

Strategic Recycling Program News and Resources

[Select Engineering Characteristics of Crushed Glass](#) (PDF)

Scrap Tire State Regulations

The Solid Waste Management Act of 1980 sets forth the regulations for scrap tires. In 1992, a regulatory change to the Act redefined scrap tires as a residual waste rather than a municipal solid waste. Scrap tire processing facilities, which have markets other, that landfills for tires or derived materials are permitted and not required to have additional solid waste permits. Act 190 of 1996 as amended by Act 111 of 2002 provides for recycling, reuse, and disposal of waste tires, the cleanup of tire piles, remediation liens, the registration of waste tire haulers.

Storage of scrap tires is subject to the following provisions:

maximum stockpile size is 5,000 square feet to a height of 15 feet;

minimum 50 foot fire lane between stock piles;

tires may be stock piled for one year-storage in excess of one year is subject to permit requirements;

and maintaining a storage or processing facilities with access control, hazard prevention, nuisance control, record keeping, reporting measures and a site closure plan.

Major Markets

LeFarge and Essroc cement kilns currently are using TDF. PADEP in conjunction with PennDOT has developed a project using shredded waste tires for a lightweight backfill for the Tarrtown Bridge project. Both PADEP and PennDOT are exploring other projects, which may allow the use of processed scrap tires in various civil engineering applications (though none are currently in process). Ground rubber is being used to make recycled products.

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Development of Product/Materials Use Approval For Scrap Tires For State And Local Projects

As society continues to generate waste and the cost of disposal continues to rise, government legislation has placed economic incentives and pressure on industry to recover and recycle these materials for use in secondary applications. Since highway construction requires large volumes of materials, PennDOT is interested in participating in the recycling effort.

Problem

Americans throw away approximately 280 million tires each year, which is approximately one tire per person. 11 percent of these tires are reused, leaving roughly 250 million scrap tires to be managed annually. Automobile tires make up 85 percent of the scrap tires to be managed each year. As many as 2 to 3 billion tires have accumulated over the years in numerous stockpiles. Scrap tires are managed as whole tires, slit tires, shredded or chipped tires, ground rubber, or crumb rubber products. Scrap tires are an abundant recyclable resource. At many local transportation projects, utilizing industrial co-product materials to substitute conventional soils as fill material may reduce the cost of construction.

Solution

The purpose of this research was to develop a product and material use approval process for state and local projects to utilize scrap tires as alternative to conventional aggregates and soils in embankments. As a result of this work, state and local projects will be able to take advantage of the Liquid Fuel Monies. The purpose of the following implementation is to provide guidance on the utilization of scrap tires in embankments.

Implementation

The research recommends the following design guidelines to avoid exothermic reactions:

1. Tire shreds should be utilized in construction of embankment fills.
2. The gradation of scrap **tires** should have a maximum of 1 percent by weight passing the No. 4 sieve.
3. The scrap **tires** should be free of oils, gasoline, diesel fuel, hydraulic fluid, grease, wood, fibrous organic matter, ice, and snow.
4. Tire shreds should have less than 1 percent by weight of metal fragments, which are at least partially encased in the rubber. Tire shreds should also have metal fragments encased in rubber that does not protrude more than 25.4-mm (1 inch) from the cut edge of tire shreds on 75 percent of the pieces and no more than 50.8-mm (2 inches) on 100 percent of the pieces.
5. It is recommended that tire shred embankments be built above the water table. If a tire shred embankment is to be built below the water table, precaution in the design and construction of the embankment must be taken to assure that water does not pond up in the embankment.
6. To increase the stability of the slope, it is recommended that a layered system be utilized where tire shreds and conventional soils are placed in alternating layers. Moreover, to be on the conservative side, it is recommended that the tire layer should not be greater than 1 meter in thickness. This will also aid in reducing the potential for exothermic reactions.

Benefits

As a result of this work, state and local projects will be able to take advantage of the Liquid Fuel Monies. Furthermore, the use of this material will reduce the large tire stockpiles throughout the state and will eliminate between 100,000 and 500,000 tons of material in the stockpiles.

More Information

See the Technical Memorandum Development Of Product/Materials Use Approval For Scrap Tires For State And Local Projects.

Tarrtown Bridge Project Tire Shred Embankment Project

The Tarrtown Bridge Project will use approximately 750,000 tires as lightweight geotechnical fill. The tire shredding and bridge construction contract was awarded to A&L Construction, Belle Vernon, PA. The PennDOT Pollution Prevention Section developed the geotechnical subsurface and embankment model for this project to model slope stability, embankment movements, and settlement, and developed trigger values for the instrument alarm system designed to monitor temperature, pressure and voltage in the fill area. This project used tires from two municipal cleanups, thus saving disposal costs for PADEP and the associated municipalities. PennDOT also held two tire amnesty days, and a

tire collection day for tire dealers, replacement and automotive companies to supply clean car and truck tires for no tipping fee in order to obtain the tires necessary for the project.

Septic Sand

Recycled glass manufactured to meet the specifications for fine or coarse aggregate in DEP's on-lot sewage system regulations had been acceptable for use as a replacement for aggregates in on-lot systems for many years. However the required approval process of this material by the Department on a site-by-site basis made its use impractical. In February 2004, a listing was added to the alternate aggregate section of the Alternate Systems Guidance to help remove previous barriers from the use of recycled glass in on-lot systems. Glass sand for on-lot systems including free access intermittent sand filters and recirculating sand filters now requires approval only by the sewage enforcement officer, and not by the Department, on a site-by-site basis, which is the same requirement that all aggregates have. As a result, one MRF has depleted their stockpile of about 8,000 tons of broken glass cullet within a few months of approval of this requirement.

Workshop on the Engineering Applications Using Crushed Glass

DEP and PennDOT conducted the second crushed glass workshop in spring 2005. The purpose of the workshop was to share new information on crushed glass applications in transportation and other engineering applications. The last workshop brought together PennDOT district engineers and glass processors, and resulted in renewed interest in using glass as an alternative to aggregate in transportation projects
