

UNH research adds to mounting evidence against popular pavement sealcoat

March 14 2012

A parking lot at the edge of the University of New Hampshire campus has contributed important research to an emerging concern for the environment and human health.

The research, detailed in a recent feature article in the journal [Environmental Science & Technology](#), has found that one type of pavement sealcoat, common on driveways and [parking lots](#) throughout the nation, has significant health and ecosystem implications. Alison Watts, research assistant professor of civil engineering at UNH, is a co-author of the article "Coal-Tar-Based Pavement Sealcoat and PAHs: Implications for the Environment, [Human Health](#), and Stormwater Management."

Sealcoat, a black surface applied over asphalt pavements that is marketed as improving appearance and enhancing pavement longevity, is made of either an asphalt emulsion or a refined coal-tar pitch emulsion. Although the two sealcoats are similar in appearance and cost, concentrations of PAHs (polycyclic aromatic hydrocarbons), a group of organic compounds known to be detrimental to human and ecosystem health, are about 1,000 times higher in coal-tar-based sealcoats than those based in asphalt.

Conducting side-by-side studies of coal-tar-based sealcoated and nonsealcoated parking lots at UNH's West Edge lot, Watts, a researcher with the UNH Stormwater Center, found that the soil at the edge of the sealcoated lot contained "orders of magnitude higher concentrations" –

several hundred parts per million (ppm) from the sealcoated lot versus less than 10 ppm from the lot without sealcoating -- of PAHs. What's more, soil samples taken three years after the initial application of sealcoat remained high in PAHs.

The problem may be even more pronounced in New England: PAHs move into the environment as the sealcoat wears off, a process that snowplows seem to accelerate. "We think it's likely that we have even a more severe problem here in the Northeast, because the sealcoat wears off more rapidly," Watts says.

The journal article discusses the potential human health effects of coal-tar-based sealcoat, which is associated with elevated concentrations of PAHs in house dust, soil, air, water, and sediment. It cites a recent study that found that children living in homes adjacent to pavement with coal-tar-based sealcoat were likely exposed to about 14-fold higher doses of PAHs than those living adjacent to unsealed pavement. Studies at the Columbia Center for Children's Health have found that PAHs in homes can contribute to delays in cognitive development, asthma and other respiratory symptoms, obesity and metabolic disorders, or changes at the molecular level that could increase children's cancer risk.

Unlike many complex environmental issues, however, this one has a relatively painless fix: avoid coal-tar-based sealcoats in favor of asphalt-based ones, or no sealcoat at all. "Consumers generally can't tell the difference," Watts says. And voluntary shifts in the market are making that choice easier, she says, noting that retailers Home Depot and Lowes no longer sell coal-tar-based sealcoat, and several commercial sealcoaters use only asphalt-based sealcoat.

"The crux of this issue is that it's a fairly simple choice we can make that will be beneficial to the environment and to human health without significant impact to the users," Watts says.

Moving beyond the Stormwater Center's test parking lots, Watts will next study the effect of coal-tar-based sealcoats in raising the PAH concentration in the sediments of New Hampshire's Great Bay. "PAHs are increasing in Great Bay sediments, and in fact in sediments across the country," she says. While there are other sources of PAHs in the Great Bay -- including old gas plants, car exhaust, and woodstove smoke -- she wonders if sealcoat may be the culprit.

More information: Watts's work has been funded by New Hampshire Sea Grant and the Environmental Protection Agency; the upcoming Great Bay study received funding from the U.S. Geological Society. Learn more about PAHs in sealcoat from this brochure co-produced by NH Sea Grant and the UNH Stormwater Center:

www.unh.edu/unhsc/sites/unh.edu.unhsc/files/UNHSC%20Seagrant%20sealcoat%20fact%20sheet.pdf

The feature article can be found here: tx.usgs.gov/coring/pubs/Mahler...lcoatFeature2012.pdf

Provided by University of New Hampshire

Citation: UNH research adds to mounting evidence against popular pavement sealcoat (2012, March 14) retrieved 30 April 2024 from <https://phys.org/news/2012-03-unh-mounting-evidence-popular-pavement.html>

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