



Ontario Hot Mix Producers Association

365 Brunel Road, Unit 4, Mississauga Ontario L4Z 1Z5
Phone: 905-507-3707 Fax: 905-507-3709 www.ohmpa.org

SPECIAL BULLETIN #4

QUALITY OF ASPHALT PAVEMENT TASK FORCE

August 2015

Re: The Responsible Use of Recycled Materials in Hot Mix Asphalt (HMA)

This bulletin deals with fostering the responsible use of recycled materials, which includes Recycled Asphalt Pavement (RAP) and Recycled Asphalt Shingles (RAS), in hot mix asphalt (HMA).

Research has shown that the responsible use of RAP enhances pavement performance. In addition to RAP, both RAS consisting of post-industrial Recycled Shingle Tab (RST) and tear-off waste from roofs have been incorporated in HMA. In light of some recent performance issues with HMA in Ontario, the Task Force agrees that as an industry, we need to review the proper use of both RAP and RAS in HMA to ensure that quality asphalt pavements are being constructed.

The use of RAP in HMA has a long and proven track record in Ontario and around North America producing quality pavements while at the same time promoting sustainability and creating environmental benefits. In Ontario, the current specifications governing mix designs allow the use of RAP and RST in hot mix asphalt.

The Ontario Ministry of Transportation (MTO) and Municipal clients depend upon OPSS 1150, OPSS 1151-PROV and OPSS 1151-MUNI, which allow the use of RAP in binder course and surface course asphalt. The OPSS 1151-PROV currently allows the use of RST. Old RAS has also been used in some municipal work. Some municipalities and jurisdictions have further modified requirements for the use of RAP in the OPSS allowances.

The following items detail our consensus opinion including benefits and concerns on the use of RAP/RST in hot mix asphalt in Ontario:

1. The continued use of RAP/RST in hot-mix asphalt is environmentally responsible and offers good value and benefits to all the stakeholders.
2. Proper mix design and production adjustments of the virgin PGAC grade must be made for mixes with RAP in excess of 20%. It is the assessment of the Task Force that high RAP content mixes, not designed and constructed properly, can result in HMA that age hardens rapidly and shows brittle performance characteristics or premature cracking. The typical correction for this is one grade lower (softer) on both the high and low temperature grades of the virgin PGAC grade. For example, if the final PGAC desired is 58-28 in a mix with greater than 20% and lower than 40% RAP, then the virgin PGAC grade should be PG 52-34. Adjustments to the PGAC grades need careful review when RAP contents are in excess of 20% in a mix as outlined in OPSS.
3. Further research to ascertain the contribution and grade of the RAP/RST asphalt cement to be incorporated in the mix is being undertaken. Currently, Ontario mix design procedures assume that 100% of the AC in the RAP/RST is available for the mix design and is given full credit to the total AC content of the mix. The contribution range varies significantly between North American jurisdictions and the debate over how much blending occurs continues. It is generally believed that total blending does not occur particularly at the higher recycling contents levels. However it is also accepted that the recycled materials do not behave like "Black Rock" in the mix.

The contribution of AC in the RAP/RST calculated as low as 60% has been used in some North American jurisdictions. NCHRP 9-12 assesses that not all AC from RAP is available (free AC), when proportions above 25% are used in HMA. It is the assessment of the Task Force that although all PGAC from RAP/RST is extractable using solvents, the 100% availability of this AC in produced HMA is questionable.

4. Some agencies in the United States have changed their recycling requirements from allowable percentage of RAP/RST to Recycle Binder Ratio (RBR) to better reflect the actual percent of binder contribution from the RAP/RST to the total AC in the mix. This becomes even more of a concern when RAP is fractionated into Fine RAP and Coarse RAP and Fine RAP is incorporated into the hot mix. From a mix design and production perspective, the availability of contributing AC from Coarse and Fine RAP can differ by as much as 1% in the final total AC content of the mix which in turn will affect the effective asphalt cement content. In this regard, the Task Force will evaluate with its stakeholders the use of RBR.
5. Total commitment from the asphalt producers is required to ensure maximum allowable percentages of RAP are not exceeded during production of the mix and that mix designs are being adhered to. Proactive measures by owners and industry in monitoring and enforcing RAP/RST addition to the HMA are a necessity. It is highly recommended by the Task Force that owners should consider additional plant inspections during production to ensure both the quality of the RAP/RST stockpiles and that submitted mix designs and actual production correlate (i.e. allowing full time inspection access to the asphalt plant control room). These types of contract requirements are simple and cost effective and various municipalities in Ontario have started to use such measures to control the quantity of RAP and the quality of the HMA on their projects.

Industry is more than willing to work with road owner agencies with an 'open door' policy to further develop appropriate controls that ensure that the proper amount of RAP/RST is being utilized by the HMA producer at all times.

This bulletin is the last of an initial series of communiqués to be issued by the Quality of Asphalt Task Force. The bulletins have touched on the three most significant issues affecting asphalt pavement quality in Ontario. More in-depth discussion and recommendations on each of these topics will be issued in the future as the work of the Task Force continues.

The Quality of Asphalt Pavement Task Force

In response to concerns about the quality of asphalt pavement in Ontario, OHMPA formed the Quality of Asphalt Pavement Task Force. The purpose of this group comprised of industry experts, consultants and academics is to assess these concerns and propose workable solutions that are scientifically sound and also practical. In responding to this challenge, the task force has road owners' concerns in mind and has drawn on the expert opinions of the members of the group.

These and other findings and recommendations of the Quality of Asphalt Pavement Task Force will be published on the OHMPA website (www.ohmpa.org). For more information, please contact the OHMPA office at 905-507-3707 or by email at info@ohmpa.org.

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