

# top 10 list



## WAYS TO GET MORE DURABLE HMA PAVEMENTS #9 USE RAP RESPONSIBLY

The asphalt pavement recycling process uses Reclaimed Asphalt Pavement (RAP) materials combined with new materials, sometimes along with a recycling agent (not common practice in Ontario), to produce asphalt mixtures that are of equal or better quality to virgin aggregate mixtures. This practice promotes sustainability and creates environmental benefits.

The following checklist provides best practices for achieving more durable asphalt pavements through the responsible RAP use.



## STATE OF THE PRACTICE

- Recycling or reuse of pavement material is a very simple but powerful concept. Recycling of existing pavement materials to produce new pavement materials results in considerable savings of material, money, and energy. The specific benefits of recycling can be summarized as follows:
  - + Reduced costs of construction;
  - + Conservation of aggregate and binders;
  - + Preservation of the environment; and
  - + Conservation of energy.
- Over the years, between 10 – 20 per cent RAP have been permitted in the surface course mixes and up to 40 – 50 per cent in the binder course mixes. However, in recent times, there has been a decline and, in some cases, a discontinued use of RAP due to concerns regarding premature cracking and poor pavement performance. These concerns have often been attributed to issues with variability, sampling, extraction and recovery practices and properties of RAP binder, and aggregate properties.



## ENSURING QUALITY ASPHALT PAVEMENTS

- To ensure that quality asphalt pavements are being constructed, RAP should be utilized in accordance with the contract requirements, adhering to the rules of practice for changing the binder grade specific to the RAP proportions, and use of the binder replacement method to minimize any risks. The following highlights expand on the requirements for responsible use of RAP:
  - + For higher percentages of RAP, i.e. greater than 15 – 20%, a softer Performance Graded Asphalt Cement (PGAC) should be incorporated/engineered into the mix;
  - + Hot Mix Asphalt (HMA) designers and producers **MUST** be mindful of RAP's most important characteristic – "stiffness" (hardness) of the existing asphalt cement or binder which greatly influences the properties and performance of the resulting recycled mix;
  - + The effects of ageing on binder properties need to be considered in the mix design



together with the further ageing expected during the production of recycled mix as a result of elevated temperatures.

- + A better reflection of the actual percent of binder contribution from the RAP to the total binder in the mix is recommended. This is particularly critical when RAP is fractionated into fine and coarse RAP, and if fine RAP is incorporated into the mix.
- + Employing quality control and RAP best management practices are recommended. Sampling, testing, and analysis of the RAP are vital to good management of this valuable material. The National Cooperative Highway Research Program (NCHRP) Reports 452 and 752 provide a comprehensive laboratory experiment to answer basic questions about preparing and characterizing RAP materials for mix designs. The National Asphalt Pavement Association (NAPA) Quality Improvement Series 129 provides best practices and guidance for management of RAP from the time of collection through processing, sampling and testing of RAP for mix design, and quality control practices during production of asphalt mixtures containing RAP. Readers interested in a concise summary information about responsible use of RAP are encouraged to consult OAPC's 2017 Publication on the ABCs of RAP.



## REQUIREMENT FOR TOTAL COMMITMENT

- Total commitment is required from asphalt producers to ensure that maximum allowable percentages of RAP are not exceeded during production of the mix, and that governing industry mix design guidelines are adhered to. This ensures that our roadways meet their lifespan expectations, and is essential for developing and maintaining a relationship of trust. All stakeholders in the road building industry **MUST** make an effort at this. The OAPC continues to work with all stakeholders to seek better ways of understanding asphalt materials, producing durable asphalt pavements, and to avoid sending RAP materials to landfills.



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