

Tire Derived Rubber Materials



Installation of recycled rubber anti-vegetation mats beneath a guardrail.

Introduction

Roughly 300 million scrap tires are generated each year in the United States, approximately 1 tire per person in the country. Most of these tires are reused in various applications, but about 40 million tires go into landfills or other land disposal options. There are also still about 180 million tires in stockpiles. Tire derived aggregate has very useful engineering properties that make these materials an excellent choice for construction applications. In addition, tires have a high energy density and can be used as fuel to generate electricity. Landfilling tires is a waste of a valuable resource, and the IRC is working to promote increased reuse of all scrap tires as well as the elimination of old stockpiles.

Applications

About half of the annually generated scrap tires are used for fuel, primarily by the cement and paper industries, though they are also used to generate electricity. Tire derived fuel is popular because the energy provided by tires is comparable to that of oil and greater than that of coal. Tires are low in sulfur and have low NO_x gas emissions, and can produce a cleaner ash than coal. In addition, end users can often get tires at a lower price compared to other fuels, making it a very cost effective option.

Tires can be cut into small pieces to produce tire derived aggregate (TDA). TDA is a light-weight aggregate with good drainage and insulation properties. TDA has been used successfully to support embankments and roads on weak or marshy soils. In addition, there are approximately 75 tires worth of TDA in 1 cubic yard, so a large project can use a significant number of tires. Two embankments built in Portland, ME used 1.2 million tires. TDA also has good vibration damping properties and has been used to successfully in light rail projects to attenuate ground-bourn vibrations from the trains. Recently, tires have also been compressed into bales and used to stabilize problem slopes.

Scrap tires can also be ground into fine rubber particles, often called ground rubber, which can be used in a range of applications. Ground rubber is very popular choice for synthetic turf athletic fields and recreation areas. Ground rubber can be added to hot mix asphalt to improve the asphalt performance, and the rubber can even be extruded into new rubber products.

Environmental Benefits

Several research studies have show that leaching of heavy metals and organic compounds from clean scrap tires is negligible. Like any material, care must be taken to ensure the tires are not contaminated by debris that may be harmful. In general, reusing scrap tires has a number of positive environmental benefits. Tire derived fuel provides a clean burning alternative to oil and coal. TDA provides a high quality construction material that reduces the need for mining virgin aggregate and the associated use of water, fuel and reduces carbon dioxide emissions. TDA is also an effective replacement for synthetic lightweight materials such as polystyrene. Ground rubber can be used in hot mix asphalt to improve performance and reduce maintenance. Lastly, reusing scrap tires conserves valuable landfill space, and reducing stockpiles decreases the risk of tire fires and the related adverse environmental impact.

