

Reprinted from **Real Answers**

Is natural
always better?

Special Edition Three

real | real QUESTIONS
real ANSWERS

BRIDGESTONE

trucktires.com

1-800-543-7522



Is natural always better

We started this “By Popular Demand” series by focusing on the ingredients that make a truck tire. Carbon black, sulfur, zinc stearate, wax, accelerators, antioxidants and antiozonants are blended with the most important ingredient of all – rubber.

We also learned roughly 40 percent of a Bridgestone truck tire is rubber, and depending on the type of tire, about three-quarters of that is natural.

Where does the natural rubber come from? To find out, let’s take a trip across the ocean.



HUNGARY
ROMANIA

SPAIN

ITALY

TURKEY

PERSIA

ARABIA

LIBERIA

Rubber
Plantations
AFRICA

INDIA

So, where does natural rubber come from?

From a rubber tree, of course. The official name of the tree is *Hevea brasiliensis*, because it was originally discovered in Brazil. The tree grows only in tropical areas where there's a lot of rainfall and it's hot. Really hot.

Harvey Firestone started a rubber plantation in Liberia in 1926. Today, the Firestone Natural Rubber Company is an operating unit of BFS Diversified Products.

The Firestone operation is just outside of Monrovia, the capital of Liberia. This area recorded the second greatest amount of rainfall in the world – which is necessary to grow healthy rubber trees.

How does one get the rubber out of the tree?

Through a process called tapping. Tappers use a special curved knife to gently shave a thin layer of bark from the rubber tree. It takes a lot of skill to tap. Too deep and it wounds the tree. Too shallow and the rubber won't leach.

After tappers shave the bark, the latex oozes from the spiral cut, down a spout and into a collection cup.

Trees are tapped every other day or every third day.

How old must a tree be before it's tapped?

Trees are six to seven years old before they are tapped.

And they can produce latex up to 32 years, depending on how often they are tapped.

How much does each tree produce at a time?

It takes about three hours to produce a little less than one cup before the latex stops flowing. It won't flow until the tree is tapped again.

What does the latex look like?

A cross between household glue and whole milk.

What's next?

The tappers pour the latex from the collection cup into a bucket and carry that to a collection station.

While it's at the collection facility, preservatives are added so it doesn't coagulate. Then a bulk hauler takes the latex to the centrifuge plant where the rubber is processed.

Why is natural rubber processed?

Unprocessed rubber has almost no use, except as an eraser.

Warm rubber – remember we're near the equator – won't hold its shape and it can be rather sticky. The latex has to be partially cured so it can be transported across the ocean.

Bark is thinly shaved causing a new flow of latex. It takes about three hours to collect less than one cup.



How does that happen?

The process begins when the latex arrives at the factory and it's again inspected for quality and consistency in the laboratory.

Two kinds of natural rubber are processed at the Firestone plant. One type remains in a liquid form, and is commonly known as latex concentrate. The second is dry rubber baled in 75-pound blocks.

Both kinds are fed into a battery of centrifuges to drive excess water from the rubber before it is shipped.



Trees are specially bred through hand pollination and bud grafting to be resistant to disease and wind damage. After spending 12 to 18 months in a nursery, carefully selected trees are planted, about 180 to an acre.

It takes about six to seven years before the trees can be tapped. Each acre of mature trees will yield around 1,900 pounds of rubber per year.

How is the rubber transported?

Firestone Natural Rubber Company owns two ships that are specially modified to transport rubber and latex across the ocean.

Each ship is equipped with tanks so it can safely transport 1.2 million gallons of liquid latex. The 75-pound dry rubber bales are wrapped in plastic and shipped in crates in the dry cargo holds.



Why go to all that trouble?

Nature still makes a better quality product than man.

How so?

Natural rubber offers superior properties over synthetic in most truck tire applications. For example, natural rubber lasts a long time and tends to run cool – especially under heavy loads.

It also has very high tensile strength, which means the tire can easily withstand repeated flexing and can still spring back to its original shape.

It's the same sort of thing as fidgeting with a thick rubber band – stretch it out as far as what is comfortable and release it – and the rubber band springs back to its original shape.

Anything else?

It offers excellent tearing resistance, so natural rubber is a superior polymer for on/off-highway tires where the tread compound requires cut, chip and tear-fighting properties for longer tire wear.

Is natural rubber used just in the tread compound?

Natural rubber is often used in the casing, especially where the bonds must be maintained between the steel cording and the rubber.

So why not use natural rubber exclusively?

Obviously cost is a big factor, but there are some tire functions we'd lose. For example, natural rubber tends to perform badly in wet traction tests and the tread surface wears unevenly.

Until Bridgestone engineers can invent an absolutely perfect synthetic polymer that does everything well, a different amount of natural rubber and various combinations of manmade polymers are blended to achieve the right balance – depending on the tire application.

So different tires have different compounds?

Exactly. For a highway tire, the engineers would blend various compounds that offer tread that is best in long, even tire wear, low heat build-up and high tensile strength.

If we were building an on/off-highway tire, the engineers would blend different polymers

– including natural rubber – so the tread compound would promote durability and cut, chip and tear resistance.

What are the biggest benefits of using synthetic rubber?

You'll have to wait for the next issue, when we take a look at the chemical properties of synthetic rubber, how it's engineered to have certain characteristics, and how it's manufactured. **FA**



In 1770, English scientist Joseph Priestley suggested that the latex substance that was drawn from a rubber tree and cooled should be named rubber, because of its ability to "rub away" pencil marks. Today Americans call it an eraser; in the United Kingdom, erasers are still known as rubbers.

