

Inertial Profiler

Preliminary Guide Spec - Use of Inertial Profilers to Measure Airfield Pavement Smoothness

Add Inertial Profilers (IPs) to Asphalt and PCC specs as alternative measure of surface smoothness and for the determination of “must grind” areas.

- IPs must satisfy requirements for a Class 1 Inertial Profiler in ASTM E950/E950M-09.
- Use full-size vehicle @ 25 mph +/- 5 mph with IP to collect smoothness data.
- Profile/Profilograph Index (PRI or PI) values derived from an IP must be generated using the Profilograph Simulation described in ASTM E2955-13.
- Calculate PRI values using the specified blanking band (0.2-in.).
- No change to PRI limits (7-9 in./mi) both California Profilograph (CP) and Inertial Profiler (IP) will the same limits and payment adjustments.
- Detection/remediation of bumps/“must grind” areas, derived from IP data follows same requirements as those for CP-based measurement.

USACE FY 2024 Effort Goals

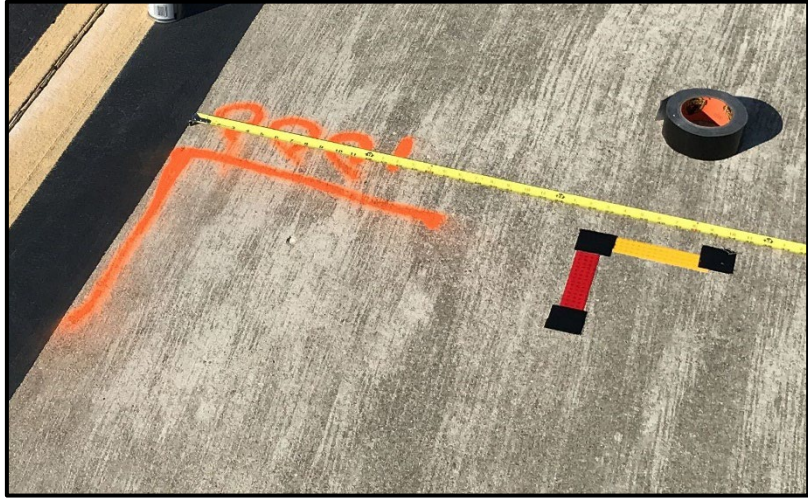
- Test IP PRI on Ames and other software packages
- Lightweight vehicles (ATVs, UTVs, etc.)
- Test light-weight profiler at lower speeds (<25 mph)
- Test different mounting positions for full-size and light-weight profilers
- Consider “discounting” IP roughness values and grinding lengths to match tested CP values
- This would address the concern over users testing with an IP then retesting with CP to get the expected lower value
- Further test speed dependence on IP measurement
- Further test use of zero-speed and standard data collection methods

Previous Effort

- Procured CP and IP (SSI CS9400-ZS)
- Test Sites:
 - Vicksburg Municipal Airport (VMA), 15-17 June – Equipment training
 - Robert Gray AAF, Fort Hood, TX – 14-18 September – Data collection
- Matched IP and CP profile tracks
- Establish correlation
- Validate accuracy smoothness parameters (PRI and IRI)
- IP PRI Software Comparison (SSI, ProFAA, ERDC)
- CP gave higher IRI than IP but IP gave 20% to 34% higher PRI than CP
- IP bumps 18% higher & 23% longer
- CP IDed 66% of bumps – IP IDed 98% - 64% IDed by both devices

INERTIAL PROFILER PROJECT

Matching IP and CP profile tracks



Reflective strips were placed on the pavement and used to line up both the CP and IP.

The 6" wide laser on the IP filled up the strip width and the CP tire sat in the middle.

