MATERIAL MANUFACTURING AND RECYCLING: TIRES

Tire Industry Background

A waste tire is a whole tire that is no longer suitable for its original purpose because of wear, damage or defect. Each year over 280 million tires enter the waste stream in the United States, not including the 16.4 million tires that are retreaded. This represents one tire per year for every person living in the U.S. These waste tires add to the current stockpiles are estimated to contain 300 million tires.

The average automobile tire weighs about 20 pounds, which is equivalent to 100 tires per ton. Truck and bus tires are much larger with only 20 tires per ton. Tires come in two designs, non-belted and steel-belted. Steel-belted radial tires have a lifespan that is two to three times longer than non-belted tires. While steel-belted tires create less waste they are very difficult to recycle due to the steel wire within the tire rubber. Non-belted tires, on the other hand, are fairly easy to recycle. They were reground and used as a feedstock by tire manufacturers until the late 1960’s, when the availability of cheap oil and low cost, high performance synthetic rubber compounds gave rise to the radial tire. Today, non-belted tires represent only five percent of all used tires in the waste stream.

Tire Recycling

Tires were banned from Wisconsin landfills in 1995. In 2007, 90% of tires were collected for recycling through a number of methods. Auto repair shops recycle tires, typically for a fee; some communities provide tire “round-ups” during spring or fall, or tires may be collected at drop-off locations throughout the state. There are three primary categories of methods by which tires can be reused or recycled: these include uses for whole tires; uses for shredded tires, and uses for crumb rubber.

Uses for Whole Tires

Retreading is a process of extending the life of a used tire, with new tread placed on the used tire casing. These tires are described as used rather than waste tires because the tires will be used for their original purpose after retreading. Steel-belted tires can only be retreaded two to three times, with the retreading process being more expensive than for non-belted tires. Airplane and truck tires are the most frequently retreaded tires.

Whole tires can also be used for artificial reef building. Tires are strung together, weighted down, and placed in desired locations below the surface of the water. Tires can also be used for breakwater construction, bumpers on boats and docks, playground equipment, erosion control and other construction applications.

Uses for Shredded Tires

Primary shredding is the first major step for changing the shape and form of whole tires. The size of tire shreds range from four to 18 inches long. Some of the uses of primary shredded tires are as daily cover at landfills and in fabricated products, such as athletic industrial, blasting and commercial mats. In composting projects, tire shreds can be used as a bulking agent to increase airflow.

Secondary shredding, to produce a smaller particle size, allows tires to be used as tire-derived fuel (TDF) and in composting operations. Shredded tires have proven to be an excellent form of industrial fuel when
used in fairly small percentages, typically 10 percent or less. TDF has more energy per weight than most types of coal. The use of TDF is becoming very popular in certain industries, especially cement kilns and in power production. In 2007, 2.5 million tons of scrap tires were converted to TDF.

**Uses for Crumb Rubber**
Crumb rubber is generally defined as rubber small enough to be reused in molded or mixed products. In 2007, 789,000 tons of scrap tires were converted to crumb rubber. Its uses include wheel chocks, car stops, recycling containers, athletic field surfaces and rubberized asphalt.

*Recycling data: U.S. Scrap Tire Markets 2007; Rubber Manufacturers Association, December 2009*

Updated 06/2012 by Joe Van Rossum, SHWEC Recycling Specialist.
Editing assistance by Lyndsay Gavin, SHWEC Intern.