**Instrumentation in Red Hill Valley Parkway Providing Data for Long Term Pavement Management**

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**Introduction**

- City of Hamilton Red Hill Valley Parkway (RHVP) perpetual pavement constructed 2007
- 7.5 km, 4 lanes (2 lanes each direction), 90 km/hour posted speed limit with controlled access
- Designed for 90 million Equivalent Single Axle Loads (ESAL’s) over 50 years
- Perpetual pavement structure (total 760 mm)

**Objectives**

- Description of two instrumentation information systems in RHVP pavement
- Use of data and analysis in pavement management

**Instrumentation Systems**

**Pavement Response System**

- Verify design parameters and assumptions
- Pressure and moisture gauges in the subgrade
- Asphalt strain gauges at bottom of RBM, lower binder course and surface layers
- Temperature sensors in subgrade, subbase, granular base and each asphalt layer

**Traffic System**

- Weight of the vehicle/axle, speed, axle pattern
- Traffic loops and weigh-in-motion (WIM) sensors
- Kistler WIM sensors in both northbound lanes
- Piezoelectric sensors in both southbound lanes

**Traffic Loading**

- Anticipated AADT in 2057 was 100,000
- AADT in 2011 70,000 measured with instrumentation
- Initial growth was 15%, assumed to be 1.8% in design

**Pavement Management Aspects**

- Instrumentation data intended to verify assumptions made in design and validate predicted performance

**Instrumentation Data Analysis**

- Traffic data is synchronized with the pavement response data
- Analysis of strains in pavement
- Relationship between induced strains and pressures and loads that cause strains.

**Strain in Perpetual Pavement**

- Design assumes tensile strains in RBM < 70 µε and compressive strain in subgrade < 200 µε
- Measured tensile strain in RBM < 50 µε, generally < 20 µε during rush hour
- Measured compressive strain in subgrade < 100 µε

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**Cost Analysis**

- LCCA for RHVP and Linc
- Including actual cost of Linc rehabilitation in 2011