

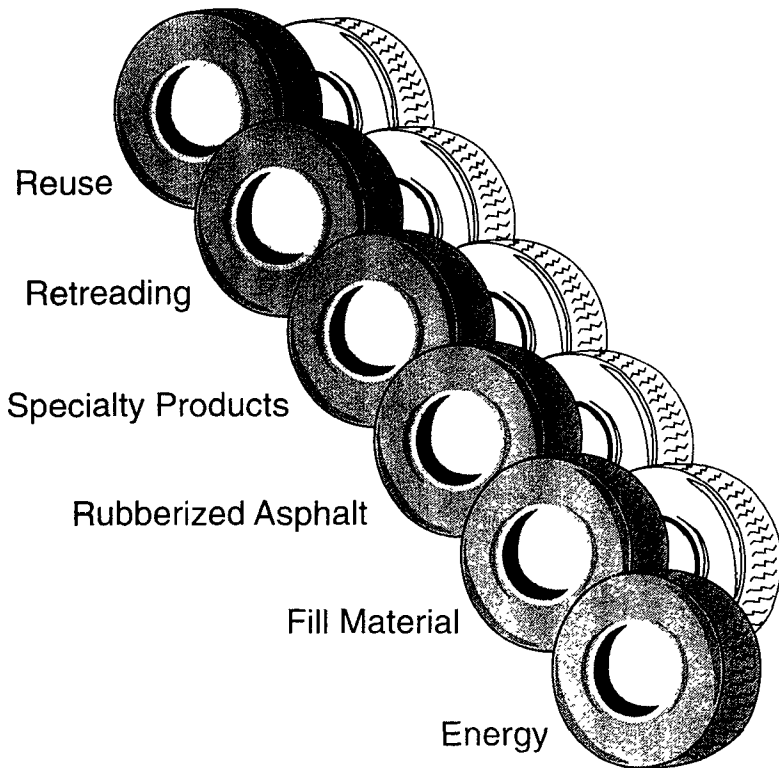
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United States  
Environmental  
Protection Agency

Region 5  
Illinois, Indiana, Michigan,  
Minnesota, Ohio, Wisconsin

EPA/905-K-001 ✓  
October 1993

 **Scrap Tire  
Handbook**



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## Acknowledgment

The members of the Region 5 Scrap Tire Work Group are recognized for their efforts in helping develop this handbook.

**Tom Newman**, Minnesota Pollution Control Agency  
**Paul Koziar**, Wisconsin Department of Natural Resources  
**Alan Justice**, Illinois Department of Energy and Natural Resources  
**Paul Purselove**, Illinois Environmental Protection Agency  
**Timothy Hotz**, Indiana Department of Environmental Management  
**Dan Harris**, Ohio Environmental Protection Agency  
**Kyle Cruse**, Michigan Department of Natural Resources

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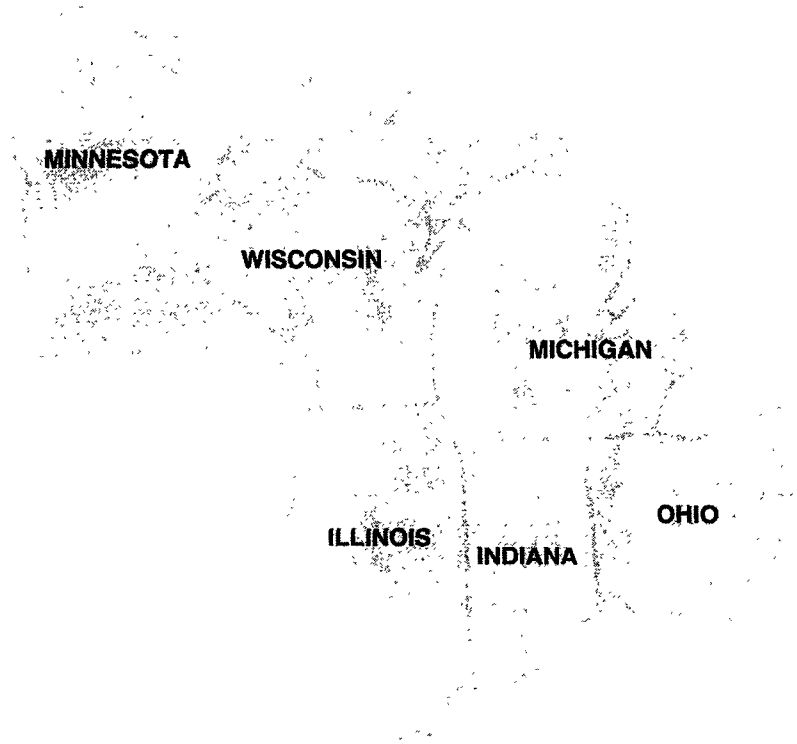


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# Scrap Tire Handbook

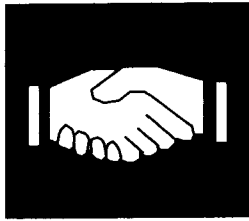
*Effective management alternatives to scrap tire disposal  
in Illinois, Indiana, Michigan, Minnesota, Ohio,  
and Wisconsin*



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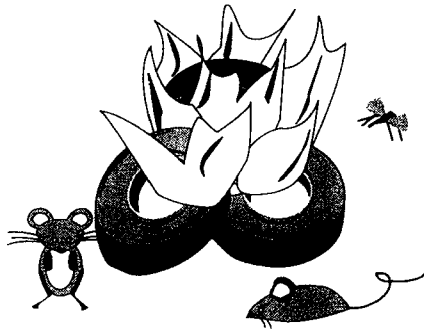
## INTRODUCTION



Over 242 million passenger and truck tires are discarded annually in the United States. Additionally, approximately 32 million tires are retreaded and an estimated 10 million are reused each year. It is estimated that 7 percent of the discarded tires are currently being recycled into new products, 11 percent are converted to energy, and nearly 78 percent are being landfilled, stockpiled, or illegally dumped, with the remainder being exported. The six states in U.S. EPA's Region 5 – Indiana, Illinois, Michigan, Minnesota, Ohio, and Wisconsin – contribute over 46 million scrap tires every year.

Landfilling is a poor management option for scrap tires. Whole tires take up large amounts of valuable space and may float or rise in a landfill, coming to the surface and puncturing the landfill cover. Many landfills either ban whole tires, charge a higher tipping fee for them, or require shredding prior to disposal. In addition, new environmental regulations eliminate landfilling as a disposal method, greatly increasing the supply of scrap tires.

Stockpiled scrap tires, estimated at two to three billion tires nationally, pose potentially serious health and safety problems.

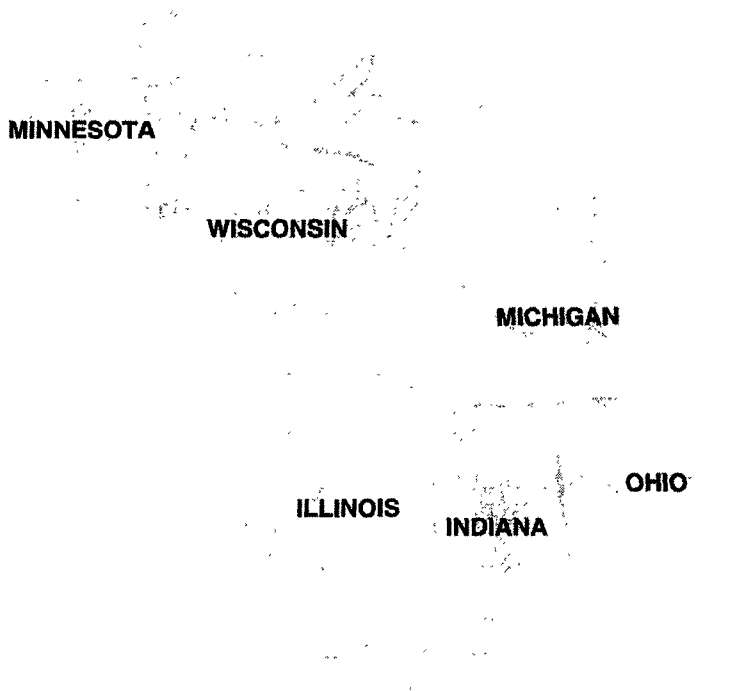


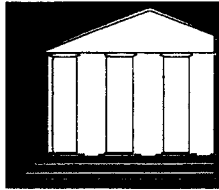
- Whole tires serve as breeding grounds for disease carrying mosquitos and rodents.
- Uncontrolled tire piles are fire hazards. Once ignited, tire piles can burn out of control for months, producing acrid black smoke and a hazardous oily residue.

Widespread illegal dumping poses the same problems associated with stockpiling. Millions of abandoned scrap tires are found in streams and rivers, ravines and roadsides throughout the United States. The states and EPA are working to eliminate illegal dumping, reduce and properly manage stockpiles, and eliminate or significantly minimize landfilling as a disposal option. EPA believes that providing accurate, available information about the scrap tire problem will help to achieve this goal.

With assistance from the States of Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin, EPA Region 5 has compiled this handbook to provide general information on scrap tire issues to government officials, industry representatives, and consumers. This handbook provides information on:

- State and federal programs and regulations affecting scrap tire disposal
- Alternatives to disposal
- Current technologies associated with recycling and reusing scrap tires



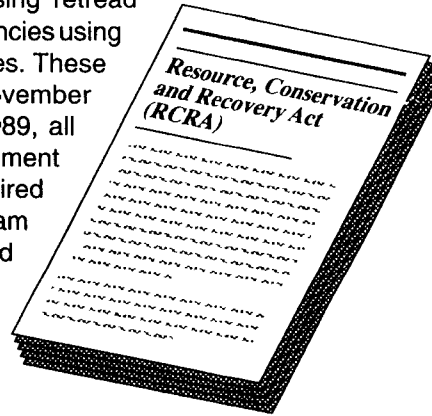


## SCRAP TIRE LEGISLATION AND REGULATIONS

Effective and appropriate scrap tire management has received increasing priority by both federal and state legislatures. Extensive efforts are underway at the federal, state and local level to provide a statutory and regulatory framework to deal with the problem.

### FEDERAL INITIATIVES

In 1976, the U.S. Congress passed the Resource, Conservation and Recovery Act (RCRA), establishing a structure for U.S. EPA's comprehensive waste management program. RCRA directed EPA to prepare guidelines for purchasing retread tires in federal agencies and agencies using federal funds to purchase supplies. These guidelines were issued in November 1977. As of November 17, 1989, all agencies of the federal government which purchase tires were required to implement a preference program favoring the purchase of retread tires or tire retreading services to the maximum extent practicable.



### STATE INITIATIVES

By 1992, 47 states had enacted legislation and/or promulgated regulations to manage scrap tires. Currently, Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin have some type of program in place. These programs reflect the special needs of each state.

## State Scrap Tire Regulatory Programs in Region 5

	IL	IN	MI	MN	OH	WI
<b>Scrap Tire Legislation</b>	✓ H B 1085	✓ P L 19-1990	✓ P.A 133	✓ CH 654	✓ S B 165	✓ A B 481
<b>Landfill Ban</b>	✓ Whole tires			✓ All tires	✓ Whole tires	✓ Whole tires (by 1995)
<b>Funding Mechanism</b>	✓ Tire fees Title fees Site fees	✓ Permit fees	✓ Tire disposal fee, collection fees	✓ Title fees	✓ Tire Fees	✓ Title fees
<b>Collection/Storage Requirements</b>	✓ Tire may not be held > 90 days	✓ Retailers accept used tires	✓ Permitted collection sites	✓ Collection sites must have permit retailers accept used tires	✓ Permitted collection sites	✓ Licensed collection sites
<b>Transportation</b>	✓ Licensed haulers	✓ Licensed haulers	✓ Registered haulers		✓ Registered haulers	✓
<b>Market Development</b>	✓ Grants, loans	✓ Grants, loans	✓ Grants, loans	✓ Grants, loans	✓ Grants, loans	✓ Grants, scrap tire use reimbursement
<b>Recycled Product Procurement Preference</b>	✓	✓	✓			
<b>Enforcement</b>	✓			✓	✓	

## Illinois

Illinois House Bill 1085 created the Used Tire Management Program. It provides local governments with financial assistance for tire pile cleanups, market development for tire-based products and mosquito control. Since 1989, the Illinois Environmental Protection Agency (IEPA) has cleaned up over one million tires throughout the state. The Act also required the development of a Large Scrap Tire Disposal Pilot Program. It requires IEPA to develop a plan to eliminate large tire piles and select one large scrap tire pile as a pilot project to test the effectiveness of the plan.

Illinois developed the following hierarchy to establish the state's preference for managing tires:

- Reusing tire casings for remanufacture
- Retreading
- Processing tires into marketable products

## Indiana

Public Law 19-1990 established a Waste Tire Management Fund and a Waste Tire Task Force, consisting of representatives from government and industry, whose aim is to develop markets and storage guidelines for waste tires. The program is administered by the Indiana Department of Environmental Management (IDEM). In 1991, additional legislation (HR 1047 and PI. 236-1991) was added to further the goals of scrap tire management and required the Indiana Department of Transportation, in cooperation with a state university, to study and report on the feasibility of using waste tires, as well as other materials, in road construction projects.

## Michigan

Public Act 133, or the Scrap Tire Regulatory Act, establishes regulations for scrap tire sites and haulers and created the Scrap Tire Regulatory Fund. Violation of this act is a criminal misdemeanor, punishable by imprisonment, fine or both. Law enforcement or conservation officers may issue violations.



## Minnesota

Minnesota's Waste Tire Program, the first of its kind in the United States, prohibited scrap tires from being landfilled or stockpiled at unpermitted sites in 1984. It authorized the Minnesota Pollution Control Agency (MPCA) to conduct a study of the scrap tire problem in Minnesota and recommend optimum ways to address and mitigate it. The legislation was amended in 1988 to expand the program's capabilities. In 1988, it was estimated that Minnesota had approximately 11 million waste tires. By 1992, MPCA tire dump cleanup activities have resulted in the removal of 7.3 million tires from unpermitted sites. The MPCA expects to have all stockpiled waste tires cleaned up by December 31, 1994.

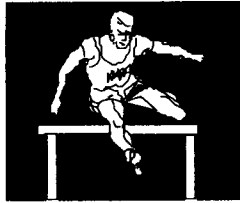
## Ohio

Senate Bill 165 established a comprehensive regulatory system governing scrap tire collection, storage, monocell, monofill, recovery facilities, and transporters. Ohio EPA will develop rules for governing the system by October 29, 1994. A fee on wholesale tire sales will fund inspections and enforcement of regulations, cleanup of old tire dumps, research into alternative uses and tire recycling technology, and loans for establishing tire recycling and recovery facilities.

## Wisconsin

Wisconsin regulates its waste tires through two pieces of legislation, H.B. 481 of 1987, and Act 355 of 1990. Together, they have established a full range of waste tire management guidelines detailed in the Waste Tire Removal and Recovery Program. Under the program, the Wisconsin Department of Natural Resources (DNR) is required to clean up nuisance tire dumps. The objective is to clean up two million tires per year. There are approximately 500-700 nuisance dumps in Wisconsin. In each cleanup case, DNR will ask the responsible parties to undertake the cleanup. If they do not comply, DNR can proceed with legal recourse and seek cost recovery for the cleanup.

*The programs and rules governing scrap tire management continue to mature. Please contact the appropriate state contact, shown in Appendix A, for current, specific information about an individual state's Scrap Tire Management Program.*



## OVERCOMING BARRIERS TO USING SCRAP TIRES

Barriers preventing the use of waste tires must be overcome before the scrap tire problem can be mitigated. There are currently several barriers impeding waste tire recovery, recycling, and reuse. However, there are also mechanisms available which can assist in overcoming these barriers.

### LEGISLATIVE/REGULATORY

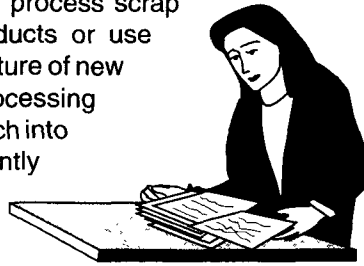
Individual states in Region 5 have different restrictions for scrap tire management. Before a company can begin utilizing scrap tires, whether collecting and processing whole tires into a product or burning tires as a fuel, all applicable federal and state permit requirements must be met. These include air and water quality permits as well as applicable scrap tire storage and transportation requirements. The costs of obtaining these permits, which can include conducting tests and installing pollution control devices, must be considered. Industry can address this situation by sharing information, such as test burning procedures, reducing the unknowns and risks to such ventures.

The current state rules and regulations pertaining to scrap tire management are briefly described in the previous section. However, these are subject to change. The most current information on applicable federal and state requirements can be obtained by contacting the appropriate state or federal agency. A complete list of state and federal environmental agencies involved in scrap tire management is contained in Appendix A.



## TECHNOLOGICAL

Companies were successfully recycling and reusing scrap tires long before scrap tires were recognized as an environmental problem. Sizable industries have developed to process scrap tires into usable feedstocks for products or use processed tire material in the manufacture of new products. New technologies for processing scrap tires are still evolving and research into new applications for scrap tires is currently underway in several states.



Independent research projects conducted by universities and private enterprises are also underway. Further information on such projects is available through the sources and references listed in the Appendices.

## ECONOMIC

Scrap tire use will continue to grow as long as healthy markets exist for either the scrap tires or for scrap tire materials. To encourage scrap tire use, several upper midwest states have established market development programs which make resources available for new areas in recycling. Such resources include low interest loans, grants, rebates, and technical assistance to localities, individuals or companies interested in recycling tires. These programs are typically housed in the state Environmental or Commerce Department/Agency.

*Information on market development programs can be easily obtained by contacting the appropriate state agency. A complete list of the appropriate state and federal environmental departments/agencies is contained in Appendix A.*

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## **SOCIOLOGICAL**

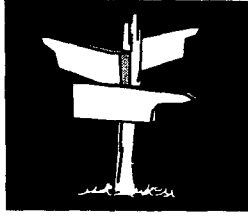
Consumers appear to have two unfounded perceptions regarding waste tire use:

- Products made with recycled materials are inferior to “new” products.
- The use of tires for energy recovery results in excessive pollution.

These misconceptions must be addressed in order for tire recycling to be successful.

Several organizations exist which have useful information available for those interested in tire recycling, retreading or reuse.

*A listing of several national and trade organizations that have information available about these uses is contained in Appendix C.*



## ALTERNATIVES TO DISPOSAL

The mismanagement of millions of scrap tires every year represents a significant waste of resources, an unnecessary burden on our dwindling landfill space, and a potential health and safety hazard. Waste tires should be used again in their whole form or be reprocessed for inclusion in numerous final products or end uses.

Options for waste tire use, other than disposal, include:

- Reuse
- Retreading
- Asphalt paving applications
- Specialty products made from tire rubber
- Fill
- Energy recovery

In terms of the maximum potential number of scrap tires used, the most promising uses for scrap tires are energy recovery and asphalt and road fill applications.



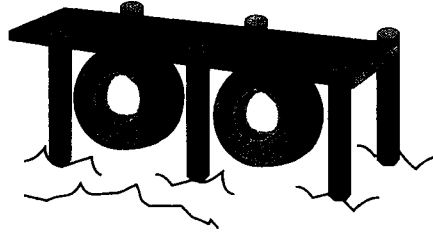
Most alternative end uses for scrap tires require that the tires be split, shredded or finely ground before they can be incorporated into a final product.

Scrap tire processing equipment has changed to meet the needs of a maturing industry. When shredded tires were identified as a potential fuel source or a component in molded products or asphalt, technology again changed to meet new demand specifications. Improved shredder design produced a greater supply of shredded scrap tires, sparking the development of more lucrative end use markets for scrap tires than landfills offered. Today, scrap tires can be reduced to various sizes and

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consistencies depending upon the targeted end use market. The equipment used to process tires is commercially available. Appendix C presents a partial list of trade journals related to solid waste management. These journals are valuable resources for finding manufacturers and distributors of tire processing equipment.

## END USES



### **Reuse of Whole Scrap Tires -**

Whole tires are typically re-used for applications such as reefs, breakwaters, fencing, playground equipment, erosion control, crash barriers, and dock bumpers.

**Retreading** - Worn, used tires can be rejuvenated by applying a new tread onto an old tire that still has a good casing. The technology is simple and proven. The old tread is removed by a grinding process called buffing. A new tread is then applied to the old casing. Properly retreaded tires are as structurally safe and effective as new tires. In addition, the rubber buffings, a byproduct of the retreading process, are a source of material for crumb rubber.

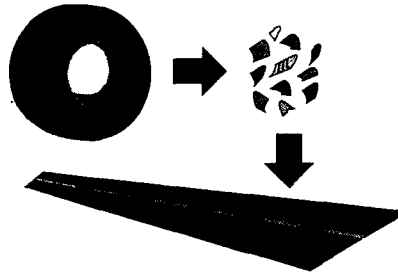
Due to a combination of low new tire prices and public misperception about retread quality, less than 50 percent of the available used passenger tires suitable for retreading are actually retreaded. However, retread farm equipment and truck tires are very popular and, in certain areas, demand exceeds supply.

In 1990, only 17.2 million passenger and light truck tires, and 15.1 million heavy truck tires were retreaded. If all the suitable passenger and light truck tires actually were retreaded, the number of scrap tires generated per year could be reduced by 8-10 percent (19 to 24 million tires). See "Success Stories" for details on a successful retreading operation. More information on retreading can be obtained from the industry trade groups listed in Appendix C.

### Asphalt Paving Applications -

The use of scrap tires in asphalt paving is becoming a promising recycling alternative. Scrap tire rubber can be used in asphalt paving in two ways: as part of the rubber binding material or seal coat; or as aggregate, known as crumb rubber modifier (CRM).

The seal coat application can use approximately 1,600 tires per mile of two-lane road sealed. When used as an aggregate, CRM asphalt can use between 8,000 and 12,000 tires per mile of two lane road repaved with a three-inch-thick layer.



Most state Departments of Transportation (DOTs) have conducted, or are conducting, experimental projects using a total of 3-5 million scrap tires annually.

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 may prove to be the catalyst that moves rubberized asphalt from the experimental stage to standard practice. Section 1038 of ISTEA authorized the U.S. DOT and the U.S. EPA to conduct a joint study of asphalt pavement containing recycled rubber which reached the following conclusions:

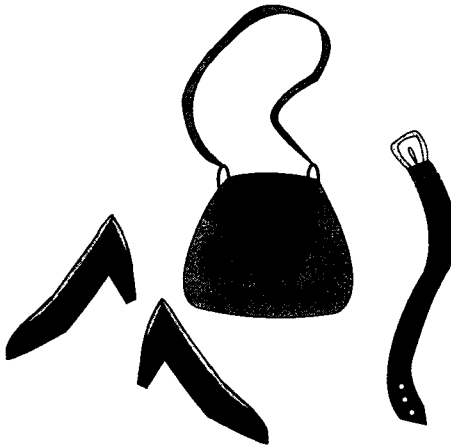
- Using currently available information, there is no compelling evidence that the use of asphalt pavement containing recycled rubber substantially increases the threat to human health and the environment as compared to the threats associated with conventional asphalt pavements.
- There is no reliable evidence that asphalt pavements containing recycled rubber cannot be recycled to substantially the same degree as conventional hot mix asphalt pavements.
- When properly designed and constructed, there is no reliable evidence to show that pavements containing recycled rubber will not perform adequately as a paving material.

National research on crumb rubber modified asphalt technologies is continuing to address and further develop the understanding of the technology.

ISTEA also requires, for all federally-funded paving projects, that states meet a minimum utilization requirement for asphalt pavement containing recycled rubber set at 5 percent for 1994, 10 percent for 1995, 15 percent for 1996 and leveling off at 20 percent for 1997. Approximately 450 million tons of asphalt are laid down each year in the United States, of which 200 million tons are "federal aid" and subject to the provisions of the Act. Assuming that ten pounds of crumb rubber can be derived from one scrap tire, the Act should result in the use of approximately 17 million scrap tires in 1994 increasing to 70 million in 1997.

*For information about research or trials on rubberized asphalt conducted in a specific state please contact the appropriate state contact listed in Appendix A.*

**Specialty Products** - Scrap tires, in various forms, can find a second



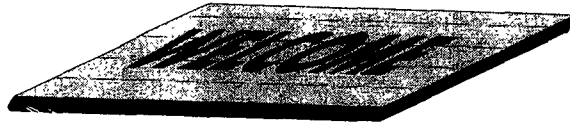
life through incorporation in numerous new products. Split tires have been made into floor mats, temporary roads, shoe soles, fishing equipment covers, muffler hangers and troughs for farm animals, just to name a few. Other non-traditional uses include forming split tires into belts, ties and purses. The national market for these products is estimated at 3.5 million tires per year.



Each year, the material from approximately 8.6 million scrap tires is used to make new rubber or plastic products. Because of crumb rubber's shock absorption and noise control characteristics, specialized non-slip and anti-fatigue mats have been made with it. Flooring products made with crumb rubber have also performed well in all-weather applications due to the rubber's high resiliency and longevity.

Crumb rubber can be mixed with other materials to produce new products such as:

- Carpet padding
- Fence posts
- Floor mats
- Highway crash barriers



- Outdoor athletic surfaces
- Roofing materials
- Railroad crossings
- Vehicle mud guards

**Products Made from Reclaimed Rubber** - Approximately 40 percent of a tire can be reclaimed in the form of rubber. Depolymerization, the process by which tires can be partially reclaimed, can produce rubber for products such as new tires, mats, adhesives, tapes, hoses, and tubing. Only about 2.9 million tires were used for reclaimed rubber products in 1990.

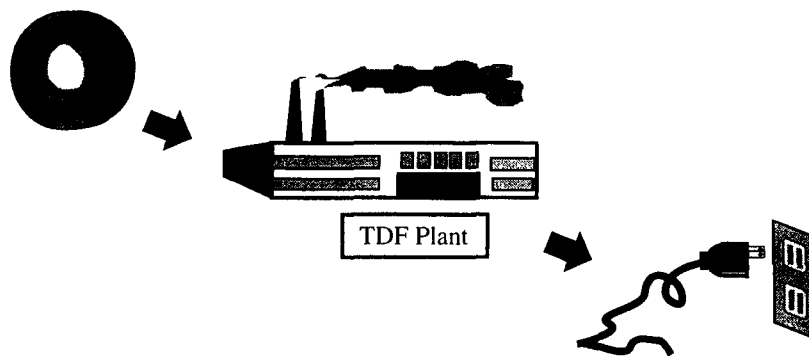
**Pyrolysis** - Scrap tires can also be broken down into useful recoverable materials through pyrolysis: the thermal degradation of scrap tires in the absence of oxygen. Pyrolysis of scrap tires results in carbon black, oil, gas and steel. Carbon black is used to produce various goods including molded goods, shoe soles, and inks and pigments. The oil recovered through pyrolysis can be used as a gasoline additive to increase octane and as boiler fuel. In 1992, approximately 2 million passenger tires were reclaimed by pyrolysis.

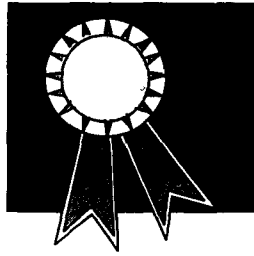
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**Fill** - Chipped tires are suitable for use as roadbase, fill, landfill cover and bulking agents in sludge and composting facilities. The economics of using shredded scrap tires in these applications appear especially promising.

In numerous trials, chipped tires have proven easy to work with and significantly cheaper than traditional fill material when used in highway and embankment construction. If properly designed and constructed to minimize or eliminate potential environmental impacts, such projects can be very effective.

**Energy Recovery** - Scrap tires offer an excellent supplemental or primary energy source for heat or power generation, primarily because each tire contains about 2 gallons of oil. Tires have an energy, or fuel, value of 12,000 to 16,000 British Thermal Units (BTUs) per pound, slightly higher than that of coal. Tires can be burned whole or as chips, depending upon the requirements of the burning unit. Chips used in this manner are called tire-derived-fuel (TDF). To use whole tires or TDF, facilities must either be modified to accept the materials or equipped with a separate fuel feed system to utilize tires. The technology for utilizing scrap tires as TDF is proven, and is currently in use in cement kilns, pulp and paper mills, electricity-generating facilities and dedicated tire-to-energy plants throughout North America.





## REGION 5 SUCCESS STORIES

### TIRE PILE CLEANUPS

The State of Wisconsin's Waste Tire Management Program has made substantial progress in both the clean up of tire piles and the development of waste tire markets. As of January 1992:

- 12 waste tire stockpile cleanups completed
- 5 waste tire cleanups in progress
- Voluntary site cleanups have removed another 600,000 waste tires
- Approximately 5 million tires will have been recovered when all 17 stockpiles are completed.

To date all material processed and removed at cleanup sites has been used for energy recovery. By July 1993, Wisconsin DNR had completely cleaned up the largest 40 stockpiles in the state.

The State of Minnesota's Waste Tire Program has also been very successful. The Minnesota Pollution Control Agency (MPCA) cleaned up over seven million scrap tires by 1992. The MPCA has developed several innovative techniques to help county and local governments to remove scrap tire piles. For example, the Waste Tire Program authorized the MPCA to work with individual counties to clean up tire dumps. The MPCA reimburses the counties up to 85 percent for the cost of the cleanup. The program works: in 1991, the MPCA helped three counties clean up over 200,000 scrap tires from 14 county tire dumps.

The MPCA also works with other state agencies to address scrap tire piles or dumps. For example, as part of Earth Week 1991, students, the Minnesota Conservation Corps and community service crews cleaned up thousands of scrap tires from the banks of the Root River. The work was done for the Minnesota Department of Natural Resources' (DNR) Trails and Waterways Program. Under its interagency agreement, the MPCA paid for the costs of processing the scrap tires that were collected.

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## **REDUCING COSTS THROUGH A TIRE MAINTENANCE AND RETREADING PROGRAM**

Able Sanitation of Grand Rapids, MI, (Able) has reduced tire costs and increased utilization of manpower and equipment through a simple tire maintenance and replacement program. Able began their effort in 1987 when the company switched from bias-ply to steel-belted radial tires. Although new radials cost substantially more than bias-ply tires, costs were held down through a cap and casing program offered by its tire supplier, Commercial Tire Service, Inc.

Able found that they could buy quality retreaded radials for less than half the cost of new radials. The incidence of tire failure has dropped dramatically, virtually eliminating service calls and keeping down-time to a minimum.

Although the Able fleet has grown 25-30 percent in the past two years, the company's tire budget remains exactly the same as in 1990. The company's president attributes the savings to the retreading program and the practice of pulling tires off the road before treads are completely worn. He states that this program not only keeps tire costs at a minimum, but maximizes safety because worn tires are less responsive than fresh ones.

## **BUILDING TEMPORARY ROADS FROM SCRAP TIRES**

In the mid-1980s an Ohio company, TERRA Mat, found an innovative use for scrap tires that has mushroomed into a four plant operation with sales throughout the eastern United States. The product consists of scrap tires which are cut, flattened and held together with PVC-coated wire into a mat. The mats are laid down onto soft soil, without grading or fill, and function as temporary roadbeds for heavy machinery over land that would be inaccessible. The mats can also be used as temporary methods of controlling runoff, road bank protection, and stream bank erosion control.

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## MAKING NEW TOYS FROM OLD TIRES

ReTired Pet Swings, a recently founded company in Madison, Wisconsin, has found a creative and fun solution to the scrap tire problem — the company transforms scrap tires into children's swings. Workers use special utility knives to slice and bend scrap tires and then bolt the odd ends, flaps and corners together to make "Tire Swings" in the shape of ponies and unicorns. The finished swing is cleaned and treated to prevent decay and dirt from rubbing off onto a child's clothes. In addition to benefitting the environment, ReTired Pet Swings is contributing to the economy and the community. The company employs homeless people and prison inmates to build the swings and donates a percentage of its profits to charity.





## WHAT MORE CAN BE DONE

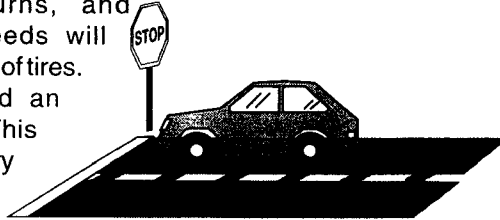
Throughout the United States there is growing public awareness of the scrap tire problem. Government, industry and the general public all play a vital role in remedying the problem.

### CONSUMERS CAN...

**Buy durable tires.** Design modifications have more than doubled tire life in the last 40 years. With proper maintenance, today's passenger tires can last 60,000 to 80,000 miles.

**Take proper care of tires.** Three key factors affect tire life:

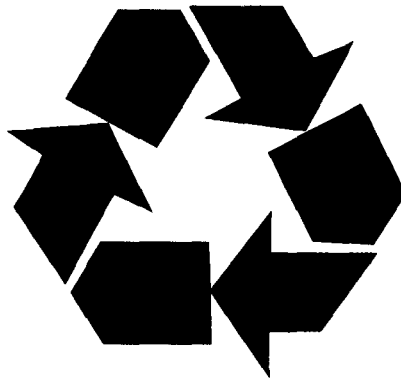
- **Tire pressure** - An underinflated tire flexes more and generates more friction on the road, producing higher temperatures, greater wear, and lower fuel economy. Overinflated tires puncture more easily and cause excessive wear.
- **Driving practices** - Accelerate and brake gradually. Rapid starts and stops, tire-screeching turns, and excessive speeds will decrease the life of tires. Never overload an automobile. This puts unnecessary demand on the tires.
- **General maintenance** - Periodically rotate the tires, balance the wheels, and maintain proper wheel alignment. Overlooking these easy maintenance steps can lead to uneven tread wear, cause tires to wear out prematurely and may leave the tire unfit for retreading.



**Purchase used tires.** Partially worn tires, still safe for passenger car use, are available in most cities. It is estimated that if one additional year of tire life is achieved out of 25 percent of the tires removed from vehicles, a 3 percent reduction in tire disposal could be realized.

**Buy retreads.** Purchasing retread or remanufactured tires provides an alternative to purchasing new tires. Properly inspected retreaded tires have lifetimes and failure rates comparable to new passenger tires. While most good truck tire casings are being retreaded, this is true of only about half the passenger and light truck tires. If all the suitable passenger and light truck tires were actually retreaded, the number of scrap tires generated per year would be reduced by 8-10 percent.

**Support the recycled product market.** Look for other products made



with recycled rubber. With an increased awareness of the quality products made with recycled rubber, consumers should change their buying patterns. As with recycled paper products, recycled products made with scrap tires are not inferior to products made with primary material. Scrap tires have been recycled into many different products such as garbage cans, hoses, floor tiles, pocketbooks, and even pens!

#### **INDUSTRY CAN...**

**Work with research groups, government agencies or other businesses** to assist in the development of scrap tire processing technologies and other technologies related to using scrap tire material in products.

**Make a clear determination regarding material needs** so that scrap tire processors can provide material suitable for use in the manufacturing process. The development of material specifications that take into consideration the possible use of recycled rubber would be a step in that direction.

**Produce and promote products made from recovered scrap tires!**

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## THE GOVERNMENT CAN...

**Develop programs addressing the “total management of scrap tires” which include the following components:**

- A funding mechanism to operate the program
- Regulation of tire collection, processing, and disposal
- Dedicated funding for tire pile cleanup and market development
- Market incentives, market development, and business development tools

**Work with industry to develop a scrap tire recycling infrastructure.**

The creation of a tire recycling infrastructure is essential. With grants and loans, tire processors are able to sustain their businesses long enough to create or gain access to reliable supply and transportation networks for scrap tires. Grants and loans can also be used to ease market barriers such as high research and development costs. Before products are readily accepted by consumers and end users, data on product specifications and quality standards must be developed, usually at great expense to the pioneers in the industry. Government agencies can support developing industry by providing financial assistance to companies to run tests and obtain needed data.

**Develop or expand government purchasing preferences for recycled goods.** Government bid acceptance programs that allow a 10-15 percent price differential for bids that include recycled material have proved successful and should continue. As a major purchaser of tires, the government can provide a significant and stable market for retreaded tires and crumb rubber for asphalt applications.

**Disseminate information on the scrap tire problem and alternatives to disposal.** Several government agencies currently have pamphlets and handbooks available to the public on various issues.



**APPENDIX A**  
**State and Federal Offices for Scrap Tire Management**

**Illinois**

Dept. of Energy and Natural Resources  
Waste Tire Program  
325 W. Adams St - Room 300  
Springfield, Illinois 62704-1892  
217/524-5454

Environmental Protection Agency  
Division of Land Pollution Control  
- Used Tire Unit  
P.O. Box 19276  
Springfield, Illinois 62794-9276  
217/782-6761

Division of Air Pollution Control  
- Permit Section  
217/782-2113

**Indiana**

Dept. of Environmental Management  
Solid and Hazardous Waste  
Management  
105 South Meridian Street  
Indianapolis, Indiana 46225  
317/232-4445

Office of Air Management  
317/232-8384

Dept. of Commerce  
Office of Energy Policy  
One North Capitol, Suite 700  
Indianapolis, Indiana 46204-2288  
317/232-8800

**Michigan**

Dept. of Commerce and  
Natural Resources  
P.O. Box 30004  
Lansing, Michigan 48909  
517/335-1178

Dept. of Natural Resources  
Waste Management Division  
Scrap Tire Regulatory Program  
P.O. Box 30241  
Lansing, Michigan 48909  
517/335-4035

Air Quality Division  
517/373-7023

**Minnesota**

Pollution Control Agency  
Waste Tire Program  
520 Lafayette Road  
St. Paul, Minnesota 55155  
Waste Tire Hotline. 800/657-3864

Air Quality Division  
612/296-7283

**Ohio**

Environmental Protection Agency  
Division of Solid and Hazardous  
Waste Management  
1800 Watermark Drive  
Columbus, Ohio 43266-0149  
614/644-2917

Division of Air Pollution Control  
614/771-7505

Dept. of Natural Resources  
Division of Litter Prevention  
and Recycling  
1889 Fountain Square Court,  
Building F-2  
Columbus, Ohio 43224-0331  
614/265-6333

Dept. of Development  
77 South High Street  
Columbus, Ohio 43266-0413  
614/466-6084

**Wisconsin**

Dept. of Natural Resources  
Waste Tire Removal and  
Recovery Program  
101 S. Webster Street  
P.O. Box 7921  
Madison, Wisconsin 53707  
608/266-2111

Bureau of Air Management  
608/266-7718

**United States Environmental  
Protection Agency**

Solid Waste Section (HRP-8J)  
77 West Jackson Boulevard  
Chicago, Illinois 60604  
312/886-3584

## APPENDIX B Current or Recent Scrap Tire Technology Studies

- Markets for Scrap Tires, October 1991, EPA/530-SW-90-074A, 115p
- Summary of Markets for Scrap Tires, October 1991, EPA/530-SW-90-074B, 12p.
- Summary of State Scrap Tire Programs — A Quick Reference Guide, April 1993, EPA/530-B-93-001, 26p.
- Guideline for Federal Procurement of Retread Tires; Final Rule, 40 CFR Part 253, Federal Register - Vol. 53, No. 222, November 17, 1988, pp. 46558-46574.
- Engineering Aspects of Recycled Materials for Highway Construction, June 1993, FHWA-RD-93-088, 216p.
- Report to Congress — A Study of the Use of Recycled Paving Material, June 1993, EPA/600/R-93/095 or FHWA-RD-93-147, 34p.
- Burning Tires for Fuel and Tire Pyrolysis: Air Implications, December 1991, EPA-450/3-91-024, 228p.
- Characterization of Emissions from the Simulated Open Burning of Scrap Tires, October 1989, EPA-600/2-89-054, 68p.
- Mutagenicity of Emissions from the Simulated Open Burning of Scrap Rubber Tires, October 1989, EPA-600/R-92-127, 53p.
- Scrap Tire Consumption in New England and New Jersey, February 1991, EPA 101/F-91/048, 85p.

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**To obtain any of the above resources, please contact:**

RCRA/Superfund Hotline  
Monday through Friday, 8:30 a.m. to 7:30 p.m. EST  
National toll-free number: (800) 424-9346  
For the hearing impaired: TDD (800) 553-7672

National Technical Information Service (NTIS)  
5285 Port Royal Road  
Springfield, Virginia 22161  
Phone: (703) 487-4600

RCRA Information Center  
U.S. EPA Office of Solid Waste (OS-305)  
401 M Street, SW  
Washington, DC 20460

**APPENDIX C**  
**Industry Groups and Trade Journals**

**Industry Groups**

American Retreaders Association  
P.O. Box 37203  
Louisville, Kentucky 40233-7203  
502/968-8900

National Tire Dealers  
and Retreaders Association  
1250 I Street, N.W.  
Washington, D.C. 20005  
202/789-2300

Rubber Manufacturers Association  
1400 K Street, N.W.  
Washington, D.C. 20005  
202/682-4800

Rubber Pavements Association  
312 Massachusetts Avenue, N.E  
Washington, D.C. 20002  
202/544-7111

Scrap Tire Management Council  
1400 K Street, N.W  
Suite 900  
Washington, D C 20005  
202/408-7781

Tire Industry Safety Council  
P.O Box 1801  
Washington, D.C. 20013  
202/783-1022

Tire Retread Information Bureau  
900 Weldon Grove  
Pacific Grove, California 93950  
408/372-1917

**Trade Journals**

BioCycle  
419 State Avenue  
Emmaus, Pennsylvania 18049  
215/967-4135

**Trade Journals (Cont'd)**

Garbage  
Dovetail Publishers  
2 Main Street  
Gloucester, Massachusetts 01930  
508/283-3200

Modern Tire Dealer  
Bill Communications, Inc  
P O. Box 3599  
Akron, Ohio 44309  
216/867-4401

Resource Recycling  
P.O Box 10540  
Portland, Oregon 97210  
503/227-1319

Recycling Today  
4012 Bridge Avenue  
Cleveland, Ohio 44113-3320  
216/961-4130

Scrap Tire News  
133 Mountain Road  
P.O. Box 714  
Suffield, Connecticut 06078  
203/668-5422

Solid Waste and Power  
HCI Publications  
410 Archibald Street  
Kansas City, Missouri 64111  
816/931-1311

Tire Business  
Crain Communications, Inc  
1725 Merriman Road  
Suite 300  
Akron, Ohio 44313  
216/836-9180

Tire Review  
Babcox Publications  
11 South Forge Street  
Akron, Ohio 44304  
216/535-6117

**APPENDIX C (Cont'd)**  
**Industry Groups and Trade Journals**

**Trade Journals (Cont'd)**

Waste Age/  
Waste Age's Recycling Times  
1730 Rhode Island Avenue, N.W.  
Suite 1000  
Washington, D.C. 20036  
202/861-0708

World Wastes  
P.O. Box 41369  
Nashville, Tennessee 37204-1094  
615/377-3322