Industrial Visit Report

On Visit to

Rubber King Tyre Pvt. Ltd

RUBBER KING®
RELIABILITY MEANS EVERYTHING!

Organized by
Department of Rubber Technology
L.D. College of Engineering

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Department of Rubber Technology

Acknowledgement

We are truly grateful to L.D. College of Engineering, Rubber Technology Department, for giving us the valuable opportunity to visit Rubber King Tyre Pvt. Ltd., Unit IV.

Our heartfelt thanks go to our respected Head of Department, Dr. R. N. Desai, and our Faculty Coordinator, Prof. Sunil Padhiyar, for their constant guidance, encouragement, and for making all the arrangements for this visit. Their support made this learning experience possible.

We sincerely thank Mr. Devin Gawarvala, Director of Rubber King Tyre Pvt. Ltd., for allowing us to visit the company and for his kind support. We also extend our gratitude to the entire management and staff of Rubber King Tyre Pvt. Ltd. for their warm hospitality and for explaining the manufacturing processes, testing facilities, and company history in detail. The interaction with company experts gave us valuable practical insights beyond classroom learning.

Finally, we would like to thank all our classmates for their enthusiastic participation, teamwork, and cooperation, which made this visit not only successful but also a memorable and enriching experience.

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INTRODUCTION

As part of the academic curriculum, the Department of Rubber Technology at L.D. College of Engineering, Ahmedabad, organized an industrial visit to Rubber King Tyre Pvt. Ltd., Unit IV. Rubber King is one of India's leading tyre and tube manufacturers, recognized globally for its consistent quality, innovation, and adherence to international standards. The company's product portfolio includes butyl inner tubes, solid tyres, flaps, and curing bladders, which are supplied both domestically and to international markets.

The purpose of this visit was to gain first-hand exposure to the manufacturing of tyre tubes, understand the types of raw materials and machinery used, and explore the company's quality control and testing facilities. During the visit, students had the opportunity to closely observe key processes such as compounding, mixing, extrusion, and vulcanization, all of which are vital for the production of durable and high-performance rubber products.

In addition to manufacturing, the visit also included a tour of the laboratory and testing section, where students were introduced to advanced instruments like the Universal Testing Machine (UTM), Mooney Viscometer, and Rheometer. These instruments are essential for ensuring that rubber compounds and finished products meet required mechanical and rheological standards before reaching the market. The laboratory session highlighted how scientific testing complements industrial-scale production, ensuring product reliability, safety, and customer satisfaction.

Furthermore, the visit provided insights into the history and evolution of Rubber King, emphasizing how the company has grown from its inception in 1981 to becoming a reputed global supplier. The tour showcased not only the production efficiency but also the company's commitment to innovation, sustainability, and maintaining an edge in the highly competitive tyre industry.

OBJECTIVE TO VISIT

The primary purpose of the industrial visit to Rubber King Tyre Pvt. Ltd., Unit IV was to expose students of Rubber Technology to practical aspects of tyre tube manufacturing and quality control. While classroom lectures provide the theoretical framework of rubber science and engineering, industrial visits allow students to witness the application of these concepts in large-scale production environments. The specific objectives of the visit were as follows:

1. Understanding Raw Materials

To study the types of rubbers, fillers, processing oils, and chemicals used in tyre tube compounding, with special emphasis on butyl and chloro-butyl rubbers.

2. Learning Manufacturing Processes

To observe the sequence of operations, including mixing, extrusion, calendaring, curing (vulcanization), and finishing, that transform raw rubber into functional tyre tubes.

3. Exposure to Machinery and Equipment

To identify and understand the working of major machines such as internal mixers (Banbury), extruders, curing presses/autoclaves, and inspection systems.

4. Exploring Laboratory Testing Facilities

To gain hands-on knowledge of how instruments like the Universal Testing Machine (UTM), Mooney Viscometer, and Rheometer are used to assess rubber properties such as tensile strength, viscosity, curing behaviour, and elasticity.

5. Studying Organizational Practices

To appreciate the company's approach toward quality assurance, standardization (ISO/IATF certifications), research and development, and global competitiveness.

6. Bridging Theory and Practice

To connect academic knowledge of rubber compounding, processing, and testing with real industrial applications, thereby enhancing the practical understanding of students.

COMPANY OVERVIEW AND HISTORY

Rubber King Tyre Pvt. Ltd. is a reputed name in the Indian and global tyre industry, recognized for its expertise in manufacturing high-quality tyre tubes, tyres, flaps, and curing bladders. Since its inception, the company has emphasized innovation, quality assurance, and technological advancement to meet the demands of both domestic and international markets.

Foundation and Early Years (1981–1992):

Rubber King started operations in 1981 with a vision to manufacture reliable tyre products for Indian consumers. In its initial years, the company focused on small-scale production and gradually built its reputation for quality and consistency.

Expansion into Tube Manufacturing (1993):

A significant milestone came in 1993, when Rubber King established its dedicated tube plant, marking its entry into the inner tube segment. This diversification helped the company tap into a growing demand for butyl inner tubes in both two-wheelers and heavy vehicles.

Growth and Diversification (2005 onwards):

In 2005, the company expanded its infrastructure with Unit IV in Ahmedabad, which became a hub for advanced production and testing facilities. Over time, Rubber King diversified its product range to include solid tyres, curing bladders, and flaps, catering to both OEM (Original Equipment Manufacturer) and replacement markets.

Modernization and Global Reach (2020 – Present):

In 2020, Rubber King established a state-of-the-art RK-IV Tube Plant, equipped with modern machinery and automated systems for large-scale, high-precision production. Today, the company exports to several international markets, showcasing its global competitiveness.

Present Status:

Rubber King is an ISO 9001 and IATF certified company, ensuring compliance with international standards of quality and safety. Its products are widely accepted in India and abroad due to superior performance, durability, and reliability. The company is driven by continuous R&D, with a dedicated laboratory for testing mechanical and rheological properties of rubber, ensuring every product meets stringent customer requirements.

With over four decades of experience, Rubber King has transformed from a small-scale manufacturer into a global player in the tyre and tube industry, demonstrating the importance of technological advancement, quality assurance, and customer-centric innovation.

MANUFACTURING OF TYRE TUBES

The manufacturing of tyre tubes is a highly specialized process that requires the precise blending of raw materials, advanced processing equipment, and strict quality control at every stage. At Rubber King Tyre Pvt. Ltd., Unit IV, the process is streamlined to ensure consistent quality, durability, and air-retention properties of the final product. The production sequence can be broadly divided into raw material selection and compounding, mixing, extrusion, tube building, vulcanization, finishing, and quality inspection.

a) Raw Materials and Compounding

The primary raw material for tube manufacturing is Butyl Rubber (IIR), chosen for its superior air impermeability, resistance to heat, and flexibility. In some cases, Chloro-butyl Rubber (CIIR) is also used to improve heat resistance and adhesion properties.

Compounding ingredients such as carbon black, zinc oxide, stearic acid, antioxidants, plasticizers, accelerators, and sulfur are carefully weighed and blended with the base rubber.

The compounding formula is designed to balance properties such as air retention, tensile strength, elasticity, abrasion resistance, and aging resistance, which are essential for the performance of tubes.

b) Mixing

The weighed ingredients are fed into an Internal Mixer (Banbury Mixer), where heat and shear forces blend the rubber with fillers and chemicals into a homogeneous compound. After initial mixing, the compound is sheeted out on a Two-Roll Mill, where operators adjust thickness and ensure uniform dispersion of ingredients.

Proper mixing is critical, as it influences both processing behavior and the end-use performance of the tube.

c) Extrusion

The mixed compound is fed into a tube extrusion machine. Through a specially designed die, the compound is extruded in the form of a continuous hollow tube profile. Cooling systems (usually water troughs) are used to stabilize the extrudate before further processing. The extruded length is cut into appropriate sizes based on tube dimensions for different vehicles (two-wheelers, passenger cars, trucks, off-road vehicles, etc.).

d) Tube Building and Splicing

The extruded tube sections are joined using splicing techniques, ensuring a seamless joint. Valves (generally made of brass stem and rubber base) are inserted into the tube at designated points. Careful workmanship at this stage ensures that the joint is smooth and strong, preventing air leakage during service.

e) Vulcanization (Curing)

The built tubes are placed into curing molds or autoclaves, where heat and pressure are applied. Sulfur cross-linking during vulcanization converts the soft, plastic-like compound into an elastic, durable product with improved strength, elasticity, and thermal resistance. Typical curing parameters involve temperatures of 160–180°C and carefully controlled cycle times, depending on tube size and thickness. During curing, the tube acquires its final shape, surface finish, and mechanical properties.

f) Finishing Operations

After curing, tubes are removed from the mold and cooled. Excess flash (extra rubber formed at the parting line) is trimmed off. Tubes undergo surface cleaning, talc or soapstone dusting, and lubrication to prevent sticking during storage. Branding and size marking are applied for identification.

g) Inspection and Testing

Each tube undergoes a 100% inflation test, where it is filled with air and submerged in water to check for pinholes, leakage, or defects.

Dimensional checks ensure that tubes conform to the required diameter, wall thickness, and weight specifications. Samples from batches are tested in the laboratory using instruments such as:

- Universal Testing Machine (UTM): For tensile strength and elongation.
- Mooney Viscometer: To monitor processing viscosity.
- Rheometer: To evaluate curing characteristics (scorch time, optimum cure, torque).
- Hardness Testers and Abrasion Testers: For durability evaluation.

h) Packing and Dispatch

After inspection, tubes are dusted with fine talc powder to prevent sticking. Tubes are folded, packed in protective covers, and boxed/cartoned for distribution. Packaging ensures protection from environmental factors like sunlight, heat, and ozone during storage and transportation.

TESTING FACILITIES

Rubber King Tyre Pvt. Ltd. has a well-equipped laboratory that plays a very important role in ensuring the quality and reliability of its products. During the visit, we observed that the company uses a variety of modern testing machines to check the performance of rubber compounds as well as the finished tyre tubes. The Universal Testing Machine (UTM) is used to measure strength and flexibility, making sure the tube can stretch and handle pressure without breaking. The Mooney Viscometer helps in checking the flow and processability of the rubber before it is shaped, while the Rheometer is used to study curing behavior so that the tubes are properly vulcanized. Apart from these, the laboratory also has equipment for hardness testing, aging tests, air leakage tests, and visual inspections. Every batch of products is checked carefully in the lab before packing, which shows the company's focus on maintaining international standards. This facility not only supports production but also helps the research and development team to improve product performance and introduce new innovations.

OBSERVATIONS AND LEARNING

The industrial visit to Rubber King Tyre Pvt. Ltd., Unit IV provided a practical understanding of the complete manufacturing cycle of tyre tubes, from raw material preparation to final inspection. Some key observations and learnings are:

1. Systematic Manufacturing Process:

The production of tyre tubes is carried out in a very organized manner, starting from raw material compounding, mixing, extrusion, splicing, vulcanization, and finishing. Each stage is monitored carefully to maintain consistency and quality.

2. Use of Advanced Machinery:

The plant is equipped with modern machines such as internal mixers, extrusion lines, curing presses, and inspection systems. Automation in certain processes ensures accuracy, efficiency, and reduction of human error.

3. Laboratory Testing and Quality Assurance:

The company follows strict quality control procedures. The laboratory is equipped with advanced instruments like UTM, Mooney Viscometer, and Rheometer. Every batch of compound and finished product is tested to ensure durability, elasticity, and safety.

4. Focus on Butyl Rubber Compounds:

The visit highlighted the importance of butyl and chloro-butyl rubbers in inner tube manufacturing due to their excellent air retention and resistance to heat and aging.

5. Health, Safety, and Work Culture:

The plant maintained a clean and disciplined environment. Workers were trained to follow safety norms, which reflects the company's concern for both product quality and employee welfare.

6. Company Growth and Global Standards:

Rubber King's continuous investment in modern technology and testing shows its commitment to meeting international standards. The company not only serves the Indian market but also exports to many countries, showing its strong global presence.

7. Practical Exposure for Students:

The visit helped in connecting classroom knowledge with industrial practices. Concepts such as compounding, vulcanization, rheology, and testing were clearly understood through real-life applications.

RUBBER KING: PRODUCTS AND APPLICATIONS

Rubber King Tyre Pvt. Ltd. is a diversified manufacturer in the tyre and tube industry, producing a wide range of products that serve multiple sectors, from automotive transportation to industrial machinery. Their portfolio is designed to meet the needs of both Original Equipment Manufacturers (OEMs) and the replacement market, ensuring durability, reliability, and international quality standards.

1. Butyl Inner Tubes

Description:

Rubber King produces high-quality butyl and chloro-butyl inner tubes for two-wheelers, passenger cars, trucks, buses, agricultural vehicles, and off-the-road (OTR) vehicles. These tubes are known for excellent air retention, flexibility, and resistance to heat and aging.

Applications:

- Two-Wheelers (Motorcycles, Scooters, Mopeds)
- Passenger Cars & SUVs
- Commercial Vehicles (Trucks, Buses, Trailers)
- Agricultural Tyres (Tractors, Harvesters)
- Off-the-Road Vehicles (Earthmovers, Mining Trucks, Construction Equipment)

2. Curing Bladders

Description:

Rubber King manufactures curing bladders, which are specialized rubber components used in the tyre industry during the vulcanization process. These bladders expand and press the green tyre against the mold, ensuring proper curing and tread pattern formation.

Applications:

- Essential equipment for tyre manufacturers (both radial and bias tyres).
- Used in tyre curing presses for consistent shape, strength, and finish.

5. Pneumatic Tyres (Specialty Range)

Description:

Apart from tubes, Rubber King also manufactures pneumatic tyres for industrial applications. These tyres provide shock absorption, traction, and comfort in heavy-duty environments.

These pneumatic tyres have a strong nylon casing to increase resistance to punctures and improve overall strength.

Sidewall lettering is made unique — visible at first glance — for easy brand recognition.

They use special tread compounds designed for better tread mass distribution, which helps optimize tread wear and performance.

Suitable for a variety of tyre applications: passenger car tyres, light trucks, agricultural tyres, etc.

Applications:

- Small Industrial Vehicles
- Specialty Agricultural Equipment
- Light Commercial Utility Vehicle
- Passenger Cars & Light Vehicles — ensuring comfort, road grip, and durability.
- Truck & Bus Tyres — for heavier loads and longer distances, requiring strengthened construction.
- Agricultural / Implement / Farm Tyres — larger sizes with designs suited for soil and field work.

CONCLUSION

The industrial visit to Rubber King Tyre Pvt. Ltd., Unit IV, was a highly enriching experience for the students of Rubber Technology. It provided valuable insights into the practical aspects of tyre tube manufacturing and testing. By observing the complete production line, students learned how raw rubber compounds are transformed into high-quality finished tubes that meet global standards.

The exposure to advanced laboratory facilities deepened the understanding of how instruments like the Universal Testing Machine, Mooney Viscometer, and Rheometer play a crucial role in ensuring product reliability. The visit also highlighted the significance of butyl rubber in tube manufacturing, the importance of quality control, and the role of research and development in continuous improvement.

Overall, the visit not only strengthened technical knowledge but also gave an appreciation of industrial discipline, safety, and teamwork. Such experiences are essential in bridging the gap between theoretical studies and real-world industrial practices. The students gained confidence, motivation, and clarity about the role of Rubber Technology in supporting the automotive and industrial sectors.

This visit can be considered a successful learning activity, as it provided exposure to both manufacturing excellence and quality assurance practices, preparing students for future professional challenges in the rubber industry.

IMAGE GALLERY OF VISIT


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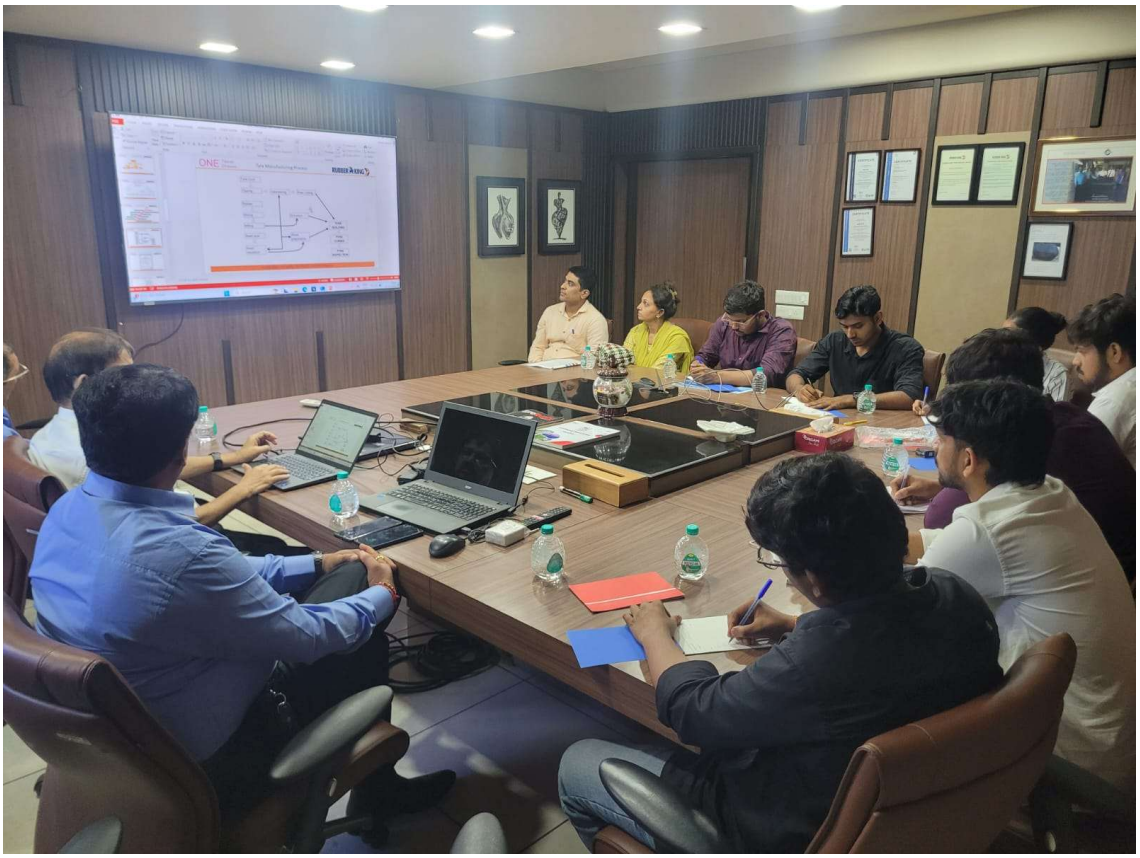

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