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Waste Tires Used For Roads

What is it?

Once tires are discarded there are many options for their recycling, two uses are as rubberized asphalt concrete (RAC) and sub base for roads. RAC is a type of asphalt that is made by grinding scrap tires into crumb rubber and then blending the crumbs with asphalt and aggregate making a new blend of rubberized asphalt concrete (Los Angeles County Department of Public Works Environmental Programs Division, 2003). Roads made out of the new RAC material have been shown to be longer lasting, better riding, resistant to rutting and cracking, they reduce road noise by 50 to 80%, and are less expensive to build than traditional concrete highways (Los Angeles County Department of Public Works Environmental Programs Division, 2003). As with conventional asphalt, broken up rubber asphalt can be recycled into other road projects, so that scrap tires can be recycled over and over. Sub base works by shredding and then laying down the tires as a base for roads, they are then covered with gravel, sand and finally with tar. This process raises the roads one to three feet creating a “snow shoe” effect, which stops the road from sinking into wet pockets (University of Minnesota, 2004).

Why bother?

Tire waste is an increasingly important issue threatening the economy, environment, and our health and safety. In the absence of adequate markets for recycled waste tires, they have been disposed in landfills or dumped illegally throughout several communities throughout the country. The results of waste tire can be urban blight and significant costs to residents. Waste tires can serve as a nesting area for pests and a breeding ground for mosquitoes that spread encephalitis and other illnesses. Furthermore, waste tires are highly flammable and release toxic smoke (Los Angeles County Department of Public Works Environmental Programs Division, 2003).

States Involved

Forty-eight of the states currently have programs to deal with the storage of old tires; however, not all of those states have tired recycling initiatives.

California: The California Department of Transportation has a Rubberized Asphalt Concrete (RAC) Project that dominates the state's tire waste recycling projects. The program began in 1993 and has since boomed to new highs. In 1999, the California Department of Transportation used 82% of the recycled tires in their RAC program. (The Department has worked in partnership with the California Integrated Waste Management Board on projects to promote the innovative use of shredded waste tires in highway construction. Together they are aggressively pursuing new innovative ways to increase the use of RAC in the department's projects, but use of RAC is largely dependent upon available funding.

California employs different private companies to clean up tire dump in order to facilitate tire recycling (California Integrated Waste Management Board, 2004).

Maine: In 1998, the State of Maine began the process of removing all tires from a large tire dump in downeast Maine. Nearly 300,000 tires were processed into tire shreds for use as sub-base road fill on Route #9 in Wesley (Maine Department of Environmental Protection, 2004). In 2003, a brand new Maine Turnpike interchange was built in Sabattus from remaining tires from their most notorious illegal tire landfill. The recycled tires will help the Maine Turnpike Authority save \$500,000 on the \$6 million project (Portland Press Herald, 2003).

Maine uses different companies that are contracted out to clean up tire dumpsites (California Integrated Waste Management Board, 2004).

Minnesota: State officials have taken a different route towards creating roads out of recycled tires. Tires in Minnesota are shredded and then laid down as a base roads, they are then covered with gravel, sand and finally with tar. Minnesota has found this process to be extremely helpful because recycled tire aggregate weighs approximately 2,250 pounds per cubic yard less than gravel fill, which brings costs down dramatically. In addition to this there are logistical factors such as the fact that tire chips perform well over soft soils, are very porous and drain granular material that is place over them, reduce effects of cold on the sub grade beneath the chips and prohibit frost from disturbing the driving surface. More than 4 million waste tires are generated in Minnesota each year. More than 1 million tires are used in civil applications (University of Minnesota, 2004).

South Carolina: The South Carolina Solid Waste Policy and Management Act of 1991 created the Office of Solid Waste Reduction and Recycling within the S.C. Department of Health and Environmental Control (DHEC), held local governments responsible for the collection of waste tires, and provided funds for the disposal and recycling of tires. The DHEC's Office of Solid Waste Reduction and Recycling and the S.C. Department of Revenue allocate grants to specific counties, and awarded a \$6-million, five-year project grant to the City of Clemson in conjunction with Clemson University in 2000 to encourage additional use for waste tires. While the primary uses for recycled waste tires are as aggregate in drain fields and tire derived fuel (mainly by cement kilns), there has been a dramatic advancement in tire recycling in South Carolina. The Clemson grant promotes the use of crumb rubber and other civil engineering projects and established the

Asphalt Rubber Technology Service (ARTS) at the University of Clemson (Asphalt Rubber Technology Service).

Deposit-Refund Opportunities

Since 1988, Rhode Island has required \$5 deposits on all types of replacement vehicle tires. Customers can recover their deposits by returning old tires within 10 to 14 days after they purchase new tires. Their refund payments are limited to one tire for every tire purchased, and the refunds can be obtained only at the point-of-sale of the new tire. In addition to the deposit, Rhode Island, along with most other states, imposes product charges on tires to finance the cleanup of piles of old tires. In addition to the deposit, Rhode Island, along with most other states, imposes product charges on tires to finance the oversight of scrap tire handling, disposal, and recycling (Deposit-Refund Systems, 2004). For example, tire retailers are required to collect a \$1.75 fee per tire purchase by the Arkansas Department of Environmental Quality (Arkansas Department of Environmental Quality), a \$2 fee on each new tire bought in South Carolina for the Waste Tire Trust Fund (Asphalt Rubber Technology Service), a \$1 fee by the State of Ohio (Ohio Department of Natural Resources), and a \$2.50 fee in New York (Schenkman, 2003).

Within the nation, the only state that has chosen to utilize a deposit-refund system is Rhode Island; however, outside of the United States, Canadian province British Columbia has a program very similar in which they require a \$3 deposit on all replacement tires purchased (Ministry of Water, Land and Air Protection; Government of British Columbia, 2001).

Studies conclude that such systems appear best suited for products whose disposal is difficult to monitor and potentially harmful to the environment. When the used product has economic value, the private sector may initiate the program (EPA, 2004).

Equipment

The array of 'necessary' machinery for recycling tires ranges from approximately \$13,500 to \$1,950,000 depending on size and portable versus non-portable equipment. The technology varies from shredders to granulators to shearers to crumb rubber machines; all depending on what is a desirable outcome for the tires. There are also extra machines, such as bagging systems and nife-hogs, which may help the process of tire recycling, but are not a mandatory part of the process. The two types of shredders that are portable are those which need to be towed and those that are attached to a truck head; an average cost for these two machines are \$120,000 to \$180,000 and \$100,000 - \$150,000 respectively (Trans World Equipment).

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