



Alberta Transportation's Early Experience Using an IRI Based Smoothness Specification

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Location Map



Alberta Facts

- Population: 4,025,000 (Sept. 2013)
- Area: Over 661,000 square kilometres
- Continental Climate: cold winters, cool summers.
- Provincial Flower: Wild Rose
- Alberta Transportation has a highway network over 31,600 kilometres.

Smoothness Testing in the Past

- Purchased first California Profilograph in 1978 – a first within Canada.
- Purchased several Cox CS8200 computerized profilographs in mid 1980's.
- End Product Specifications for pavement smoothness developed in late 1980's – another first within English Canada.
- Late 2000's: Profilograph testing completed using different platforms – Cox computerized, Pavaset and Inertial Profilers.



California Profilograph

Hi-Speed Inertial Profilers

- First use of Hi-Speed Inertial Profilers (HSIP) for smoothness testing at the network level began in the mid 1990's.
- Pavement Management System begins to use International Ride Index (IRI) data in 2004.
- IRI data collected each year for most of the network for one lane or one direction.

2013 Construction

- IRI smoothness specification first used on seven paving contracts in 2013.
- Tested over 530 km of rehabilitation including multi-lift, single lift and mill & inlay.
- **Ride Quality** assessed on a 100 m subplot basis using the Mean IRI (MIRI) – average of left and right wheel paths.
- **Areas of Localized Roughness (ALR)** measured using short continuous IRI (right wheel path) with a moving baseline of 7.62 m. Expressed as length of pavement with an IRI > 2.00 m/km.
- Separate bonus/penalty criteria based upon type of paving – multi-lift, single lift, etc.
- Contractor supplies the acceptance testing. Department may undertake verification testing.

Revisions for 2014

- All paving projects using the IRI based specification as of February 2014.
- Minor adjustments to the penalty schedule for Ride Quality on multi-lift paving.
- ALR trigger value increased from 2.00 m/km to 2.40 m/km.
- Penalty assessment for ALR revised to \$40/m for multi-lift paving and \$15/m for single lift and mill & inlay paving versus \$12/m and \$4/m in 2013.
- Criteria for "must repair" ALR is removed. Now a field decision by the project consultant.



Bumper Mounted Accelerators and Laser Sensors

Pre-Qualification Process

- Highway site profiled using a World Bank Class 1 reference profiler. Site chosen was considered to be smooth – MIRI of 1.10 to 1.30 m/km.
- Site is 500 m long with painted "profile" lines placed within the wheel paths.
- Hi-speed inertial units take five runs over the certification site.
- Accuracy and repeatability evaluated using two procedures.

Alberta Transportation Procedure

- Mean IRI to be within $\pm 10\%$ of reference profiler.
- IRI for each run is not to be $> \pm 5\%$ of the mean value.

AASHTO R56 Procedure

- Cross-Correlation of the HSIP profiles to that of the reference profiler. Accuracy 90%, Repeatability 92%.