Dealing with tar bound arisings

David O’Farrell
Cumbria County Council

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Introduction

- What is tar?
- The occurrence of tar
- The potential hazards
- The ADEPT guidance
- The current position

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Tar - definition

- Two types of crude coal tar were produced with different compositions and properties:
  
  - Coke Oven (High temperature) tar. Produced at around 1200°C and have a high aromatic hydrocarbon content and a pitch content of around 50%
  
  - Low temperature tar. Produced at around 600 to 700°C in gas works and is paraffinic with a pitch content of around 35%. Less viscous than high temperature tar
Tar - definition

• It can be difficult to define “coal tar” for identification purposes
• It can be similar in appearance to bitumen
• Testing is required for identification
Uses of tar in highway works

- Grouting (probably pre 1950/60)
- Asphalt (until the mid 1970’s)
- Surface dressing (until the mid 1980’s)
- Fuel resistant surfacing
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Potential hazard

• The potential hazard posed by coal tar arises from the levels of Polycyclic Aromatic Hydrocarbons (PAHs).

• Some PAHs are known to have carcinogenic effects and levels of these are very high in the case of tar (but extremely low in bitumen)

• Materials containing tar may be classified as Hazardous Waste

• Other constituents may be harmful to the environment
The ADEPT (CSS) Guidance Note

Published November 2008

The Guidance Note

• Developed in response to queries about arisings following the introduction of the Hazardous Waste Regulations 2005
• Any excavated material is considered to be waste
• Emphasis on assessing materials prior to commencing work and if tar is found, developing solutions that avoid disposal to landfill
Definitions of waste

• Waste is defined in the European Waste Catalogue

• Section 17 03 defines bituminous mixtures, coal tar and tarred products. There are 3 subgroups:
  – 17 03 01* bituminous mixtures containing coal tar
  – 17 03 02 bituminous mixtures other than those mentioned in 17 03 01
  – 17 03 03* coal tar and tarred products
Investigation and testing

- Check maintenance history and records
- Cores or trial pits at design stage
- Examine each layer in the construction
- More likely to be an issue for Utility works
Investigation and testing

• Further guidance on sample preparation is needed
• Test for PAH and phenol concentration
• Testing at an analytical laboratory
• There are 17 PAH components
• There are some indicator tests which may identify where detailed analysis is required
Investigation and testing

Indicator tests:

• White spray paint (goes brown in the presence of tar, little affected by bitumen)

• Adding a drop of Methylene Chloride to a fragment of material on a filter paper. Tar gives yellow-brown stain; bitumen gives dark brown stain)

• Use of PAK marker (available from www.interlab-bv.nl). Marker is sprayed on the material and left to dry. If the white spray discolours to a light brown/yellow, PAH level exceeds 150 ppm. PAK marker gives an indication of PAH presence, but does not give a measurement.

• Use of a UV lamp. Interlab recommend the use of a UV lamp in cases of doubt after using PAK marker. Under UV light material the discoloured PAK spray lightens and becomes yellow/green.
### PAH components

<table>
<thead>
<tr>
<th>Acenaphthene</th>
<th>Coronene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acenaphthylene</td>
<td>Dibenzo(ah)anthracene</td>
</tr>
<tr>
<td>Anthracene</td>
<td>Flouranthene</td>
</tr>
<tr>
<td>Benz(a)anthracene</td>
<td>Flourene</td>
</tr>
<tr>
<td>Benzo(a)pyrene</td>
<td>Indeno(1,2,3-c,d)pyrene</td>
</tr>
<tr>
<td>Benzo(b)flouranthene</td>
<td>Naphthalene</td>
</tr>
<tr>
<td>Benzo(g,h,i)perylene</td>
<td>Phenanthrene</td>
</tr>
<tr>
<td>Benzo(k)flouranthene</td>
<td>Pyrene</td>
</tr>
<tr>
<td>Chrysene</td>
<td></td>
</tr>
</tbody>
</table>

(US EPA PAH16 plus Coronene)

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Interpretation of results

• If the total concentration of the 17 PAH components is > 25ppm, then the material cannot be recycled via a hot mix asphalt process.

• For use as an unbound material these criteria apply:-
  – The concentration of Benzo(a)pyrene is below 100 ppm.
  – The concentration of all other components of PAH17 is below 1,000 ppm.
  – The concentration of phenol in the leachate of a liquid to solid ratio of 10 litres per kg is below 1 mg/kg.
options

• Look at alternative designs which would allow the material to remain in place
• Examine methods of working to segregate (minimise) tar bound layers
• Excavate and treat the tar bound material using a cold process
The current position

- The 2008 guidance has been used by many local authorities and some revisions have been proposed based on its use.

- These included:
  - Guidance on sample preparation
  - Clarification of some of the testing requirements
  - Guidance on environmental limits where re-use is proposed
The current position

- During 2010 a working group was set up including EA, MPA, HTMCA and ADEPT to review the ADEPT guidance.
- A Technical Advisory Group (TAG) has very recently been established by EA under the European Pathway to Zero Waste project.
- The group’s objective is to develop an End of Waste Quality Protocol for tar covered road materials. A key desire is for the TAG to agree a measurable and practical definition for "Coal Tar" that can classify coal tar above or below 0.1%.
The current position

• A proposed revised version of the Guidance Note has been sent to EA for comment and will hopefully be issued as an interim until the protocol is available
• A Regulatory Position Statement was published by EA in December 2010
• This Regulatory Position Statement will be reviewed by 30 April 2011
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The Regulatory Position Statement

• If you comply with the requirements set out, EA will allow the use of waste tar bound road planings (where they are hazardous waste and have been treated at a suitably permitted facility so that they are fit for re-use) to be used in construction operations without the need for an environmental permit.

• EA defines these materials as hazardous waste where the coal tar content >0.1%
The next steps

• Leachate testing is being carried out on tar bound materials coated with foamed bitumen and hydraulically bound material

• Further discussion needed on the definition of tar to determine what constituents make up the 0.1% coal tar

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Thank you for listening

David O’Farrell
Technical Director
07971 446266
david.ofarrell@cumbriacc.gov.uk

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