State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Making Conservation
a California Way of Life.

To: DEPUTY DISTRICT DIRECTORS, Construction
DEPUTY DIVISION CHIEF, Structure Construction
CONSTRUCTION MANAGERS
SENIOR CONSTRUCTION ENGINEERS
RESIDENT ENGINEERS

Date: November 30, 2023

File: Division of Construction
CPD 23-10

From: RAMON HOPKINS, Chief
Division of Construction

Subject: **REVISED CTM 387 TO ALLOW USE OF STOP-AND-GO INERTIAL PROFILERS**

This directive provides information to California Department of Transportation (Caltrans) resident engineers, contractors, and testing laboratory personnel about the revised California Test Method (CTM) 387, "Method of Test for Operation, Calibration and Operator Certification of Inertial Profilers," issued September 21, 2023. The revised CTM 387 allows the use of stop-and-go inertial profilers in the measurement of pavement smoothness, or the use of conventional inertial profilers that are already in use.

Stop-and-go inertial profilers, also called zero speed inertial profilers, collect profile data at any speed over a range of 0 mph (stoppage) to 100 mph.

Conventional inertial profiling systems have minimum effective speeds. If the collection speed falls below the minimum, the inertial profiler records an error. Inertial profiler manufacturers have different speed minimums. For example, Ames Engineering reports a speed minimum of 10 mph, and SSI reports a minimum collection speed of 5 mph. In order to collect accurate data at low speeds, additional sensors with revised software must be used to augment the inertial profiler.

Testing compared the performance of the SSI stop-and-go inertial profiler to the AASHTO r56 and ASTM e950 requirements for certification and collection. When equipment calibration and pavement smoothness measurement is done properly, there is no significant statistical difference between conventional and stop-and-go profilers. However, the use of stop-and-go profilers decreases interruption to traveling public by reducing lane closure needs.

Stop-and-go inertial profilers use multiple sensors to collect data over a range of 0 to 100 mph, eliminating speed dropouts that introduce International Roughness Index profile errors. The stop-and-go inertial profiler collects an accurate profile at any speed, including stoppages.

For contractors or Caltrans staff who continue to use the conventional inertial profilers for measuring pavement smoothness, no upgrade in equipment or software is required. If a contractor or Caltrans replaces conventional inertial profilers or upgrades them to stop-and-go technology, there is an initial investment needed to incorporate stop-and-go technology, but there may be cost savings from reduced cost of labor to perform inertial profile runs.

Revisions to CTM 387 give contractors and Caltrans the option to use stop-and-go inertial profilers for pavement smoothness measurements, or use the conventional inertial profilers, or both, on a single project. Use of stop-and-go inertial profiler reduces exposure time to traffic and reduces lane closures, helping Caltrans achieve its safety-first goal by improving operator and traveling public safety.

Revisions to California Test Method (CTM) 387, “Method of Test for Operation, Calibration and Operator Certification of Inertial Profilers,” were published September 21, 2023. Section 1-1.05, "References," of the *Standard Specifications* states, “Where the version of a referenced document is not specified, use the most recent version in effect on the date of the Notice to Bidders.” Therefore, a change order is required to implement the revised California test method on projects with Notices to Bidders dated before September 21, 2023.

If contractors ask to use stop-and-go profilers on projects with Notices to Bidders dated before September 21, 2023, the resident engineer must issue a no-cost change order.

Attached to this directive are revised California Test Method 387, a sample change order memorandum, and sample change order. This directive serves as a delegation of authority from the Division of Construction for change order approval, except when the change order language is altered. Risk-Based Involvement projects are subject to Federal Highway Administration oversight requirements. Consult the Federal Highway Administration transportation engineer for change order concurrence.

If you have questions or comments regarding this directive, contact Mirak Mehari, Division of Construction, at Mirak.Mehari@dot.ca.gov or (916) 539-4883.

Attachments:

1. Revised California Test Method 387 (September 21, 2023)
2. Sample Form CEM-4903, “Change Order Memorandum”
3. Sample Form CEM-4900, “Change Order”