Health, Safety & Environmental stewardship in the bitumen industry

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HEALTH
Hazard, Exposure & Risk

› **Hazard**: An inherent property of a substance, object or activity with a potential for adverse, or harmful, effects to occur

› **Exposure**: A quantitative measurement of the extent to which a given hazard is present

› **Risk**: the probability that an adverse event will occur
Hazard, Exposure and Risk

Risk = fn[Hazard * Exposure]

No Exposure
No Risk, No Health Impact
## Bitumen Hazards and Risk management

**REACH: EU Regulation 1907/2006**
- Ensure a high level of protection of human health and the environment from the risks that can be posed by chemicals,
- Manufacturer is responsible for assessing and managing the risks posed by chemicals and providing appropriate safety information to downstream users.

**Bitumen is not classified as hazardous for Health and the Environment**

**Risk Management Measures aimed at controlling exposure**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Exposure</th>
<th>Risk at high exposure Potential Health Impact</th>
<th>Risk Management Measures</th>
<th>Risk after Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat / high T</td>
<td>Dermal Contact</td>
<td>Skin damage … death</td>
<td>PPE, Equipment, Procedures</td>
<td>Low</td>
</tr>
<tr>
<td>H₂S in fumes</td>
<td>Inhalation</td>
<td>Acute toxicity … death</td>
<td>Procedures, Equipment</td>
<td>Very low</td>
</tr>
<tr>
<td>Cancer (due to PAH in fumes)</td>
<td>Inhalation, Dermal Contact</td>
<td>Chronic toxicity … death</td>
<td>Lower emissions, temperature, fume extraction equipment, etc</td>
<td>Very low</td>
</tr>
<tr>
<td>Fumes (respiratory tract irritation)</td>
<td>Inhalation</td>
<td>Respiratory irritation Breathing problems</td>
<td>Lower emissions, temperature control, fume extraction, etc</td>
<td>Very low</td>
</tr>
</tbody>
</table>
Historic Exposure

Always room for improvement

Exposure Reduction

› Warm mix technologies
  ▪ More than a dozen
  ▪ Application temperature reduction (from 10 to 100 ºC)

› Increased use in Europe since 2000

› Technology along the whole supply chain
  ▪ raw materials and additives
  ▪ production equipment
  ▪ laying technologies
  ▪ working practices
SAFETY
Safety

› Safe loading & delivery
› Safe Handling of bitumen
› Burns Card
› Maximum Safe Handling Temperature
› Information on transport legislation

Updated Eurobitume Technical Guidance on Maximum Safe Handling Temperatures for Bitumen

For many years, bitumen manufacturers have specified maximum safe handling & storage temperatures for bitumen products, primarily to prevent the formation of flammable atmospheres in heated storage tanks. The maximum handling & storage temperatures vary according to bitumen grade, but the current recommended maximums for paving grade bitumen and bitumen for industrial application are 90°C and 100°C respectively. If contact occurs with the skin, immediately remove all contaminated clothing and wash the skin thoroughly with soap and water. If redness, itching, pain or irritation occurs, contact a doctor immediately.
ENVIRONMENT
Environment

› First bitumen LCI produced in 1999, Updated in 2011
  ▪ ‘Cradle’ to refinery gate
  ▪ Paving bitumen, bitumen emulsion and PMB
  ▪ Can be used as input for EPDs

› Emissions to water are low and far below any regulated limit

› Bitumen is uniquely suitable for repair and maintenance of road pavements
  ▪ Re-usable and recyclable indefinitely
A Global Perspective

› Joint publication with the Asphalt Institute
  ▪ Bitumen manufacturing
  ▪ Bituminous products
  ▪ Chemical & physical properties
  ▪ Emissions to air & water
  ▪ Occupational Exposure
  ▪ Health & safety
  ▪ Sustainability

Coming soon.... 3rd edition
CONCLUSIONS

Health
› Bitumen is not classified as hazardous to health or to the environment
› Hazards of working with bitumen are now well defined
› Risks are very low and can be reduced further through exposure reduction
› Temperature control and reduction are key

Safety
› Bitumen is usually handled and applied hot
› Workers can be adequately protected by
  ▪ following good practices and
  ▪ using the right equipment (PPE)

Environment
› Bitumen is a durable and environmentally benign construction product
› 100% re-usable/recyclable
› Quantified environmental footprint
Finally...

Bitumen is a sustainable product that you can work with in confidence!