

## **RESEARCH PROBLEM STATEMENT #PA-501**

### **I – Problem Title**

Alternative skid testers for contract acceptance on PCC pavements, bridge decks and surface treatments.

### **II – Research Problem Statement**

Testing skid resistance on PCC pavements, bridge decks and various maintenance surface treatments is becoming increasingly difficult due to the limited number of field-test units. Caltrans currently has three skid testing units operating out of headquarters and Southern California that have to be scheduled for acceptance of every job that requires friction testing. Because the testing is done via towed trailers at highway speeds, extensive lane closures are required (even for bridge decks). Also, the equipment is becoming difficult to maintain because of specialty parts, such as tires.

Additionally, new surface treatments are being employed by Maintenance that can have a pronounced affect on the friction characteristics of the pavement. Testing these treatments is critical for ensuring a safe roadway, but adding demands to the already over-burden friction testing units.

### **III – Objective**

The objective of this study would be to develop robust, reliable and reproducible alternative portable methods for quickly determining skid resistance on site, especially for contract acceptance. This will result in the reduction of traveler delays (Caltrans' Strategic Plan - Reliability). The testing will be safer since less extensive traffic control will be required and new maintenance treatments will be assured of having adequate friction for the traveling public (Caltrans' Strategic Plan - Safety).

### **IV – Background**

Over the past 40+ years the Department has relied upon CTM 342, "Surface Skid Resistance with the California Portable Skid Tester," for construction acceptance of skid resistance on Portland Cement Concrete (PCC) pavements and bridge decks. Caltrans currently has three units, which are towed trailers that test at highway speeds. Scheduling tests has become difficult because of the limited number of units and need to do the testing at night. Since the testing is done at highway speeds, it requires a longer lane closure and thus longer exposure to public traffic. Additionally, these test devices are specialty items (Caltrans only) that require unique parts (e.g., tires) to maintain and are often down while waiting for parts.

Because of the scheduling difficulties Districts 4, 7 and 11 also have investigated a portable friction testing device. They have found that calibration has been difficult which leads to concerns of reproducibility. Other portable devices are available, but haven't been evaluated for reliability and reproducibly. This study will evaluate these various devices and compare their performance against the Caltrans skid tester.

Portable testing will be safer since less extensive traffic control and exposure to public traffic will be required. Portable tests would ideally be performed by the Contractor (or sub-contractor) and checked by the Engineer, thus eliminating the scheduling problems.

Another aspect concerning friction testing is with the advent of new maintenance treatments, such as fog seal, methacrylate, open grade materials and grinding of PCC. There is a need to assure that the roadway continues to be safe after applying these treatments. Many portable test methods have been developed specifically for PCC pavements, but haven't been examined for various maintenance treatments. This study will also look at the reliability and reproducibility of the testing on these surfaces.

#### **V – Statement of Urgency and Benefits**

It is expected that within the next year or two the requests for testing PCC pavements and bridge decks will exceed the capacity to test. The other maintenance treatments that require testing need an immediate solution.

Because the new testing procedure will be portable and scheduled by the contractor, lanes can be opened earlier and there will be a reduction of traveler delays. Portable units will also allow the testing to be conducted in the existing closure and not have to be extended to accommodate the towed units (e.g., bridge decks). Finally, a reliable and reproducible test will allow for testing of new maintenance treatments and assure the traveling public a safer roadway, thus reducing Caltrans' liability.

#### **VI –Related Research**

\* IFI paper: NCHRP Synthesis 291, "Evaluation of Pavement Friction Characteristics." A Synthesis of Highway Practices"

\* NCAT paper: "Evaluation of Circular Texture Meter For Measuring Surface Texture of Pavements Executive Summary." Hanson, Prowell September 2004

#### **VII – Deployment Potential**

No work has been done to date. The deployable product will be an alternative device or list of devices that can be utilized by the field staff or contractor's staff to provide immediate results of the skid resistance on the surface being constructed.