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New code of practice encourages use of lower VOC-emitting asphalt during ozone season



By Heather Hudson

In the coming months, the federal government is set to introduce a code of practice for volatile organic compound (VOC) emissions from the application of asphalt – a move that may require changes in some asphalt emulsion and cutback products and their associated application methods.

While some contractors are using the more environmentally friendly asphalt emulsions in their roadbuilding work, many others continue to rely on asphalt cutbacks, which emit more VOCs.

We're exploring why Environment and Climate Change Canada is introducing the Code of Practice for the Reduction of VOC Emissions from the Use of Cutback and Emulsified Asphalt and how it might affect the industry.

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“The code is proposing best practices to encourage the use of lower VOC emitting asphalt during ozone season. For the majority of SHCA members, day-to-day activities should not change.”

– Denis Pineault, Head, VOC Controls Unit, Environment and Climate Change Canada

Back to basics: What are VOCs and the code of practice?

VOCs are organic compounds that contain one or more carbon atoms with high vapour pressures, which evaporate easily into the atmosphere. According to Environment and Climate Change Canada, products that produce VOC emissions are typically solvent-based and are on the list of toxic substances in the Canadian Environmental Protection Act.

“VOCs are a precursor to the formation of ground-level ozone as well as particulate matter – the main ingredients of smog,” said Environment and Climate Change Canada’s VOC Controls unit head, Denis Pineault. “To reduce the smog level and improve air quality, it’s necessary to control and reduce VOCs.”

VOCs are particularly present in the application of cutback asphalt and emulsified asphalt during road construction. To prepare these products, asphalt cement is often mixed with a petroleum diluent to produce cutback asphalt or with emulsifiers, water and sometimes petroleum diluent to produce emulsified asphalt.

“Once the liquefied asphalt cement is applied during road construction, the diluent petroleum solvent (in the case of asphalt cutbacks) and water (in the case of asphalt emulsions) evaporates, leaving the cured residual asphalt cement,” reads the Environment and Climate Change Canada’s website.

When asphalt is applied, VOCs are emitted through the evaporation process, which create ground-level ozone and particulate matter.

Environment and Climate Change Canada maintains that the majority of asphalt used in Canada today is emulsified asphalt. Pineault cites a study conducted for the department in 2010 which found that of the 301 kilotonnes (kt) of liquefied asphalt used in Canada in 2009, 85 per cent was emulsified asphalt.

“While cutback asphalt represented only 15 per cent of asphalt use in Canada in 2009, it was responsible for 59 per cent of the VOC emissions associated with the use of asphalt,” said Pineault.

The study estimated that, without an environmental framework to guide the use of asphalt in Canada, VOC emissions from asphalt could reach 10.8 kt by 2020.

As a result, in 2012, Environment and Climate Change Canada held a public



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Raw asphalt

consultation regarding options to manage the health and environmental risks associated with VOC emissions. Pineault says a number of options for reducing VOC emissions were considered, including regulations, before the decision was made to use a code of practice.

“Comments from the industry indicated that a code of practice was the preferred instrument for this industry to reduce VOC emissions,” said Pineault. “It’s voluntary, easy to implement and can give some guidance to reduce VOC emissions during the ozone season, May 1st to September 30th.”

In 2014, Environment and Climate Change Canada published a discussion document on the draft code of practice, allowing a 60-day consultation period during which the industry could contribute questions and comments.

“We received 10 sets of comments, which were largely technical in nature and mainly focused on how the code would apply,” said Pineault. “The comments were from users, manufacturers and others asking us to clarify some definitions. There were no major changes.”

In March 2016, the department published a proposed code of practice that included changes made as a result of the public consultation. The objective of the code is to reduce VOCs from this sector of up to 5,000 tons of VOCs per year.

“The code is proposing best practices to encourage the use of lower VOC-emitting asphalt during ozone season. For the majority of SHCA members, day-to-day activities should not change. Most of the liquefied asphalt used in Canada is emulsified,” said Pineault. “What we are proposing is aligning with practices already adopted in the U.S. by the Environmental Protection Agency and in a number of states across the U.S. It’s nothing new.”



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An industry point of view

“Cutback asphalts that do not meet code of practice are still widely used in some applications. If they weren’t, there would be no reason to have this code of practice,” said Ontario Hot Mix Producers’ Association Environmental Committee chair, Steve Manolis.

Options for meeting the code of practice include switching from a high VOC cutback to a low-VOC emulsion or to low-VOC version of the cutback, if one is available. He points out that cutback asphalts can be used all year round, while the water-based emulsion asphalts may not be able to perform as well in below freezing temperatures.

“If a contractor uses cutbacks and switches to emulsion, he may have to watch application temperatures more carefully than in the past,” he said. “While we expect low VOC products to work, we’re going to have to learn about their lifetime performance compared to existing products. These are some of the things contractors are going to run into.”

Low-VOC cutback asphalt products have been developed and trialed with success, but Manolis says there may be instances where the low-VOC cutback or emulsion alternatives haven’t stood the test of time yet.

He’s also concerned about regulatory repercussions should the code of practice become law.

“It will be interesting to see how aware municipalities and provincial governments are of the code of practice,” said Manolis, noting that RFBs may include the use of asphalt cutbacks in their material specifications. “If [these agencies] choose to tender grades of asphalt cutbacks that don’t comply, it will need to be reported [to Environment and Climate Change Canada].”

Environment and Climate Change Canada maintain that the code of practice is non-binding and strictly voluntary, but Manolis predicts that if there isn’t sufficient compliance within the five-year review period, it could become a regulation.


“Some agencies could be inadvertently non-compliant, which will have an impact on the contractor,” said Manolis. “What does the contractor do if they receive a tender

that doesn’t meet the code of practice? The contractor may be able to work with the tendering agency to change tender so that the specified product(s) comply with the code of practice or may find themselves in a position where they have to decide whether or not to bid on the project and be deliberately non-compliant.”

Despite his concerns, Manolis believes the new code of practice may ultimately prove successful.

“I think there’s a reasonable chance that this will be a successful transition, but there are some things that need to be paid attention to as we go along,” he said. “It’s important to note that the code of practice is not yet finalized and we will have a better understanding of the requirements and the timelines once that occurs.”

Environment and Climate Change Canada is currently finalizing the code of practice and plans to publish it by the end of the year.

“Once in place, we will evaluate how the code is doing, how it’s been adopted and see if other control instruments are required to better manage emissions from this sector,” said Pineault. 



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