

Perpetual Pavements

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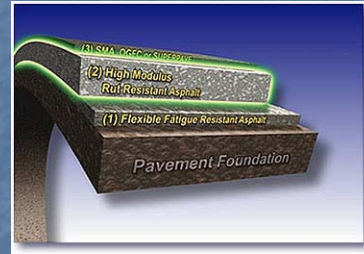
Perpetual Pavement

- Why??
 - Extend pavement service life
 - Reduce delays to traveling public
- Not a new concept for Ontario
 - Don Valley Parkway in the City of Toronto was chosen by NCAT as one of the 8 inaugural winners of the APA Perpetual Pavement awards in 2003 and is one of the longest in service
 - MTO and City of Hamilton have both constructed Perpetual Pavements

Definition

"A **Perpetual Pavement** is a hot mix asphalt pavement designed to last 50 years or more without major structural rehabilitation or reconstruction"

– Newcomb (NAPA)



Design Concept

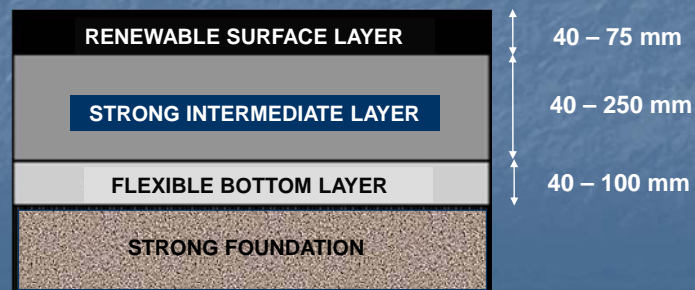
- Thin asphalt pavements may crack and rut under repeated loading of heavy traffic.
- In thicker asphalt pavements, the potential for fatigue cracking is reduced and pavement distresses (cracking and rutting) occur only in the near surface layers.
- When surface distresses reach an unacceptable level, the surface course is removed and replaced.
- Periodically renewing the driving surface keeps the pavement serviceability high throughout the life of the pavement while reducing the inconvenience for the driving public



Multi-Layer Design

The multi-layer design consists of:

- a renewable rut resistant surface layer
- a strong, rut-resistant intermediate layer
- a flexible, fatigue-resistant bottom layer



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Design Methodology

- Pavements are design for the traffic loading they will experience – typically in a 50 year lifetime
 - This is the lifetime without structural overlay not total lifetime
- **PerRoad** and **PerRoadXPress** were both developed by Dr. David Timm (NCAT, Auburn University)
 - **PerRoad** is a detailed tool for experienced pavement engineers and requires detailed input
 - **PerRoadXPress** is based on PerRoad but the inputs have been reduced and so has the calculation time

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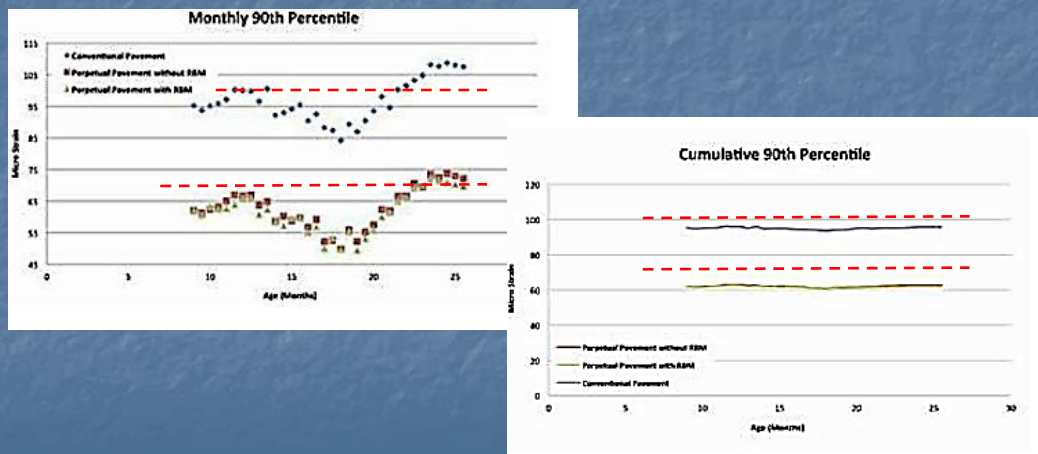
Instrumentation of Hwy 401 Perpetual Pavement Project

- Centre for Pavement and Transportation Technology (**CPATT**) at the University of Waterloo has been monitoring performance
- Industry funding provided by the Ontario Hot Mix Producers Association (**OHMPA**) and McAsphalt Industries
- All 3 sections Have been instrumented

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Results of Monitoring



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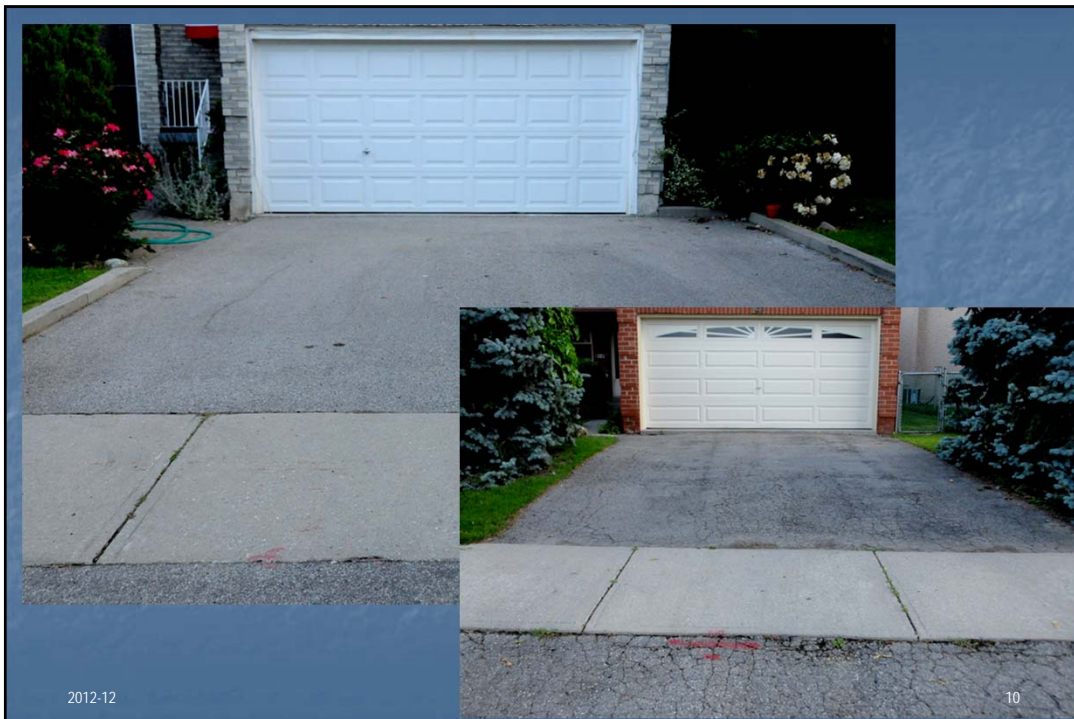
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Where can it be used?

- Perpetual Pavements are not just for highway projects
- Many municipal pavements can also be designed as Perpetual Pavements
- Increasing the thickness of the hot mix layers by 25 to 35 percent will likely result in a perpetual pavement
- There are tools to allow municipalities to look at Perpetual Pavement options
- **PerRoad v3.3** and **PerRoadXPress v1.0** are both available free of charge from the National Asphalt Pavement Association
 - <http://www.hotmix.org/>

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Advantages of Perpetual Pavement

- Durable, long lasting flexible pavement
- Less rutting
- Less fatigue cracking
- Smoother pavement
- No major reconstruction required
 - Work can be carried out at low traffic times
 - Minimize disruption to travelling public

Thank you