Shredded tires a cheap, environmentally friendly way to cover landfills

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Placing shredded tires on top of -- rather than in -- landfills can save money and benefit the environment, researchers from the University of Illinois say.

Timothy Stark, a professor of civil and environmental engineering at the University of Illinois at Urbana-Champaign, and Krishna Reddy, a professor of civil engineering at the University of Illinois at Chicago, recently evaluated the use of shredded tires as a drainage material in waste-containment systems. Shredding tires into chips roughly 4 inches by 6 inches, they report, offers a simple and cost-effective way of providing drainage for modern landfills, remediating older landfills, and disposing of mountains of scrap tires.

Nearly 280 million tires are discarded annually in the United States. Piles of worn-out tires can become eyesores and breeding grounds for mosquitoes. In landfills, intact tires can collect methane (produced by decomposing waste) and create potential fire hazards. Over time, these tires can work their way to the surface, where they can damage liner covers and cause increased leachate production that could contaminate groundwater.

"As a result, many states now require that scrap tires be shredded into chips prior to disposal," Reddy said. "Instead of simply burying those chips with all the other waste, we suggest using them as a drainage layer in both modern and abandoned landfills."

The drainage layer prevents water from percolating through the waste and polluting the ground water, Reddy said. Typically, the drainage layer is composed of sand or gravel, which must be purchased and transported to the landfill.

To investigate the feasibility of using shredded tires as a surrogate drainage material, scrap tires were shredded and distributed as drainage layers at two landfills: one in southern Illinois and the other near Chicago.

Stark and Reddy monitored the two sites for such characteristics as settlement, erosion, flow rates and water quality, and compared them with conventional sites that used sand or gravel. The researchers also measured the permeability of tire chips in the laboratory.

"Our research shows that replacing the sand or gravel with a layer of tire chips works just as well and costs less," Stark said. "The tires must be shredded for disposal anyway, so there is fairly little expense compared to buying and hauling sand or gravel."

The remediation of old landfills could consume huge quantities of scrap tires. "A drainage layer one-foot-thick covering one acre requires about 70,000 tires," Stark said. "A typical landfill covers 10 to 20 acres, and there are about 150 abandoned landfills in Illinois, alone, that are in need of some degree of remediation."

Shredded tires also could be used as backfill behind retaining walls and in other locations where sand or gravel is commonly used, the researchers report.

Source: University of Illinois