Code of Practice for the Reduction of Volatile Organic Compound (VOC) Emissions from Cutback and Emulsified Asphalt

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CTEP/APWA Pavement Workshop
February 6, 2018
Overview of Presentation

• Air Quality Issues
• Asphalt use in Canada
• Code of Practice
• Important Dates
Air Quality Issues

• 2003: VOCs added to Canadian Environmental Protection Act, 1999 (CEPA) List of Toxic Substances, given contribution to formation of ground-level ozone and particulate matter (PM), the two main components of smog

• Both PM and ozone have targets but are considered to be having no safe level

• Serious health and environmental concerns posed by smog, including:
  – premature deaths
  – increased risk of lung cancer and heart disease
  – reduced growth and survivability of tree seedlings
  – increased plant susceptibility to environmental stresses
How is smog formed?

Primary Pollutants

Ozone

Particulate Matter

Pollutants and sources

NOx  VOCs  NH3  SO2  PM
Definitions

• **Cutback Asphalt (CA):** produced by mixing asphalt cement with a petroleum diluent
  – Generates **higher VOC emissions**
  – Classified into three groups depending on the relative speed of evaporation of the petroleum diluent:
    ▪ rapid curing
    ▪ medium curing
    ▪ slow curing

• **Emulsified Asphalt (EA):** produced by emulsifying asphalt cement in water with an emulsifying agent, such as soap (and sometimes a small amount of petroleum solvent)
  – Generates **lower VOC emissions**
  – The emulsion setting rate determines the four grades for EA:
    ▪ rapid setting
    ▪ medium setting
    ▪ slow setting
    ▪ quick setting
Why Target Asphalt?

- 2009: Environment and Climate Change Canada (ECCC) end-user survey estimated asphalt use and emissions in Canada:

<table>
<thead>
<tr>
<th></th>
<th>Quantity used (kt)</th>
<th>Quantity used (%)</th>
<th>VOC emission (kt)</th>
<th>VOC emission (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutback asphalt (CA)</td>
<td>45</td>
<td>15%</td>
<td>5.2</td>
<td>59%</td>
</tr>
<tr>
<td>Emulsified asphalt (EA)</td>
<td>256</td>
<td>85%</td>
<td>3.6</td>
<td>41%</td>
</tr>
</tbody>
</table>

- Cutback asphalt contributes disproportionately to the VOC emissions in this sector
- Possible reduction of 5 kilotonnes of VOC emissions through the use of EA instead of CA (product comparable in price and in quality)
Selection of a Code of Practice

• 2012: ECCC consultations on development of control instruments for VOCs emissions from asphalt

• **Code of practice**: voluntary instrument that identifies recommended procedures or practices to help a sector prevent, control or eliminate emissions

• Preferred option because:
  – encourages reduction of VOCs, while allowing flexibility

• Additionally, could be:
  – developed more expediently
  – used by industry and associations to set standards and encourage better practices
  – cited by all levels of government and other parties in procurement and contract specifications
Publication of the Final Code


• **Objective**: to protect environment and health of Canadians, while maintaining road safety, by recommending best practices that encourage the use of low VOC emitting asphalt
Applicability

• The Code applies to any person involved in the manufacture, import, offer for sale, sale or use of cutback asphalt or emulsified asphalt, including:
  – manufacturers and distributors
  – procurement enablers
  – end-users (paving companies)
Recommended Practices

When used in paving material, the following maximum VOC concentrations are recommended (% by volume):

<table>
<thead>
<tr>
<th></th>
<th>Cutback asphalt</th>
<th>Emulsified asphalt</th>
</tr>
</thead>
<tbody>
<tr>
<td>During ozone season (May-September)</td>
<td>0.5%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Outside ozone season (October-April)</td>
<td>5.0%</td>
<td>No recommendations</td>
</tr>
</tbody>
</table>
Recommended Practices (cont’d)

• **Low-emitting VOC product alternatives**
  – recommends the manufacture, import, sale or use of low VOC emitting product alternatives instead of cutback asphalt with petroleum solvent formulations

• **Labelling**
  – technical specification sheets that accompanies the product should be included, with seasonal recommendations on product use
  – technical specification sheets should reference the Code
Recommended Practices (cont’d)

• **Contracting**
  – commitment to follow the Code should be included in contracts
  – use of alternative formulations of asphalt containing low VOC emitting products should be promoted during contracting discussions

• **Conditions of use and training of staff**
  – persons conducting paving or maintenance operations should conduct their activities in accordance with the Code
  – employees should be trained on recommended practices of the Code and record keeping procedures
Reporting

- Manufacturers should submit reports every two years
- Reports should contain product name, type of asphalt, quantity manufactured/sold, and VOC quantity
- First report should be submitted by March 31, 2018 for 2017 calendar year’s activities
Record Keeping

• Manufacturers
  – Should keep records of the quantity and grade of all asphalt manufactured and sold for that year for a minimum of six years

• Procurement enablers
  – Should keep a copy of contracts for a minimum of six years

• End-users
  – Should keep records of the quantity and type of asphalt product used for each year for a minimum of six years
Promotion of the Code of Practice

• ECCC will promote the Code by:
  – Communicating the availability of the Code of Practice to our list of stakeholders:
    ▪ Associations
    ▪ Indigenous People
    ▪ Provinces and Municipalities
  – Developing and distributing FAQ sheets
  – Communicating with Associations about potential promotion of the Code
  – Presentations at industry conferences and meetings
  – Reminding Manufacturers to complete and submit their reporting
Important Dates

• Code of Practice for the Reduction of Volatile Organic Compound (VOC) Emissions from Cutback and Emulsified Asphalt published on February 25, 2017

• Code recommends best practices with an emphasis on use during ozone season (May 1 - September 30)

• Manufacturers should submit their first report by March 31, 2018

• The implementation of the Code will be reviewed six years after publication (2023)
Questions?

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For more information please visit:
Annex 1 : Estimated VOC emission factors for asphalt products

• Different types of asphalt products are associated with different emission factors of VOCs.

<table>
<thead>
<tr>
<th>Emission Factors for Product Groupings</th>
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</thead>
<tbody>
<tr>
<td><strong>Product Group</strong></td>
</tr>
<tr>
<td>Cutback Asphalt</td>
</tr>
<tr>
<td>Slow cure</td>
</tr>
<tr>
<td>Medium cure</td>
</tr>
<tr>
<td>Rapid cure</td>
</tr>
<tr>
<td>Emulsified Asphalt</td>
</tr>
<tr>
<td>Low or no VOC emulsions</td>
</tr>
<tr>
<td>High float surface treatment emulsions</td>
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<tr>
<td>High float mixing grade emulsions</td>
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</tbody>
</table>

1. Volatility w/w assumed in percent

Page 18 – 9 février 2018
Annex 2: Reducing VOC’s in Canada – Asphalt Sector

- Consultation on the proposed renewal of the Federal Agenda
- Publication of discussion paper outlining seven possible initiatives for the Government of Canada to reduce VOC emissions from products during the period 2010 to 2020 (Included Asphalt as a category)

2012
- Public consultations on control measures for the asphalt sector. From these, a voluntary code of practice emerged as the instrument of choice

2014
- Publication of draft Code of Practice for reducing VOC emissions arising from asphalt use (60 day consultation period)

2016
- Publication of the Proposed Code of Practice for the Reduction of Volatile Organic Compound (VOC) Emissions from the Use of Cutback and Emulsified Asphalt which included comments received in 2014 (60 day consultation period)

2017
- Publication of the Code of Practice for the Reduction of Volatile Organic Compound (VOC) Emissions from Cutback and Emulsified Asphalt which addressed comments received in 2016