

Understanding *Retreading*

*The facts, the Industry,
the process and the benefits*

To get the facts, go to
the source!

The Tire Retread and
Repair Information
Bureau has provided
info for the retreading
industry for over 30
years. We strive to
support the needs of
the industry, while
supplying news and
info about retreading
and tire repairing
worldwide.



***Retreads:
Maximizing a Tire's Value.***

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FACT:

**RETREADING IS AN
EXCELLENT WAY TO
SAVE MONEY**

**RETREADED TIRES
ARE PROVEN SAFE**

**RETREADING IS
RECYCLING**

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Tire Industry Association
and The Tire Retread &
Repair Information Bureau*

Understanding Retreading was produced by the Retread Industry to improve the public's knowledge of the retread process and emphasize the important contribution retreading makes to the economy and the environment by reducing a tire's lifecycle cost and minimizing the number of tires going into the solid waste stream.

An example of this important contribution is the U.S. Environmental Protection Agency Guideline for Federal Procurement of Retread Tires, 40 CFR Part 253, established November 1988. The purpose of the Guideline is to use the stimulus of government procurement to increase the use of retreaded tires within government agencies. The Guideline requires all federal, state and local government agencies and contractors that use federal funds to purchase retreaded tires or tire retreading services to the maximum extent practicable.

Another significant measure supporting the contribution retreaded tires make to the economy and the environment is Executive Order 12873 signed by the President in October 1993. Further, subsequent Executive Orders 13101 and 13149 were signed in April 2000.

Following the recommendations and guidelines of these government documents can substantially reduce total tire costs for government agencies.



Why

Retread?

An Excellent Value

Whether you are a motorist looking for ways to stretch the family budget or a fleet manager buying thousands of tires a year, costs must somehow be controlled in today's stringent economy. Truckers, airlines, construction companies, farmers and passenger car owners all purchase retreaded tires for one basic reason - to save money.

A retreaded tire costs less to produce than a new tire and sells for less-usually between 30 and 50 percent of the comparable new tire price. By using retreaded tires, the commercial and military aircraft industries save more than \$100 million a year. Retreading truck tires saves the trucking industry over \$3 billion each year. Retreading is an effective way to lower your tire costs, too.

Why are retreaded tires such a good value? Most of the manufacturing cost of a new tire is in the tire body or casing. The tread-the portion of the tire that meets the road-represents only a percentage of the new tire cost. Today's steel radial commercial truck tires are an industrial product designed to provide multiple tread lives over the life of the casing. This useful casing life is monitored and managed closely by the tire owners as tires are the number one maintenance cost of operating commercial vehicles and on the road down time is very expensive. As a truck tire's useful casing life is consumed, and it becomes less durable than a new tire, the management of the casing is accomplished by changing the

applications / downgrading to less stressful wheel positions. The objective is to avoid the casing failing before the current tread is worn out. Casings are inspected on and off vehicles, at many points in their lives. The most complete inspections are conducted in full service retread plants that take advantage of all the technology available. When a tire becomes worn and seems ready for discard, the bulk of its cost remains unrecovered. In fact, the tire's useful life has hardly begun!



School buses save money and help the environment by safely using retreads.



Fire engines and other emergency vehicles depend on retreads because they are safe, economical and very environmentally friendly.



4 *Are Retreads Safe?*

You bet they are! The President of the United States signed an Executive Order in April 2000 requiring federal agencies to replace the original tires on their vehicles with retreaded tires wherever practical. All commercial airlines, as well as military jet aircraft, use retreaded tires. In fact, nearly 80 percent of all aircraft tires now in service in the United States are retreads.

More than 100,000 aircraft retreads are used annually with an average of 270 takeoffs and landings per tread life. Professional retreaders adhere to stringent industry recommended practices

at every step of the retreading process. Most retread plants in North America and elsewhere are either franchised, licensed or otherwise consulted by or affiliated with major brand suppliers who provide technical assistance and requirements to insure a reliable product is produced.

Also the industry is self regulating by the consumer. If a mistake is made in the process, such as contamination of buffed surfaces, the results are almost immediate with severe financial and operational consequences to the retreader.

Retreaded tires in all applications, from

passenger cars to heavy construction equipment, have consistently demonstrated the same reliability in operation as new tires. Many trucking fleets plan their new tire purchases with the intention of having their worn casings retreaded two or more times as a routine part of their tire budgets. Today, in North America, there are as many retreaded tires in operation as there are original tread life tires.

Retreaded tires are used safely every day on airplanes, school buses, fire engines and ambulances, trucking fleets, taxis, Postal Service vehicles, military vehicles and by millions of motorists.

Airlines average six retreads per tire, with some tires being retreaded as many as 12 times.

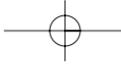


Many military vehicles routinely use retreads as an economical and environmentally friendly alternative to higher priced new tires.



Commercial and military airlines routinely retread their tires, some as many as 12 times.





If You Want to be Green –
Retread!



Millions of tires are kept out of scrap tire piles and landfills every year, thanks to retreading.

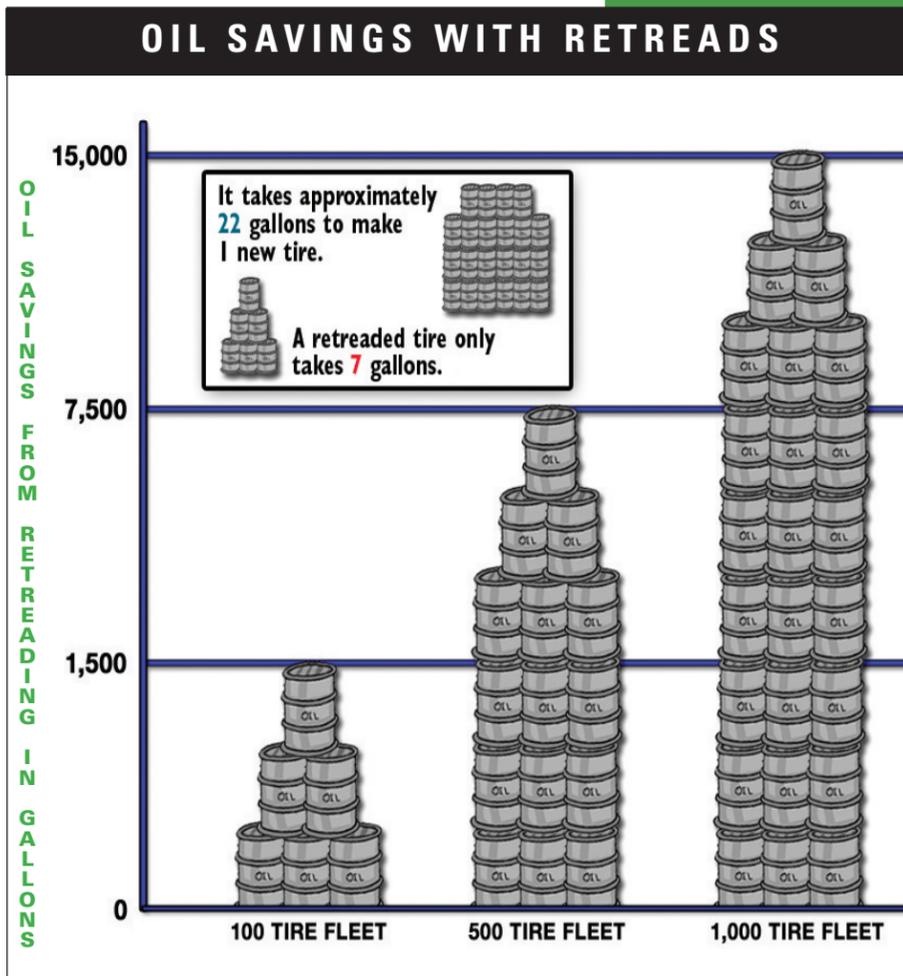
FACT:

EVERY RETREADED TIRE IS A RECYCLED TIRE. RETREADING IS TRULY RECYCLING!

Retreading conserves oil. The synthetic rubber components in a new passenger tire contain seven to eight gallons of oil. Retreading the same tires uses only two to three gallons of oil! The manufacture of a new medium truck tire requires approximately 22 gallons of oil, but it takes only seven gallons to retread.

Every year in North America, the use of retreads saves hundreds of millions of gallons of oil, and millions of tires continue a useful life rather than being consigned to a tire pile or landfill.

Be a friend to your tires. Whether they are new or retreaded, maintain the correct inflation pressure! In this way you'll make sure they'll be retreadable when the tread is worn off, and you'll save fuel in the bargain!



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Who we are

The **Retread Industry**

What is retreading? Simply put, retreading is the process whereby selected and inspected worn tires, called "casings," receive a new tread.

Only sound, carefully inspected tire casings are used for retreading. The worn tread is buffed away and a new tread bonded to the tire body in a process very similar to the manufacture of a new tire. There are different processing techniques, but the ultimate objective is always the same—affixing a new tread through the application of heat, time and pressure.

Tire retreading is an established industry that began in the early 1900s and grew steadily. Today, there are approximately 850 retread plants throughout North America. These plants are various sizes, from small operations producing 20 retreaded tires per day to the very large plants processing 1,000 or more retreads per day. Additionally, there are plants that retread only specialized tires, such as those for off-the-road, farm and construction equipment. Altogether, these plants retread millions of tires a

year, using millions of pounds of synthetic and natural rubber. This represents over \$3 billion in retread tires sold annually.

Long-haul trucking companies are a major market for retreaded tires. Indeed, their profits would be seriously affected if they were unable to use retreaded tires. Radial truck tires are guaranteed by the new tire manufacturers to be retreadable. (In some instances, the major tire manufacturers guarantee two retreads on steel radial truck tires.)

Trucking companies retread millions of tires annually.

Every tire has the potential to become a retread, but only the best worn tires are selected.

Passenger cars, aircraft, sand and gravel trucks, delivery vans, the U.S. Postal Service, farm equipment and earth-movers can use all retreaded tires.

Opportunities for retreading are increasing in North America and internationally.



The Postal Service delivers your mail on environmentally friendly retreads.



How we do it

The **Retread Process**

STEP 1: Initial Inspection

A successful retread must be built on a sound foundation. The initial inspection determines whether a worn casing will be accepted for retreading or rejected. This preliminary inspection is perhaps the most important step in the retreading process. It determines whether the tire body is technically sound enough to support another tread life and meets the customer's specifications. Tire bodies that are not capable of service through another tread life are rejected. The decision to accept a tire for retreading is the decision to put the company's name on the final product. Preliminary inspection is fundamental to the success of the entire retread operation. In fact, every operator at every post is an inspector.



A visual inspection begins the process.

STEP 2: Non-Destructive Testing

Shearography, ultrasound, high-voltage, and X-Ray are some of the non-destructive testing methods used in retreading, enabling retreaders to actually "see through" the tire to determine if there are separations, broken steel cords or any other damage that would preclude the tire casing from undergoing another safe and useful life after retreading. Tire casings that cannot pass these tests will not be retreaded.



A non-destructive testing machine detects nail holes using 25,000 volts.



Shearography detects separations invisible to the naked eye, and is a valuable tool in the inspection arsenal.

FACT:

The retreading process comprises the following steps: and ensures the quality of each retreaded tire.

STEP 1:
Initial Inspection

STEP 2:
Non-Destructive Testing

STEP 3:
Buffing

STEP 4:
Casing Preparation/
Repairing

STEP 5:
Tread Application

STEP 6:
Curing

STEP 7:
Final Inspection



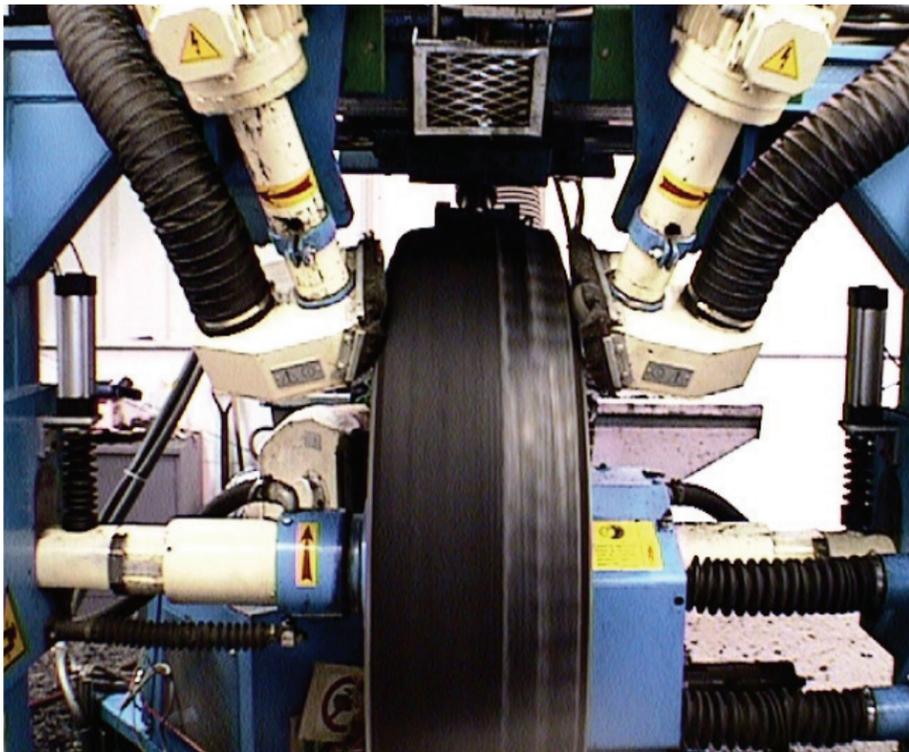
8 The Retread Process (continued)

STEP 3: Buffing

The worn tread is removed from a tire casing by buffing. The proper performance of the buffing operation is crucial to the retreaded tire's future performance.

The casing is mounted on a lathe-type machine called a buffer, and inflated. While the tire rotates, a rasp removes the remaining tread material, buffing the casing surface to the correct shape, size and texture to receive a new tread.

Every tire model has a designated crown width, profile and radius. The casing must be buffed to the particular shape that will give the best tread-to-road contact. Part of the retreaders' expertise is the ability to buff to the exact recommended dimensions.



The old tread is removed on a computerized buffer to an exact tolerance.



The rubber residue is removed by vacuum into a collection receptacle. It is then recycled into various products such as rubber mats, etc. Nothing is wasted!



The Retread Process (continued)

STEP 4: Casing Preparation/Repairing

Injuries remaining in the tire casing after buffing can be repaired if the damage is within acceptable limits.

The repair professional is trained to recognize which injuries can be repaired and which cannot. Where injuries are too extensive, the casing must be rejected. The repair operation is a crucial step in the tire retreading process.



The damaged section is carefully removed.

A properly repaired tire is intended to last the life of the new tread being applied.

Repair specialists must be dedicated, knowledgeable individuals who are aware of their responsibility to the end user—people like you and me who drive on the tires they help restore to a useful life.



New unvulcanized rubber is added to fill voids where damaged sections have been removed.



A plug and a patch are installed, always from the inside of the tire.



FACT:

A properly repaired tire is intended to last the life of the new tread being applied.

10 The Retread Process (continued)



The buffed and repaired casing is now ready for a new tread.

STEP 5: Tread Application

Once all repairs are made, the buffed casing is ready for a new tread. There are two types of vulcanizing processes that bond the tread to casings: mold cure and precure.

A buffed tire casing will often be more true and round than the original tire.

The Mold Cure Process

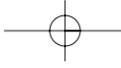
The application of tread in the mold cure retreading process is very similar to that in the new tire manufacturing process. Using one of several methods, uncured tread rubber is applied to the crown area of the buffed casing (in the case of bead-to-bead retreading, also to the sidewalls). The prepared casing, built to the correct diameter with uncured rubber material, is now ready to be placed in the mold for curing.



Unvulcanized "green" rubber is wrapped around the casing by a computer driven extruder to a carefully measured tolerance.



The prepared casing built to the correct diameter with unvulcanized rubber is now placed in a mold for vulcanizing, also known as curing.



The Retread Process (continued)

The Precure Process

As the name indicates, the tread rubber used in this process is molded and precured by the tread rubber manufacturer. The retreader selects the appropriate treads in strips or full circles of various designs, widths and thicknesses. In the precure retreading process, a cushion gum bonding layer is placed between the tread and the casing. The proper tread width is applied to the prepared casing in a straight and even fashion. The tire then moves to the chamber for curing.



Precured rubber is applied to the prepared casing.



A cushion gum bonding layer is applied to the casing prior to having the precured tread applied.



After the precured rubber is applied, the tire is ready to be placed in a rubber envelope before it is moved to the curing chamber.



A precure system curing chamber.

FACT:

**RETREADS MAY
LOOK ROUND
AND BLACK, BUT
THEY ARE REALLY
VERY GREEN.**



12 The Retread Process (continued)

STEP 6: Curing

Curing, or vulcanization, is the process of bonding the new tread material to the prepared tire body. During the curing process, uncured rubber is transformed from a soft, tacky, stretchy substance to a tough, hard tread that resists abrasion and provides excellent mileage and traction.

In the mold cure process, the prepared casing, built to the correct diameter with uncured rubber, is placed into a mold.

When the mold is closed with the tire body inflated to the proper pressure, the casing conforms the uncured material to the mold, forming the tread design. Heat is then applied for a specific period of time to accomplish curing.

Trucking fleets - both private and public - can cut their tire costs significantly by using Retreads!



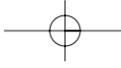
A mold cure segmented mold ready for a prepared casing.



After the casing is placed in the mold it is closed and the curing process begins, using time, heat and pressure.



The tire, with the new tread vulcanized in place, is removed from the mold.



The Retread Process (continued)

In the precure process, curing takes place within a chamber. The unit is pressurized and the air is heated by electricity, steam or hot liquid, such as oil moving through a radiator-like heat exchanger. With the new rubber in place, the prepared casing is put into a rubber envelope or membrane much like an inner tube with a valve used to suck out the air, creating a vacuum and physical pressure on the tread. It is then put into the chamber where pressure and temperature, applied over the correct length of time, cure the cushion gum layer and bond the precured tread to the tire.



The tire is placed in a curing chamber.



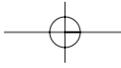
A vacuum is created by using a valve to suck out the air from the enveloped tire.



A combination of time, heat and pressure are applied to cure the cushion gum layer and bond the precured tread to the tire.

FACT:

Although these descriptions of the retread process are very brief, the point to remember is that whether the process is mold cure or precure, the end result is a retread with at least as much toughness and durability as the tire had when it was new.



14 The Retread Process (continued)

STEP 7: Final Inspection

The last step in the retreading process is final inspection. At this station in the retread plant, all retreaded tires are closely inspected to ensure that a reliable and attractive product will be recycled to the customer.

Once the tire is approved, it may be painted and labeled for a like-new appearance.



The finished retread is subjected to a thorough final inspection.

School buses have reliably used Retreads for years, allowing school districts to spend less money on tires and more on educational materials.



Once the tire passes the final inspection, it may be painted and labeled for a like-new appearance.

Get the Facts About **Retreads**

TODAY'S RETREADS are produced in modern plants operated by trained specialists. Professional retreaders adhere to stringent Industry Recommended Practices at every step in the retreading process, and each retread product can be traced to the facility that produced it. Only the best worn tires are used for retreading.

Retreaded tires are proven reliable. They are used by commercial airlines, United States military aircraft, school buses, government vehicles and emergency transport of all kinds. Trucking companies routinely depend on retreads for long-distance hauls. Retreaded tires have been proven as reliable and durable as new tires in laboratory tests and through years of practical experience in all the same applications where new tires are used. In some cases, retreads have become the product of choice for certain applications where new tires are not used by the fleet. Drive wheels of school buses are a prime example.

Retreading is an excellent way to save money. A properly constructed and maintained retreaded tire will give comparable miles per tread depth as a new tire. In fact, the more expensive the original new tire, the greater the retread savings. Since many tires can be retreaded one or more times, to discard a worn tire without retreading is to lose most of its value. Whether you are a fleet professional, or an owner-operator, retreaded tires are a viable economic alternative to new tires.

Retreading is recycling. Because tires contain significant amounts of synthetic rubber, an oil derivative, retreading is an excellent way to conserve oil and keep tires out of landfills. Each purchase of a retreaded tire is a substantial act of conservation.

For an online copy of this booklet, please visit www.retread.org.

We hope this booklet helps you begin thinking of retreading as a normal part of a tire's lifecycle. If you are not already familiar with the performance and economy of retreaded tires, please discuss the benefits with your local retreader or contact TRIB.

We will be happy to arrange a tour of a retread plant in your area.

Additional copies of this publication may be ordered from TRIB or TIA.

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FACT:

Be a friend to your tires. Whether they are new or retreaded – *maintain correct inflation pressure!*



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