RUBBER manufacturers association

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THE USE OF SCRAP TIRE AS PLAYGROUND MATERIAL

Playgrounds can be a source of great happiness and joy for children. However, they can also be a source of injury. To minimize injuries from trips and falls, especially falls from equipment, playgrounds are being equipped with shock absorbing surfaces under and around equipment. While various materials provide shock protection, some of the most protective surfaces are being provided by scrap tire-derived materials. There have been questions or concerns raised about tire derived materials being used for playground cover. This Briefing Sheet is intended to provide answers to these questions. The information provided below is taken from a variety of sources, including State & Federal agencies, laboratories contracted by State agencies, research hospitals, licensed testing companies and tire manufacturers.

Two types of rubber playground surfacing material are on the market today: loose fill and solid mats. Loose fill generally consists of chips of rubber ranging from one half inch to three quarters inch in size. All non-rubber materials are removed, and the chips are washed before being placed on the playground. Tires contain neither asbestos nor fiberglass as reinforcement fibers.

Mats can be one of two types; pour-in-place or conventional matting. Pour-in-place rubber is a composite of ground tire rubber or other rubber that is mixed with a binding agent and poured under the playground equipment, much like concrete. Conventional mats are manufactured in a similar manner to pour-in-place material and can either be one large piece or smaller pieces that lock together to form a mat of any desired shape or color. Mats have an added advantage of being able to meet playground access requirements mandated by the Americans with Disabilities Act.

Safety Value of Scrap Tire Material as a Playground Cover

According to the Mayo Clinic (Mayo Health O@sis, May, 1998), about 70 percent of playground injuries are a result of falls. The Consumers Product Safety Commission recommends that "hard surfacing materials, such as asphalt or concrete, are unsuitable for use under and around playground equipment of any height unless they are required as a base of for a shock absorbing unitary material such as a rubber mat." (CPSC document 1005). The CPSC defines unitary materials as "...generally rubber mats or a combination of rubber-like materials held in place by a binder that may be pour in place at the playground site and cures to form a unitary shock absorbing surface." (CPSC document 1005).

Shock Attenuation

The Mayo Clinic recommendation is to use playground mating/flooring that "gives", such as rubber. The State of Illinois conducted a direct comparison between scrap tire rubber and other loose fill playground surfacing materials at a depth of six inches. It is reported that wire-free scrap tire chips have roughly twice the cushioning effect of other material. (Report to the Illinois Department of Commerce and Community Affairs, January 1994).

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Shock Attenuation (continued)

Critical Heights for a 6 Inch Uncompressed Layer*

Wood Mulch	7 Feet
Fine Sand	5 Feet
Medium Gravel	5 Feet
Tire Chips	12 Feet

Tire chip data from the Illinois Department of Energy & Natural Resources. Measured in accordance with ASTM F12-93 and ASTM F355-86. Data on other materials from U.S. Consumer Product Safety Commission, CPSC Document 1005.

*According to the testing criteria, the higher the height, the safer the material.

Flammability

Tire chips were tested in 1995 in accordance with the Federal Hazardous Substance Act (16 CFR 1500.44) to determine whether this material would be considered "flammable" (a material is considered flammable if it ignites and burns with a self-sustained flame at a rate greater than 0.1 inches per second along its major axis).

Burn Length (inches)	Time (seconds)	Burn Rate (inches/second)
0.5	60.0	0.01
0.1	60.0	0.001
0.4	60.0	0.01
0.4	60.0	0.01

From the test results it was concluded that scrap tire material is considered non-flammable.

Other Advantages of Wire-Free Scrap Tire Chips:

- ⇒ Clean and non-toxic
- ⇒ Does not produce toxic leachate
- ⇒ Resilient
- ⇒ Does not attract or maintain moisture
- ⇒ Economical, lasts for years
- ⇒ Reduces dust and mud around playing area
- ⇒ Does not attract cats, dogs, rodents or insects
- ⇒ Will not rot or decay
- ⇒ Not susceptible to reduced performance due to rainy weather or freezing temperatures

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What if a Child Swallows a Rubber Chip?

In 1994 the Maryland Environmental Services (MES) put this question to a series of tests. At the MES request, a testing laboratory subjected 3/4 inch pieces of tire chips to hydrochloric acid (stomach acid). "Visual examination of insoluble residue appeared to indicate only fibrous reinforcing strands were dissolved by the hydrochloric acid. The tire rubber did not appear to be affected in any way; i.e. chalking, cracking, spauling, fracturing, etc." (PSI report No. 486-40013-001). What does this mean? If a piece of rubber is swallowed, it should not cause any acute or chronic problems. Short-term issues, such as an upset stomach will be a function of the amount of rubber swallowed. As to the fate of the rubber chips swallowed, they are eventually evacuated from the body, just like any other non-digestible material.

Additional Information

Any of the above referenced documents may be obtained from the Scrap Tire Management Council at no charge. For further information on playground safety, contact the Consumers Product Safety Commission, Washington. DC 20207; http://www.cpsc.gov. We suggest obtaining their publication on Playground Surfacing Materials, CPSC Document #1005.

About the Rubber Manufacturers Association:

The Rubber Manufacturers Association is the national trade association for the rubber products industry. Its members include more than 100 companies that manufacture various rubber products, including tires, hoses, belts, seals, molded goods, and other finished rubber products. RMA members employ over 120,000 workers and account for more than $21 billion in annual sales.

The RMA would like to thank the following contributors:
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