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A METHOD OF CONDUCTING EXPERIMENTS ON THE PRODUCTION OF CAR TIRES AND THE DISPOSAL OF OBSOLETE CAR TIRES

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Annotation. *In this work discusses the method of conducting experiments on the production of car tires and the disposal of obsolete car tires.*

Key words: *tire, automobile, transportation, manufacturing, technology, obsolete tire, tread, cord, rubber, vulcanization, raw material.*

МЕТОДИКА ПРОВЕДЕНИЯ ОПЫТОВ ПО ПРОИЗВОДСТВУ АВТОМОБИЛЬНЫХ ШИН И УТИЛИЗАЦИИ УСТАРЕВШИХ АВТОМОБИЛЬНЫХ ШИН

Аннотация. *В данной работе рассматривается методика проведения экспериментов по производству автомобильных шин и утилизации морально устаревших автомобильных шин.*

Ключевые слова: *шина, автомобиль, транспорт, производство, технология, устаревшая шина, протектор, корд, резина, вулканизация, сырье.*

INTRODUCTION

A necessary condition for the full use of obsolete car tires is to separate them into separate components:

- tread;
- side wall;
- inner ring;
- breaker layers;
- foundation frame.

Each component has a different composition and structure, and in addition, the production of tires is very complex and expensive. The tire is based on the following basic principles:

- high quality rubber;
- use of quality fabrics for the cord;
- reliable steel frame;
- plastic assembly technology;
- high quality vulcanization;
- Comprehensive quality control.

RESEARCH METHODOLOGY

Thus, the following scheme is used in the production of tires, including three stages: processing, preparation and production of raw materials.

In the raw material processing stage, the rubber mixture is mixed in a closed rubber mixer. The whole process takes place under pressure and at high temperature in automatic mode.

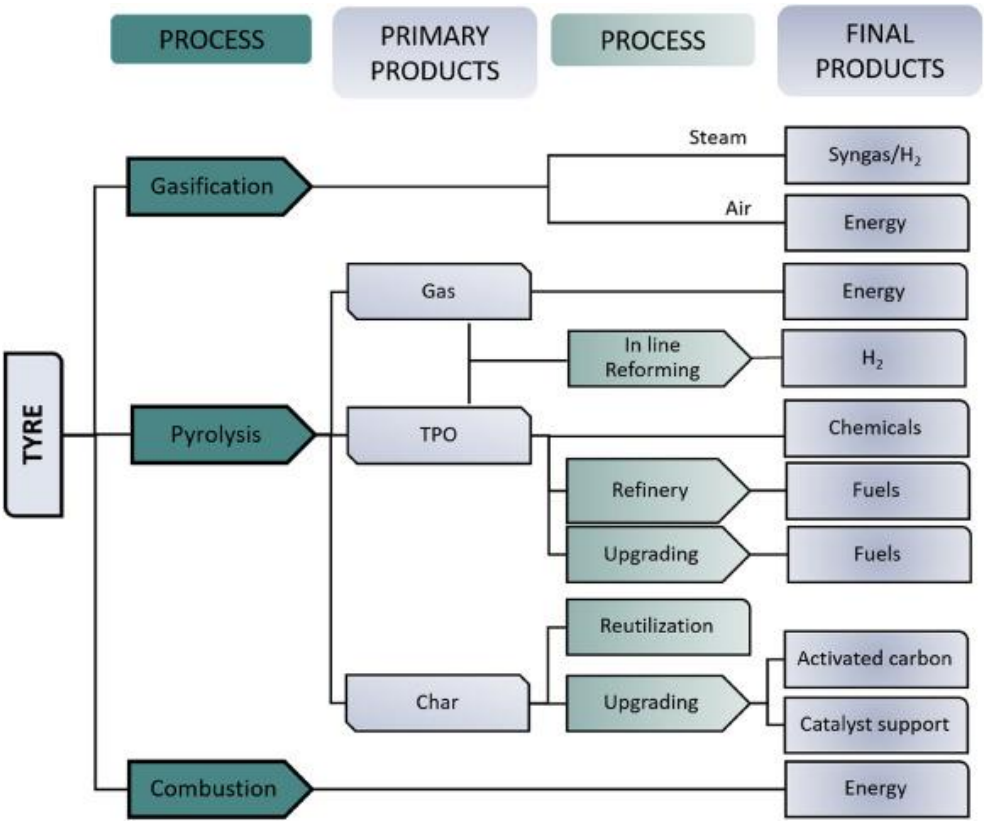

Figure 1. Scheme of tire raw material processing process

In the extruder (syringe or screw press), each component of the tire is formed in the form of tape (tread, side walls and other elements). At this stage, recycled compounds are also used in the formation of the mixture, and the rubber mixture is plasticized separately, and only then are they mixed. Reconstituted mixtures are much easier to inject because they have less shrinkage and retain their shape and size better. However, the speed of the process is high and energy costs are high.

RESEARCH RESULTS

In parallel with mixing, other technological positions produce textile tires carcass, bead cores and cutters.

The textile fiber is wrapped in a cord and inserted into a calendar, where it is lubricated with a thin layer of rubber on both sides using a complex and expensive method. There are 2 types of calendars for rubberizing fabrics:

- friction, in which the rubber mixture is applied to the fabric due to friction between the rolls;

-Rubber mixture is applied to the lining fabric in the form of a thin layer and passed through rolls.

Calendars also apply a layer of airtight rubber to the tireless tires.

Rubber is also applied to steel wire in a complex way. It should be borne in mind here that the decisive factors are the minimum oscillations in the thickness of the rubber layer to which the rubber is applied, and secondly, that the rubber must be connected to the wires.

The textile fiber is cut into strips of any length and the steel is cut along a similar width and wrapped around the drum in the form of a rigid ribbon. The side ring is also equipped with a rubber shell.

All components are fed to a collection drum that has the shape of a cylindrical inflatable roller. The two sides approach from the side, then the wire is pulled into the frame, after which the flat structure acquires its final toroidal shape. The solid layers are supplied with compressed air.

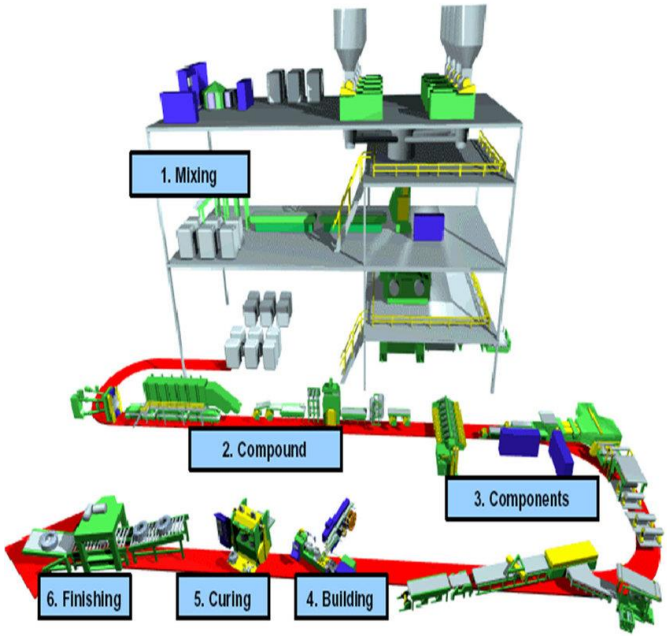

Figure 2. Schematic of the tire production process

The semi-finished product is pressed into the mold during heating for 9-17 minutes at a pressure of 12-24 atmospheres and 165-200 ° C.

Thus, all manufactured car tires can be divided into radial location of the frame - radial and diagonal - diagonal tires.

Radial tires use steel wire with a diameter of 0.2 mm as a material for cord and carcass threads. These types of tires are used in both cars and trucks and buses.

Diagonal tires use materials such as textiles, nylon, polyester and more. These types of tires are mainly used in low-speed vehicles.

Therefore, the process of separating the above Ash types into separate components should be done differently.

As mentioned above, the ash separation process should be performed according to the following algorithm

- washing;
- heat treatment;
- extraction of the inner ring by means of an extractor;
- tread release;
- separation of wire and frame layers (for radial tires);
- grinding (rubbering) of rubber components;
- assembly and packaging of the finished product.

CONCLUSION

Therefore, the method of conducting the experiment will have the following sequence.

1. Car tires from leading factories of the world and Russian manufacturers were selected as samples for the experiment: Michelin, Goodyear, Continental, Bridgestone, Kama, Medved.
2. Pre-selected ash is washed using washing equipment.
3. All of the above prepared tires are heated in a temperature range of 120 to 300 ° C. For each ash, the actions required to break it down into components are determined. Mathematical dependencies were built.
4. Efforts to obtain a Cord Ring and Bracket were identified and mathematical dependencies were constructed.
5. Disassembly of car tires.
6. Grinding of rubber parts of ASH was carried out by means of an abrasive grinder with abrasive grains of different sizes in a full-size installation. Experimentally determined: - feeding power, H;
- linear cutting tool speed, cm / min;
- amount of feed, mm;
7. The dimensions (dust) of the obtained rubber chips are measured.
8. The process of obtaining rubber powder is optimized.

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