

Pavement Sealcoat Contributes Toxins to Stormwater Runoff

DURHAM, New Hampshire, April 29, 2009 (ENS) - Driveways and parking lots may look blacker and shinier with a layer of sealcoating applied to the pavement, but the rainwater running off the surface into nearby streams will be carrying more than oxygen and hydrogen atoms.

New research conducted at the University of New Hampshire Stormwater Center shows that sealcoating contributes to the amount of polyaromatic hydrocarbons entering waterways from stormwater runoff.

More commonly known as PAHs, polyaromatic hydrocarbons are found in diesel and crude oil. The Department of Health and Human Services has determined that some PAHs may reasonably be expected to be carcinogens.

Although small amounts of PAHs are typically found in the waters around the New Hampshire Seacoast, the sudden spike in the hydrocarbon concentrations in water draining from a university parking lot used for research caused Tom Ballestero, UNH associate professor of civil engineering, to be concerned about unknown impacts.

"Our society has been sealcoating pavement for decades and there are things we've never asked about," he says. "Now we're starting to probe and ask these questions."

Although it is intended to remain on the pavement surface, much of

the sealcoating eventually washes or scrapes off and ends up in nearby streams and rivers, says Alison Watts, affiliate faculty member at the University of New Hampshire Stormwater Center.

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Sealcoating was applied to part of a parking lot at the University of New Hampshire. (Photo courtesy UNH)

Most PAHs do not dissolve easily in water but stick to solid particles and settle to the bottoms of lakes or rivers.

Microorganisms can break down PAHs in soil or water after a period of weeks to months, according to the federal Agency for Toxic Substances.

For the study, one-quarter acre of a parking lot located near the Stormwater Center was covered with coal tar-based sealcoat and one-third acre was covered with asphalt-based sealcoat. The remainder of the nine-acre lot was left unsealed.

On-site stormwater drains off the parking lot and into a nearby swale. The PAH concentration was measured in the water and sediments coming from the sealcoated and unsealed parking lot sections.

Both types of sealcoating led to a rapid increase in PAH concentrations in the initial runoff - up to 5,000 parts per billion, much higher than the 10 ppb levels released from the unsealed lot, although concentrations decreased after several rainstorms.

The PAH concentrations in the sediments mirrored these trends. The concentrations immediately downstream of the coal tar-sealed lot increased by nearly two orders of magnitude within the first year.

Unlike other compounds, PAHs do not break down easily and persist in the environment for decades. Even a small amount of PAHs coming off sealcoated parking lots may overwhelm an aquatic ecological system already stressed by other contaminants.

Increased PAH concentrations in waterways could be a human health issue if people are exposed to the substance regularly. In addition, dust particles coming from a sealcoated driveway could potentially be troublesome for children who play on the sealed surface.

Ballestero cautions that it should not be a major source of concern, but nevertheless he and Watts will be investigating PAH levels in dust from sealcoat later this year.

"You don't see people falling over from PAHs in sealcoat, it's not that big of a health issue," Ballestero says. "But it could be a cumulative exposure problem that gets uglier over time."

Ballestero says he has sensed an interest by the sealcoat industry in offering more less toxic alternatives in the future. He says there should be options that allow workers in the industry to continue to make a living, but without causing additional harm to the local ecosystems and human health.

"There are much bigger environmental problems out there than PAHs from sealcoats, but the bottom line is that it is easily preventable," Watts said. "All you have to do is not apply it to pavement."

The UNH Stormwater Center works to protect water resources through effective stormwater management. The center receives funding from the Cooperative Institute for Coastal and Estuarine Environmental Technology at the University of New Hampshire and the National Oceanic and Atmospheric Administration. The sealcoating research study was funded by New Hampshire Sea Grant.

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