incorporates findings from controlled

Caltrans

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

experiments and updates to key guidance. These activities help define current limitations and establish priorities for improvement. Based on these findings, the research advances to developing and testing practical solutions in collaboration with FHWA, other state DOTs, and industry partners. This includes working with equipment manufacturers to refine technologies. The project also includes monitoring progress, assessing performance, and sharing results through webinars and technical resources. These efforts support the implementation of best practices and ensure that improvements are effectively deployed to enhance the consistency and reliability of pavement profile measurements.

WHAT IS OUR GOAL?

The goal of the proposed pooled fund study "is to continue and extend the work of TPF-5(063) and TPF-5(354)", which was led by the Federal Highway Administration and South Dakota DOT, respectively. The project will enable states and FHWA to:

1. Identify data integrity and quality issues associated with measuring and analyzing pavement profiles
2. Suggest approaches to addressing identified problems
3. Initiate and monitor projects to address identified problems
4. Disseminate results
5. Assist in solution deployment

WHAT IS THE BENEFIT?

This research will improve the accuracy, consistency, and reliability of pavement profile measurements, providing Caltrans with higher-quality data to support pavement management and decision-making. More dependable data will enhance the assessment of roadway conditions, enable better prioritization of maintenance and rehabilitation projects, and promote more efficient use of resources. In addition, participation in this pooled fund study aligns Caltrans with national best practices and supports the development and deployment of standardized solutions in collaboration with FHWA, other state DOTs, and industry partners, benefiting both California and the broader transportation community.

WHAT IS THE PROGRESS TO DATE?

TPF-5(537) hosted a webinar open to the public. The webinar presented some of the updates to the Little Book of Profiling. The webinar focused on measurement basics and sources of profiler error. The webinar was recorded and posted to the RPUG website for future use to the public.