

# Scrap tires can be used to filter wastewater

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Every year, the United States produces millions of scrap tires that clog landfills and become breeding areas for pests. Finding adequate uses for castoff tires is a continuing challenge and illegal dumping has become a serious problem throughout the nation.

Dr. Yuefeng Xie, associate professor of environmental engineering at Penn State Harrisburg, has developed a method that uses crumb rubber to filter wastewater, which can help ease the tire problem and clean up the environment at the same time.

"My research has found that crumb rubber, derived from waste tires, can be used as a filter media," Xie explains. "The crumb rubber could be used for treating wastewater, ship ballast water, and storm water."

Crumb rubber is produced by chopping up and grinding up waste tires to a desired size, cleaning the rubber and removing any metal particles. It is currently being used in highway pavement, athletic track surfaces, playgrounds, landfill liners, compost bulking agents, various manufactured products, energy recovery and even as artificial reefs for aquatic life.

For traditional wastewater filtration, gravity downflow granular filters using sand or anthracite as a medium are commonly used. One major problem with these filters is that upon backwashing the particles, the larger ones settle at a greater rate than the smaller.

The Penn State researcher explains that this causes the top of the filter bed to hold the smallest medium particles and the bottom to hold the largest with the small medium particles or top layer of the filter tending to become clogged quickly.

In his research, he has proved that crumb rubber is not a rigid material; instead it can be easily bent or compressed. Through the crumb rubber method, the larger solids are removed at the top layer of the

filter and the smaller solids at a lower level, greatly minimizing the clogging problem.

Several studies conducted by Xie show that the crumb rubber filter is much more cost effective than conventional sand or anthracite filters. Because of substantially higher water filtration rates and lighter weight in comparison to sand or anthracite, crumb rubber filters may also be used in a mobile treatment unit for disaster relief operations, he adds.

Because the crumb rubber is compressible, the porosity of the particles is decreased which resembling an ideal filter medium configuration. It can then be used at higher filter rates while performing similarly to other media now in use. The crumb rubber media provide better effluent qualities and larger media allow longer filter runs at higher flow rates.

Source: Penn State

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