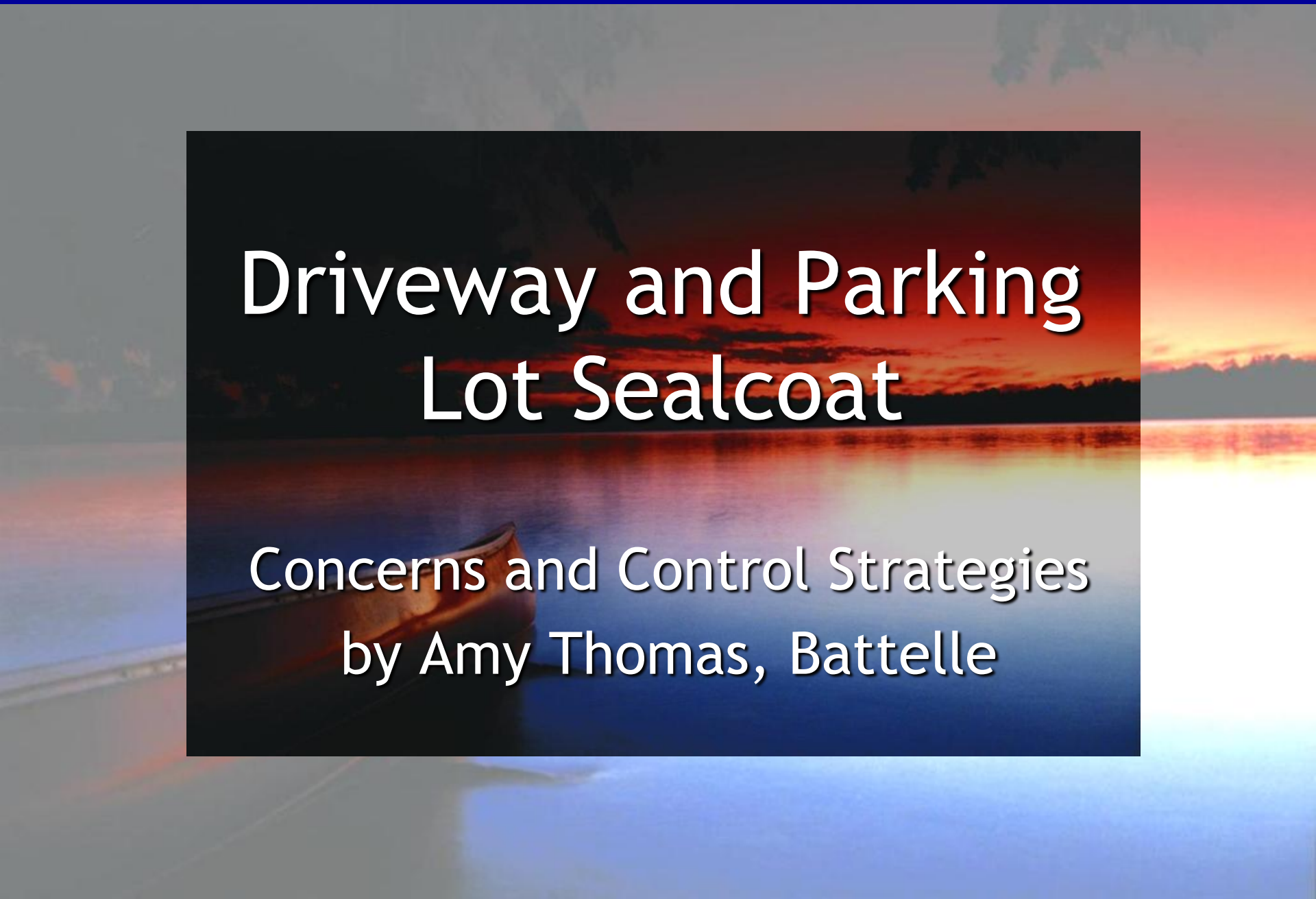


Driveway and Parking Lot Sealcoat

Concerns and Control Strategies

by Amy Thomas, Battelle

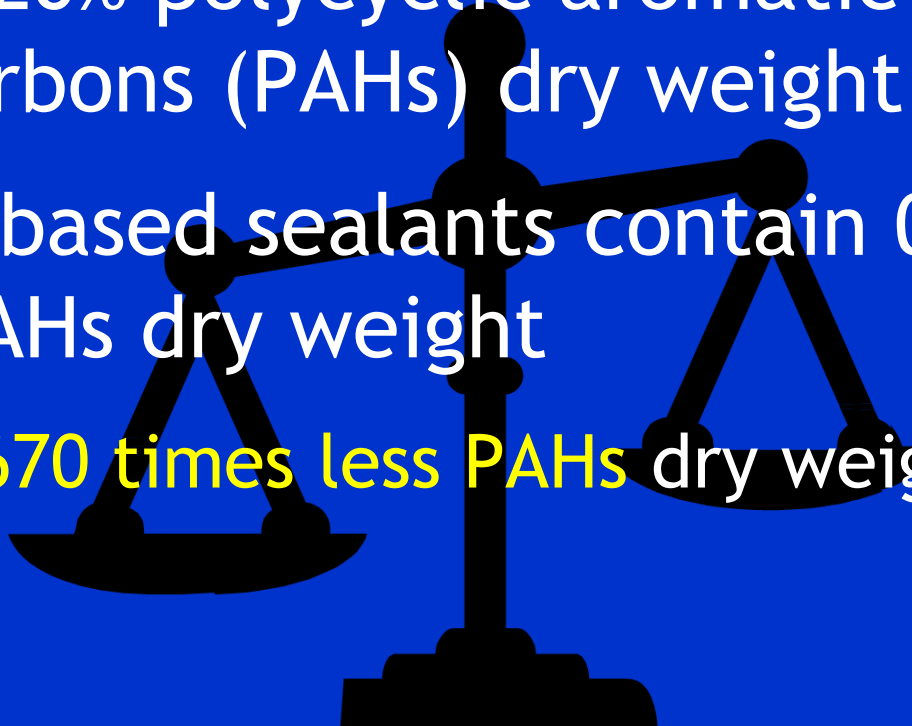
Sealant Uses

- Pavement sealers are applied to protect and beautify driveways and parking lots
  - Cracks can cause damage and allow grass to grow through
  - Protects against damage from ultraviolet rays and oil/gas spills
  - Over time, sealants abrade and need to be reapplied

Photo courtesy of USGS and the City of Austin, TX

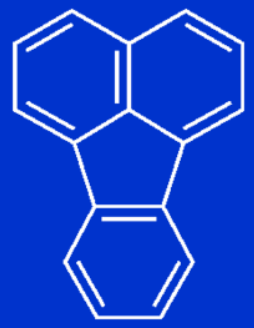
Types of Sealants and Environmental Implications

- Refined Coal Tar Sealants (CTS) contain 3.4% to 20% polycyclic aromatic hydrocarbons (PAHs) dry weight
- Asphalt-based sealants contain 0.03% to 0.66% PAHs dry weight
  - Up to 670 times less PAHs dry weight than CTS!



What are PAHs?

- Polycyclic Aromatic Hydrocarbons (PAHs) are a group of more than 100 chemicals
- PAHs are made up of only carbon and hydrogen grouped in two or more rings and are formed when organic materials are burned incompletely



Fluoroanthene

Benzo[a]pyrene

Naphthalene

Why are PAHs a problem?

- PAHs are toxic to aquatic life
- Several PAHs are suspected human carcinogens
- Most PAHs do not dissolve easily in water, but attach to particulates such as soil and can be transported to nearby waterways
  - They are very persistent in the environment

The Distribution of PAHs

- The presence of PAHs in urban streams and lakes is a growing and widespread issue
  - Research suggests a strong association between the presence of PAHs in lake sediments and urbanization
  - Contributing factors include increases in vehicular traffic and the use of coal tar sealants
- High levels of PAHs are found in many U.S. streams, rivers and lakes

Problems with Coal Tar Sealants

- Coal tars and coal tar pitches are a "*known human carcinogen*" according to the U.S. Dept. of Health and Human Services
- Are a source of PAHs in stormwater runoff
- Parking lot CTS dominate PAHs loadings to watersheds
- PAH "hot spots" are commonly found in streams adjacent to parking lots with CTS

Problems with Coal Tar Sealants

- Research suggests CTS contributes more PAHs to stormwater runoff than alternatives
  - About 65 times more than unsealed lots
- Estimated releases of 900 – 5,800 kg/yr to NY/NJ Harbor watershed
  - Estimated that CTS contributes 12% of PAHs to NY/NJ Harbor

Limitations of Coal Tar Sealants

- CTS tend to dry, shrink and crack with time
- Require frequent re-application
  - Sealants need to be reapplied every 2 to 5 years, depending upon wear
- Can cause surfaces to become slippery when wet
  - Washington DOT has reported low friction resistance in association with CTS

Photo courtesy of USGS and City of Austin, TX

Alternatives to Reduce PAHs from Coal Tar Sealants

- Reduce the need for paved surfaces
  - Share parking areas and driveways
  - Shared areas reduce costs
- Use low-PAHs sealants
  - Asphalt-based sealants

Photo courtesy of the City of Olympia, WA

Alternatives to Reduce PAHs from Coal Tar Sealants

- Consider alternative paving materials
  - Use gravel or concrete, which do not need sealants
  - Consider permeable asphalt

Photo courtesy of Smithsonian Institution Research Information System

Photo courtesy of the KY Ready Mix Concrete Assoc.

Advantages of Asphalt-Based Sealers

- Asphalt-based sealers are flexible
  - No cracking
- Significantly lower concentration of PAHs
- No carcinogenic chemicals (does not apply to blended products)
- Economical option

Photo courtesy of Boss Asphalt Maintenance, Inc.

Advantages of Gravel

- Permeable surface reduces runoff
- Flexible and not prone to cracking
- Variety of colors available
- Economical and low maintenance
- May help achieve LEED goals relevant to stormwater management
  - LEED is the benchmark for the design of green buildings

Photo courtesy of Bespoke Landscapes.

Advantages of Concrete

- Less maintenance than asphalt
- Stands up to weather
- Higher tensile strength than asphalt
- Can be decoratively stamped or stained
- Pervious concrete is an option to reduce stormwater runoff

Photo courtesy of Kentucky Ready Mix Concrete Association

Advantages of Permeable Asphalt

- Does not need to be sealed
- Promotes stormwater infiltration
- Economical compared to concrete
- Replenishes aquifers
- Reduces runoff

Options: Restrictions on CTS

- Restrict the sale of CTS
  - Lowe's and Home Depot home improvement stores have discontinued the sale of CTS nationwide and within the Austin, TX area, respectively
- Restrict the use of CTS
  - The City of Austin, TX passed an ordinance in 2005 prohibiting the use and sale of CTS
  - Dane County, WI passed similar ordinance in 2007

Austin, TX Ordinance

- Prohibits the use and sale of CTS in the City of Austin
  - CTS may only be sold if purchaser states in writing the CTS product is for use outside of City limits
- Penalty of fine up to $2,000 per offense
- Applies to all land-use classifications, including residential

Dane County, WI Ordinance

- Prohibits the application and sale of sealcoat products containing coal tar in Dane County, WI
  - CTS may only be sold if seller displays a statement with specific language referring to the ordinance and explaining that PAHs are "an environmental concern because they are toxic to aquatic life."
- Fines for violations apply to residents, contractors and sellers

Effect of CTS Restrictions on Coal Tar Industry

- More than 95% of coal tar is not used for CTS
  - Coal tar is mostly used to produce aluminum
  - CTS constitutes less than 5% of coal tar use
- In some areas, contractors have already stopped using CTS because of pressure from local government authorities

For More Information

- Any Thomas, Battelle (thomasa@battelle.org)
- USGS Fact Sheet available at: http://pubs.usgs.gov/fs/2005/3147/
- USGS FAQs at: http://water.usgs.gov/nawqa/asphalt_sealers.html
- Contact Barbara Mahler at the U.S. Geological Survey (USGS) at bjmahler@usgs.gov