A COMPARISON OF RIDE IMPROVEMENT FOR VARIOUS ROADWAY REHABILITATION METHODS IN WESTERN CANADA

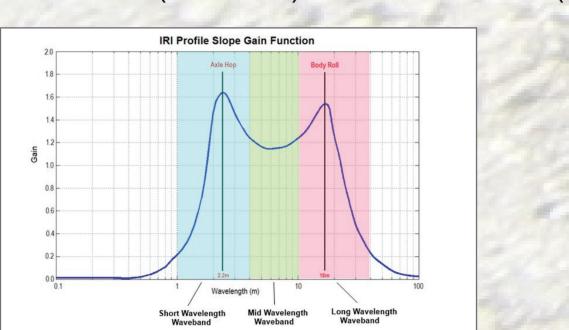
How is Roadway Profile Affected by Rehabilitation Treatment Type?

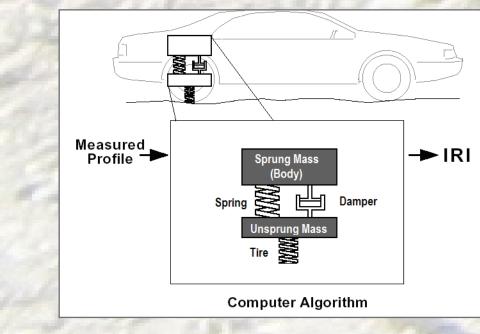
OUR ANALYSIS AND APPROACH

- Objective is to determine if significant differences in the magnitude of the roughness reduction in each waveband exists between treatments and between agencies.
- While IRI is an accepted measure of roughness, a more indepth method was developed to determine the nature of the roughness for each project which was affecting the ride characteristics (and in turn IRI).
- All pre-construction profile data collection in AB and BC and all post construction data collection in AB was collected by the same high speed inertial profiling platform as part of network PMS data collection programs. The post construction data collection in AB was typically collected th year after construction. Post construction data collection was carried out by BC MoTI Field Services immediately following construction.

ROAD PROFILE TO INTERTIAL PROFILE TO IRI

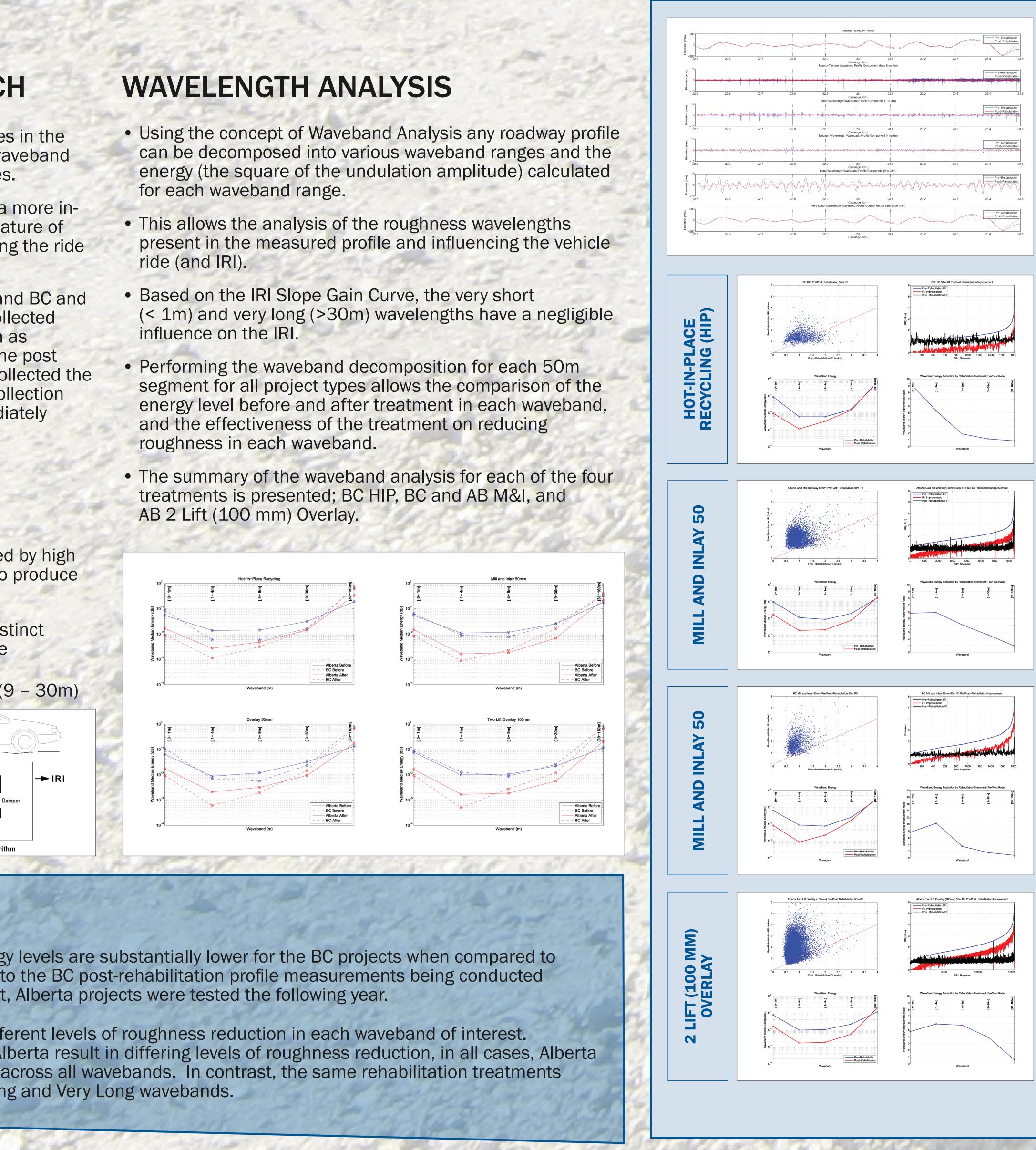
- High resolution longitudinal profile data collected by high speed inertial profilers can be post-processed to produce an inertial profile and to calculate IRI.
- Roadway roughness can be divided into three distinct wavebands as defined by the IRI response, these wavebands are; Medium (4 – 9m)
 Long (9 – 30m) • Short (1 – 4m)





WAVELENGTH ANALYSIS

- for each waveband range.
- ride (and IRI).
- influence on the IRL
- roughness in each waveband.
- AB 2 Lift (100 mm) Overlay.



CONCLUSIONS

- The post-rehabilitation Short Wavelength energy levels are substantially lower for the BC projects when compared to the Alberta projects. This has been attributed to the BC post-rehabilitation profile measurements being conducted immediately following construction. In contrast, Alberta projects were tested the following year.
- Different rehabilitation treatments result in different levels of roughness reduction in each waveband of interest. Although rehabilitation treatments applied in Alberta result in differing levels of roughness reduction, in all cases, Alberta treatments result in a more uniform reduction across all wavebands. In contrast, the same rehabilitation treatments applied in BC result in less reduction in the Long and Very Long wavebands.

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How is International Roughness (IRI) Affected by Rehabilitation Treatment Type?

OUR ANALYSIS AND APPROACH

- Identify projects for each treatment type and build data base
- QA data and exclude outlier projects
- Assess 50m average pre and post construction IRI for all projects
- Calculate pre and post construction IRI statistics for all projects within each treatment type and by province



DISCUSSION ON CONSTRUCTION SPECS FOR BC AND AB

- BC (reference Section 502 Asphalt Pavement Construction (EPS)) acceptance based on IRI measured with Class 1 profiler or non contact inertial profiler
- AB (reference Spec 3.50 Asphalt Concrete Pavement (EPS)) acceptance based on PrI measured by California Profilograph

DATA SOURCES - BC

- 45 2010 and 2011 construction "projects" (project 315 "projects" identified by comparing yearly IRI from network level data collection for 2007 through = contract) 2011 (project = uniform PMS segment)
- Pre-construction IRI mined from network level data collection for RPMS and could be the year before construction
- Post-construction IRI from project QA

CONCLUSIONS

- Average pre-construction IRI values ranged from 1.80 (BC HIP) to 2.14 (AB 3 lift overlay)
- Average post construction IRI values were similar for all treatments and ranged from 0.80 (BC 2 lift overlay) to 1.11 (BC HIP)
- Pre and post IRI values were similar in BC and AB for the same treatments even though BC has an IRIbased smoothness specification and AB has a Prl-based smoothness specification.
- For all overlay treatments, the average % Improvement in IRI [(Pre post)/Pre] ranged from 54% (AB 1 lift overlay and AB Mill and Overlay) to 61 % (AB 3 lift overlay)
- For HIP and Mill and Inlay 50mm projects, the average % Improvement in IRI ranged from 38% (BC HIP) to 49% (BC Mill and Inlay 50mm)





DATA SOURCES - AB

• Pre and post construction IRI mined from PMS; pre-values could be the year before construction, post-values could be the year after construction

TREATMENT DESCRIPTIONS

to a minimum 50 mm depth

with hot mix

course

3 LIFT OVERLAY – total thickness 130 mm or greater





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