

# TIRE RETREADING & REPAIR



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### PHOTO ABOVE:

The envelope was a welcome addition to retread plant employees who had struggled for years to apply and remove envelopes from tires.

## INVENTIONS THAT MADE A FUTURE

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In the years since the first tire was retreaded, hundreds of inventions and innovative ideas designed to enhance retreading were developed. Many of these are still in use today while others have faded into the past and only survive as news articles or patent documents in old files.

I have had the opportunity to view hundreds of patent applications and it is amazing how many never made it further than the drawing board. The ones that have been successful range from equipment and technologies to tire manufacturing and rubber products. Some make the process of retreading or repairing a tire easier, yet others make the retread product better.

I am sure that I will probably fail to mention something someone will think should be mentioned, but the following list is, in my opinion, a compilation of the greatest inventions in the retread industry.





The invention of the pre-cure envelope was critical to the success of pre-cure retreading.

**FULL CIRCLE MOLD** – This was the first major change that improved the performance of retreaded tires and the efficiency of retread production. Prior to the Full Circle Mold, retreads were run in third circle molds, which caused major balance problems as vehicles speeds increased and caused the production of retreads to be a slow laborious process. The Full Circle Mold came into use in the 1920's and is still in use today and has evolved into full circle segmented molds for most radial mold cure retread production.

**SYNTHETIC RUBBER** – The development of synthetic rubber for new and retreaded tires during WWII enabled the retread industry to survive and grow throughout the war and was a big part of the tremendous growth of retreading after WWII. Synthetic rubber is still a major component in new and retreaded tires today.

**CEMENT SPRAY** – Many of you will probably not agree that the ability to spray cement onto buffed casings was a major improvement in the retread process, but you likely have never had to apply cement to buffed casings using a hand stipple brush. I cannot confirm that spray cement had any effect on improving retread quality, but it certainly improved production efficiency.

**ORBITREAD** – Over the years, there have been several different methods used to apply rubber to a buffed casing, but the Orbitread brought about the biggest change in rubber applications. The Orbitread was used to apply rubber to every type of retread produced, from passenger



The Hawkinson NDT-II Nail Hole Detector can be found in most retread plants throughout the world.

to aircraft and large OTR tires. It was even used in the manufacturing of some large new tires. This machine can be programmed to place a predetermined amount of rubber on the tire and can eliminate the large inventories of die-size slab rubber. These machines are still in use today, but their use has been drastically reduced by the major growth of pre-cure retreading.

**ENVELOPER** – The enveloper, which is used to apply and remove envelopes from the retread, does not affect the quality of the finished retread. The main thing the enveloper does is make the tough job of applying and removing envelopes much easier. Most pre-cure plant workers will tell you that the enveloper allows you to grow fingernails.

**PRE-CURE RETREADING** – Although it is difficult to get an agreement on when pre-cure retreading began, there is no doubt that its major growth started in the late 1950's. Pre-cure retreading has grown and today, represents over 90 percent of the total truck tire retreads produced.

**PRE-CURE ENVELOPES** – The pre-cure envelope was developed also in the late 1950's and, in my opinion, was responsible for the growth of pre-cure retreading. The envelope continues to be improved with new compounds and sealing devices and is still a major part of pre-cure retreading today.

**CHEMICAL REPAIRS** – Chemical cure repairs have enabled the retread and repair industry to safely and easily





Shearography is becoming an important inspection process for larger retread plants.

repair any type of tire without the use of costly equipment and large repair facilities that were required in the past.

**HAND-HELD EXTRUDER GUNS** – Prior to the hand-held extruder gun, all buzz-out and tire repair rubber was stitched in place with a hand-held stitcher and a strip of cold rubber. Virtually every retread plant in the world today has one or more hand-held extruder guns.

**INSPECTION TECHNOLOGY** – Not too many years ago, we were hammering on truck casings with a piece of pipe trying to determine if it had a ply separation. Today, we have inspection equipment that can find hidden ply separations, broken cords and nail holes with ease. This equipment ranges from ultrasound and shearography machines to find separation to electric nail hole detectors, all of which have brought the quality of retreadable casings to the highest level in history.

**AZ CUSHION EXTRUDER** – This machine was slow to be accepted by the retread industry, but today it is an important part of the operation in most large pre-cure retread plants. It has reduced the time to fill buzz-outs and eliminated the inventories of many different widths of roll cushion gum. It has also helped to eliminate the need to use spray cement in the plant.

As I mentioned previously, there are many other events that have occurred in the past that have had a positive effect on retreading, but two of the major developments had nothing to do with retread equipment. The first was



It took several years for the AZ Cushion Extruder to be perfected and accepted by the retread industry, but today it is an important part of retreading.

the development of the tubeless tire, and the second, the development of the radial tire. The radial tire has given the retread industry a uniform and stable platform on which we are able to build quality retreads that will perform at today's high speeds and severe conditions. This has made it easier to keep expensive radial casings in service through multiple retreads that will perform for hundreds of thousands of additional miles after the original tread is worn away. **TTI**

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