

MONMOUTH RUBBER & PLASTICS



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WHO NEEDS RUBBER? HISTORY

1 Who discovered rubber?

The Indians of Central and South America were the first to utilize rubber's unique properties. Christopher Columbus watched them play a game called "Tlachtlic," a vigorous cross between basketball and football, with the object of directing a rubber ball through a stone ring.

2 What was the first practical use of rubber?

In England, Joseph Priestley, best known for his discovery of oxygen, noted that pencil marks could be "rubbed out" by the substance. From this early use, rubber derived its name.

3 What discovery marked the beginning of modern rubber technology?

Prior to 1839, the properties of rubber were dictated by the surrounding temperature. During the hot summer, rubber was sticky and malleable, while it became hard and brittle in the colder months. This was finally remedied by the discovery of the process of vulcanization. A mixture of rubber, white lead and sulphur was dropped accidentally upon a hot stove. When it was removed, the material was no longer affected by temperature. Despite stretching, it always returned to its original shape. This process of vulcanization made it possible to use rubber in raincoats, overshoes, and eventually many other products, including tires.

THE TWO TYPES OF RUBBER

4 What are the two types of rubber?

The two types of rubber in common use today are natural and synthetic. Natural rubber comes from the rubber tree (*Heavea Brasiliensis*). When a tree matures at age of six or seven years, the latex is collected from a diagonal incision in the tree trunk. The tapping process does not affect the health of the tree and the tree wound later heals itself. Synthetic rubber is made by man from petrochemical feed stocks. Crude oil is the principal raw material.

5 Where is natural rubber produced?

Today more than 90% of the natural rubber. Supply comes from Southeast Asia. As rubber trees require a hot, damp, climate, they grow only in the "Rubber Belt," an equatorial zone that stretches around the world. In 1876, the English, in recognition of the difficulties of securing quality rubber from the jungle, hit upon the idea of growing rubber on plantations of Southeast Asia and Africa have developed.

6 What accelerated the development of synthetic rubber?

The United States was cut off from virtually all of its sources of natural rubber in Pacific during World War II. In order to meet the nation's needs for this vital material, the government built synthetic rubber plants and the industry operated them. Synthetic rubber productions jumped from 8,000 tons in 1941 to 820,000 tons in 1945. After the War, the government sold the plants to the industry.

7 How is synthetic rubber produced?

General purpose synthetic rubber has its origin in two gases: butadiene, a by-product of petroleum refining, and styrene, captured either in the coking process or as a petroleum refining by-product. When the two are mixed in the presence of soapsuds in a reactor, liquid latex results. The dry rubber in this milky liquid is then coagulated into crumbs, washed, dried, and baled read for shipment.

8 Does the industry utilize more natural or synthetic rubber in its manufacturing process?

Approximately 70% of all rubber used is synthetic.

9 How many chemical types of rubber are there?

There is only one chemical type of natural rubber. However, there are approximately 20 different chemical types of synthetic rubber, and within each type there are many distinguishable grades. The different types of rubber, each with its own properties and advantages, allow industry to choose the rubber that most clearly meets the demands of an intended use.

10 What event popularized the use of pneumatic tires?

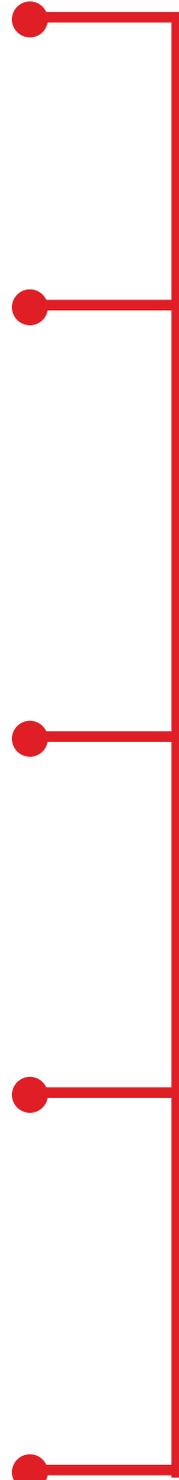
The arrival of the "horseless carriage"- the passenger automobile with an internal combustion engine- in the late 1890s popularized the use of pneumatic tires, which had started on bicycles and tricycles. The first pneumatic tire was invented in England in 1845.

11 What types of tires are available today?

The three types are bias, belted bias and radial tires. Today, radials are the predominant choice of tire used in passenger vehicles. Advances in design and construction techniques have led to the tripling of tire life in past two decades. Today's state-of-the-art radials have also led to proven increases in operational safety, performance and reliability.

12 How much oil is required to produce a tire?

Approximately seven gallons. Five gallons are used as feedstock (from which the substances that combine to form synthetic rubber are derived), while two gallons supply the energy necessary for the manufacturing process.



13 How much rubber is used to manufacture products other than tires?

Non-tire products use nearly 40% of all rubber consumed in the U.S.

14 Where are the United States rubber manufacturing plants located?

Everywhere. There are approximately 15,000 establishments operating in the U.S.

15 What is the trend in U.S. rubber consumption?

The long-term trend is upward. The need for the indispensable material will continue to grow in our modern society.

16 What green activities is the rubber industry engaged in?

Through aggressive green management practices, the rubber industry is a leader in environmentally friendly manufacturing. Air, water and waste emissions have been reduced by 50% in the last 25 years. Reducing and recycling waste in both the manufacturing and the post-consumer markets have led to great reductions in the amount of scrap materials generated. Industry-funded research is actively pursuing even further reductions.

17 Is the rubber industry important to our national economy?

The sixty billion dollar international industry directly employs hundreds if thousands of Americans and creates countless other jobs in business that either supply the industry or use rubber products.



18 Is rubber important to our citizens?

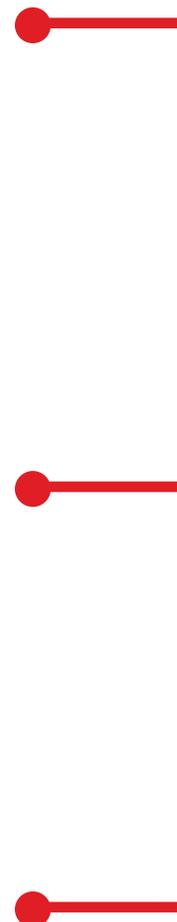
Today our products contribute to almost every aspect of modern life- agriculture, transportation, safety and health services, aerospace, energy, and electronics. A limited list of the many diverse products, besides tires, includes conveyor belts, sporting goods, computer gaskets, oil seals, and fire hoses.

19 How is the industry continuing to seek better ways to serve the public?

Through research and development efforts, the industry is designing better products and improving the environment. To assure that a sufficient number of trained personnel are prepared to meet the special challenges of the rubber industry, the Rubber Manufacturers Association works closely with the University of Akron, Ferris State University and other institutions of higher learning.

20 What is the Rubber Manufacturers Association?

The RMA is a trade association which traces its origins back to 1915. The Association represents industry before public, Legislative and customer forums. It also provides a variety of technical and operational service to its members, to the government, and to the general public.



SO YOU SEE..... WE ALL NEED RUBBER!

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