The Mississauga intersection of Courtney Park and Kennedy Road was in dire need of repair. The City fixed the intersection in 2007 and 2010 and intended to repair it again in

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2012 with asphalt. The asphalt already had up to 100-mm (4-inches) of rutting in just 2 years. Clearly asphalt was not an effective solution and an alternative was needed. The City of Mississauga Transportation and Works Department's solution was this: restoration of the severely rutted asphalt turning lane using a concrete pavement.

**The Project**

The asphalt in the turning lane had been repaired in 2007 with a 100 mm milling and replaced with 60 mm of HL-8HS asphalt and 40 mm of HL3. In 2010, the lane was rutting again and a milling operation was performed to remove the high areas. An investigation of the site revealed that severe rutting of the existing asphalt pavement was taking place once again in the west bound turning lane, on the order of 75 to 100 mm. Due to the severe rutting again in 2012 the City of Mississauga was looking into two options:

1. **Asphalt:**
   
   Mill 140 mm, HDBC - 100 mm (2 lifts), HL-1 - 40 mm

2. **Concrete:**

   Remove asphalt (225 mm), 32 MPa Class C-2 concrete

Considering the severity of rutting, as well as the two previous asphalt repairs, the City chose the concrete option.
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The severe rutting of the asphalt can be seen in this photograph

A full engineering study was not able to be conducted, considering the short development period. There were only eight working days between the identification of the problem and the time of reconstruction. It was determined that the easiest course of action would be to completely remove the asphalt and replace it with concrete; additionally, this method also improved the durability of the repair.

The weather was calling for rain the evening of the scheduled concrete pour, so the start
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time was moved up by nearly 12 hours (to 10:30 am). 35 MPa High Early strength concrete with macro-synthetic fibres was ordered and the first load of concrete arrived at the jobsite at 3 pm. The placement, finishing, and testing of the concrete was completed by 6:30 pm.

In addition to the standard concrete testing, Maturity Metre wires were installed to accurately determine when the lane could be opened to normal traffic. Maturity testing showed that 15 MPa was attained in less than 8 hours and 20 MPa was attained in 14.5 hours. To see a time lapse video of the entire project visit RMCAO’s YouTube Channel.

The Paybacks

Had concrete been used in the first place, rather than asphalt (over the original 5 year life) concrete would have saved the City 14 hours of traffic delays at that intersection. Furthermore, there was a significant savings in cost, as well as reduction in the amount of time the road had to be closed (due to the frequent repairs the asphalt would require over a 20 year period).

<table>
<thead>
<tr>
<th>20 Year Life Cycle Cost</th>
<th>Asphalt Estimate</th>
<th>Concrete Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>$100,000+</td>
<td>$32,000</td>
</tr>
<tr>
<td>Lane Closure Time (hours)</td>
<td>83</td>
<td>18</td>
</tr>
<tr>
<td>CO₂ Impact of Repairs (equivalent to annual cars on the road)*</td>
<td>154</td>
<td>9.7</td>
</tr>
</tbody>
</table>

* [www.epa.gov/cleanenergy/energy-resources/calculator.html](http://www.epa.gov/cleanenergy/energy-resources/calculator.html)

Over the expected 20+ year life of concrete, asphalt would have needed to be repaired several times over. Due to the conservative design, concrete is expected to last greater than 100 years as constructed.
Environmental impact and life cycle cost are increasingly becoming requirements in today's funding projects. This project highlights how concrete pavements can be used to address significant pavement performance issues in a very short time, while also addressing a number of significant cost savings and road safety issues.
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The fixed intersection

The Awards

This project has won two awards:

1) 2012 OPWA Project of the Year Award in the Disaster/Emergency Construction/Repair, Less than $2 Million Category

2) Ontario Concrete Award in the Materials and Constructability category for Specialty Concrete Products

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Source: This post has been adapted from reTHINK Pavements' Project Profile, which was kindly provided by the RMCAO.