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Recycled asphalt delivering dividends: experts

DAN O'REILLY
correspondent

Two leading academics —one American, one Canadian — delivered positive updates on the performance and potential of recycled asphalt pavement (RAP) in asphalt construction to members of the [Ontario Hot Mix Producers Association](#) at OHMPA's recent fall seminar.

In Canada, however, RAP has not been adopted to the same extent as south of the border, said Susan Tighe, director of the [Centre for Pavement and Transportation Technology](#) (CPATT) at the University of Waterloo.

"RAP is routinely used in hot mix asphalt (HMA) by nearly all 50 states and is considered standard asphalt paving practice."

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At the federal level, the U.S. Federal Highway Administration supports and promotes the use of recycled highway materials in pavement as a cost-effective construction method which helps preserve the environment and reduce waste, she pointed out.

While use of recycled asphalt pavement in HMA is a common practice in Ontario, notably by the Ministry of Transportation, some municipalities do not accept it in their pavements. An ongoing study CPATT is conducting in collaboration with OHMPA, the ministry, and DBA Engineering is intended to see if those practices can be improved, she said.

"Is there a difference between RAP (use) in Northern Ontario versus southern Ontario," said Tighe, in highlighting the study's objectives.

Other key goals include examining how adding RAP alters the performance of hot mix asphalt and providing some new guidelines on its use. Citing concerns such as performance levels against fatigue and thermal cracking, she said a full understanding of RAP is crucial and emphasized the results of various studies on those levels have been "contradictory".

At CPATT, a full assessment of issues such as rutting resistance, fatigue endurance, pavement durability, and resilience to heavy loading is being carried out using an array of highly sophisticated equipment, the audience was told.

For the most part, the results have been positive, said Tighe.

"Most of the mixes at CPATT perform better with RAP in our experience."

One of the lessons the audience might have gleaned from the second speaker is that an economic crisis can sometimes be the catalyst for innovations in pavement technology.

Richard Willis is the lead researcher at the National Center for Asphalt Technology (NCAT) at Auburn University in Auburn, Alabama. It operates an oval race track — divided into 46, 200-foot-long test sections — which is used to analyze asphalt mix performance. Funding is provided by various state departments of transportations and some private sources.

The research is conducted in three-year cycles, with the complexity of that research increasing with each cycle and that's what occurred between its 2006 and 2009 studies. In the 2006 study, 45 per cent RAP content was used in the surface layer of four sections, he said.

Then asphalt prices started to peak and NCAT starting receiving numerous requests from state transportation departments to

increase the amount of RAP in their tests.

“The price increase was fairly dramatic. Asphalt was commonly between \$500 to \$600-per ton. The price went up to over \$800 and sometimes closer to \$1,000 per ton.”

As a result, in the 2009 study there were five test areas, with 50 per cent RAP being used to full depth in two of those sections. One 50 per cent RAP section was placed using a foaming WMA (warm mix asphalt) technology while the other section was placed hot. The remaining three sections in the experiment were virgin mixtures.

Hot mix asphalt was used in one section, with a warm mix asphalt with water injection foaming method placed in a fourth section. The fifth test section used virgin materials and used a WMA additive technology.”

Over a two-year period, the test areas received 15 million equivalent standard axle loads. The results were extremely encouraging and the overall conclusion at the end of the study was that: “Today, the HMA – RAP mix has the best cracking performance.”

“We are now looking at thinner pavement test sections with additional green technologies such as roofing shingles and ground tire rubber,” said Willis in a short interview about the progress of NCAT’s current study which got underway in 2012.



500 Hood Rd, 4th Flr., Markham, ON. L3R 9Z3
Phone: 905-752-5408 | Fax: 905-752-5450
Toll free: 800-465-6475 | Toll free Fax: 888-396-9413
E-mail: dcnonl@reedbusiness.com

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