

Electro Tyre Retreading Machine

State Award
Kerala



Augustine Thomson
Thrissur, Kerala

Scout: Raesh T R

"It is ironical that in some instances, I was called to replace the tread machines of those local businesses who had tried unsuccessfully to copy my machine".

Usually tyre retreading is done using steam based heating system, which consumes about 1.5 tons of firewood to cure a 14 kg of matrix. Proper vulcanizing requires about 150° C temperature and 80 psi steam pressure. The tyres are directly exposed to heat, which results in reduction in life also.

Thomson has developed an electrically heated matrix system for tyre retreading. The system has coil heaters with ceramic beads, digital thermostat control and timer to maintain constant temperature throughout the process for balanced curing. One can complete the operation in 18-20 per cent of the cost of the conventional process by using this innovative process and mechanism.



Background

Thomas Augustine (53) hails from Athani in Thrissur, which is the rubber heartland in Kerala. Augustine was born in a small village of Vazhoor, Kottayam in an average middle class family on 12th June, 1955. His father was a primary school teacher in a nearby St Dominic School and mother was a housewife. His family consists of an elder brother, sister, two younger brothers and a younger sister. They had around 12 acres of land in this village, where rubber, tapioca and tubers were cultivated.

His entire life took a new turn, when his father died in a bus accident, while he was studying in the 8th standard. By that time, his elder brother had got a job in Andhra Pradesh and the responsibility of the family fell on him. While continuing his studies, he took up agriculture as a full time vocation to support his family.

During this period, he felt the desire to move away from farming and wanted to start a business in the village. At that time, his maternal uncle was running a rubber treading unit nearby, in which old vehicle tyres are made serviceable by removing worn out treads and replacing them with new treads.

He decided to start retreading unit, nearby his village, in Manimala. His brothers also joined him. They took a loan of Rs 48, 000 from Kerala state financial cooperation by mortgaging their farmland and started the workshop in 1978. Business started off well. The unit started with just one machine for retreading the tyres of trucks and two wheelers. The tread rubber is made from natural rubber by adding carbon black and a synthetic material through a process called extruding. But, they soon faced the problem of getting quality raw material in the form of tread rubber rolls.

In 1979, they decided to start a production unit for manufacturing tread rubber. Subsequently, they got a big order to supply tread rubber to a well-known company named Midas based in Kottayam. The company 'Midas' was a bulk supplier of tread rubber to Kerala State Transport Cooperation (KSRTC) and with these large orders. Slowly, their manufacturing unit started flourishing. By then, the focus had shifted from rubber retreading to

manufacturing the tread rubber. They took loans and added another unit to manufacture tread rubber.

Genesis of innovation

In 1983, with great expectation, Thomson had added another manufacturing unit to produce tread rubber. Calamity befell when KSRTC suspended the agreement with Midas. Midas, in turn refused to buy the large quantity of tread rubber manufactured by their unit. Left with large amount of stock, they were forced to sell this at throwaway prices. Having taken loans from banks and private parties at very high interest rates, the debt had accumulated to a big amount. They were forced to sell four acres of land and even decide to wind up the manufacturing units.

Augustine then decided to revive the old business of tyre retreading.

Over the years, he had observed many problem areas in the existing steam based units. These units usually deployed boilers, which consumed upto 1.5 tonnes of firewood to cure a 14 kg of matrix and generate a temperature of 150 degrees for proper curing. The bulky units required a lot of space and manpower, lacked operational precision, and depleted natural resources. The rudimentary steam based units could not maintain the constant temperature required to deliver high quality treads. It was observed that a 10% variation in the steam temperature resulted in more than 20% reduction in service life of the tyre. The boilers sprung leaks in three to four years, thus, altering performance and requiring recurring maintenance.

The units required more than 30 minutes to deliver the required pressure of 80 psi, and involved heating the entire unit along with the casing. Workers used hard tools to pry open the tyre and load into the machine. This heating of the entire tyre unit and rough handling often damaged the casings and reduced the service life of the tyre.

Since, the heavy tyre disc also had to be fitted into the machine; it entailed, employing sturdy labor (more than one person) and also keeping a watch on the steam and air pressure. Observing that chappal making units used electricity instead of steam boiler, he thought of using an electric powered

heater for the tyre retreading. After inspecting some of these units, he noticed that the moulds used in chappal making were flat, horizontal and needed much modification for his purpose.

Having learnt about electrical wiring and repairing from his father since childhood, he had the necessary confidence in building an electric unit for treading. First he used a strip heater in the device and partially succeeded after spending four years in standardizing the operation. In 1989, he met P.S Esho, an officer in district industrial center, who asked him to exhibit this innovation in the local trade fair 'Index 89". He also helped him with making the very first write-up and taking product photographs. The machine was displayed in the exhibition and a press conference was also organized. The provisional patent was filed in 1989.

While marketing this new technology for retreading, he faced stiff opposition and false propoganda from manufacturers of conventional treaded systems, who felt threatened by this new entrant. Finding it difficult to market the technology in his home state, he tried hard and with the help of friends some units were sold in other parts of India. But after getting complaints regarding the tread failing and problems with strip heater, he realised that the product needed refinement.

The development saga continued but he had to struggle with various sub-systems in refining them and also faced financial constraints and ultimatum from the bank. By this time, he had already been forced to sell the ancestral property to repay the debt. But he hung on; since, he believed that he was in the right track with his innovation. Since, the major tyre retreading industries and skilled labor in making molds were located in Thrissur, he relocated to Thrissur in 1991 and purchased a plot in an industrial estate located away from town. Here, he built a temporary shed and continued his research.

By 1996, he dropped the idea of strip heater and introduced 18 gauge resistance wires, which were then bent over the mould. But the problem was not solved. The temperature variance in outer and inner side of mould



was not found acceptable. While the temperature in outer side of the mould reached 600 degree Celsius, the inner side was only having 300 degree Celsius. When heated, the mould expanded and the coil got tightened and it broke away and this resulted in short circuits.

He then changed the contouring; made a series of grooves over the mould, through which the coiled resistance wire was inserted. A ceramic insulation was given over the resistance wire. With this, the problems were controlled to a great extent. By 1998, he was able to develop the machine with trouble-free performance. He started marketing the machine with a three-year guarantee.

During that time, the mould making was outsourced to local workshops that were given the raw material (aluminium alloy). But they often missed delivery dates and wasted the materials. So he took a bank loan again of eleven lakhs and bought the mould-making machinery and built the facilities

in-house. With this, he had all parts of the manufacturing process under his control. However, he was still hampered by the fact that his unit was located far from town, his technology was not yet familiar among local customers and his detractors and business rivals were still discrediting his technology. While his business was slowly getting established, he also built the electrical control panels for his machine.

Now that his efforts were bearing fruit, he faced a new problem. Local workshops tried to copy his methods and while they succeeded in copying the vertical loading process of the moulds, they failed miserably in copying the horizontal loading process.

Product application and dispersion

The innovation is a much needed solution for thousands of small scale retreading units spread across highways and towns of India, working in tiny workshops with few helpers and narrow operational margins. The innovator has manufactured and sold more than 100 units across the country till date. He has been provided with micro venture funding to the tune of five lakh rupees by National Innovation Foundation in 2007. This first version of this innovation was granted an Indian patent in 1989. Subsequently, the specification for patenting the latest version of machine has been filed in January, 2009.

NIF facilitated the technology licensing to Eastern Threads, a group company of Eastern Masalas, hoping that the benefits will reach many more people; saving energy in the process and making vehicles go farther than ever before.

