

# OCCUPATIONAL HEALTH AND SAFETY MEASURES WITH REFERENCE TO TYRE INDUSTRY: THEORY PROSPECTIVE

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## Abstract

Health and safety in manufacturing industries are important to protect the working conditions and overall safety and health of employees in the workplace. Rubber and tyre manufacturing industries with large manufacturing processes due to these various processes and working with rubber leads to high risk, health and safety hazards like Physical, Chemical and Biological etc. The rubber and tyre industries major issues and challenges are proper handling, storage and transport of chemical substances with safe and without risks to health, controlling the risks from fire and hazard identification and corrective action to minimize the risk or avoid risk. Many effective measures of OHS regulations exist to avoid hazards and risks but still rubber and tyre industries are facing serious issues and challenges. The present paper emphasizes Occupational health and safety measures, issues and challenges in rubber and tyre manufacturing industries. Basic element Occupational health and safety, the manufacturing process and occupational health and safety aspects, safety measures in tyre manufacturing, role of employer in occupational health and safety, role of employees in OHS, common safety measures in tyre industries, SWOT analysis of OHSE, challenges faced by the tyre industries during Covid-19, major changes in human resource policies towards occupational health and safety.

**Keywords:** Hazards, Health and safety, Preventive Measures, Rubber and Tyre industries.

## Introduction

The automotive sector in India employed over 1.36 million people in the financial year 2018. Tyre Industry turnover is 13,500 crores per annum and India has top 7 large tyre companies accounting for 85% of total tyre production. According to the Occupational Health and Safety act 1994 providing a safe workplace to their employees and other related persons is rendered as the general duty of employers. Tyre manufacturing industries include various operations like raw material handling, mixing, weighing, milling, extruding, assembly,

calendaring, curing, finishing and inspection due to large process occupational risk and hazards are high. Rubber and tyre industries are full of chemicals and its substances and rubber based products lead to heat and noise,

Slips and trips are hazardous and dangerous and can cause serious injury and even kill people who are exposed. WHO (World health Organizations) IARC (International agency for research on cancer concluded in 2012 the diesel engine exhaust is a group 1 carcinogenic to humans. Tyre and rubber product manufacturing workers' adverse health effects

cannot be imputed to a single chemical or group of chemicals because chemical formulations change frequently. Excess deaths from bladder, lung, stomach, hematopoietic and cancers have occurred among manufacturing workers who are exposed.

### **TYRE MANUFACTURING PROCESS: OHS ASPECTS**

Tyre manufacturing process includes various steps: Tyre and rubber manufacturing workers adverse health effects cannot be imputed to a single chemical or group of chemicals because chemical formulations change frequently. Excess deaths from bladder, lung, stomach, hematopoietic and other cancers have occurred among tyre and rubber manufacturing workers who involved in the manufacturing process.

#### **Compounding and Banbury mixing:**

A ban bury mixer is a process of compounding the rubber stock, carbon black other chemical ingredients to make a homogeneous rubber material. Hundreds of components are amalgamated to form rubber utilized for tyre manufacturing. The elements include compounds which act as antioxidants, accelerators, extenders, vulcanizes, plasticizers, pigments, most components are uncontrollable and may not have had extensive toxicological and evaluations. Generally banbury operator occupational exposure to raw materials became reduced by improvements in engineering and administrative control. Still concern remains due to the nature and quality of elements which make up the exposure.

#### **Milling:**

After Banbury mixing cycle shaping of rubber starts in the milling process, rubber is placed onto a drop mill. In this process shapes the rubber into long and flat strips by forcing it between two set rolls rotating in different directions at different speeds. Mill operators are usually concerned with safety hazards corresponding with the open operation of the turning rolls. Operators may get caught in the mill and also exposed to heat and noise.

#### **Extruding, calendaring and Component Assembly:**

This process continues to shape rubber. Extruding and calendaring operators may be exposed to solvents, talc and also exposed to highly repetitive task, there is chances of hand gets broken. Tyre assembly machine contains a rotating drum; this is a highly automated process. In this process tyre builders and other workers are exposed to a number of repetitive motion operations. They are involved in lifting and handling of heavy rolls in limited space and also exposed to solvents and hexane.

#### **Curing and vulcanizing:**

This process places the green tyre into the curing press. This press exploits steam to heat or cure the green tyre. When rubber is heated in curing carcinogenic N - nitrosamines are formed at any level this exposure should be controlled as much feasible. Along with gas, dusts, fumes and vapors contaminated the work environment when rubber is heated and vulcanized or cured.

#### **Inspection and finishing:**

After curing and finishing operations inspection should be done before the tyre is stored or shipped. One of the major hazards is that workers are exposed to cured rubber dust while handling cured tyres. This contributes to respiratory ailments in workers in the finishing area.

### **SAFETY MEASURES IN TYRE MANUFACTURING:**

Rubber and tyre industries have a well established commitment to assure health and safety in the working environment with the involvement of employer trade unions and the health and safety executives.

Emerging covid-19 measures: In India have taken precautionary measures against the Virus and all countries continue to make efforts to avoid human contact by taking precautionary measures, Covid - 19 preventive measures are vaccinations, screening, social distancing, mask, sanitizer and alignments in the work

station, so it's all citizens responsibility to fight against Covid – 19 by rehearse self hygiene and social distancing.

Personal Protective Equipments (PPEs): Chemical protection and safety clothing, Nitrile gloves, chemical resistance shirts, face shields, respiratory protective equipment, high protection equipments are safety glasses and face shield and goggles, flame resistance equipments are shirts, overalls and pants, foot and head protection equipment are shoes/boots and helmets, hand and arm protection gloves are mechanical gloves, resistant gloves, tactical gloves to protect hands from cuts and abrasions and impact resistant gloves, welding protection equipment are welding gloves and cutting glass, goggles and face protection shield.

Safety team:

Safety team in an organization plays a crucial role to bring a safer working environment. In tyre industries safety teams and officers are very important to identify safety hazards/risk assessment, investigate them thoroughly and avoid them before someone gets hurt. Safety team is a group of internal employees and the safety officer is the head of the department. They make sure that everyone is following safe work practices and doing their jobs in a safe manner. Identify & diseases hazards handling and control measures, conduct ongoing review of operations and evaluate & record hazards, establishment of procedures & practices, verify that all workers following all OSHA regulations in the company.

Training of OSHA and make sure that the health and safety environment policies are followed by all employees, investigation on workplace accidents, injuries & report to the proper authorities. Safety teams and officers generally have a technical degree such as mechanical engineering, structural engineering and safety practices, however they can effectively look out for their employees and prevent any major safety issues, safety officers can prevent accidents or injuries of employees by maintaining a safe and healthy work environment.

Revised government policy in 2009:

The government of India under ministry of labor and employment on 20th February 2009 had declared the national policy on health, safety and environment network place (NPSHEW) to enact a preventive health and practice in the country through elimination of the work related injuries, fatalities, disasters, diseases and to strengthen the well being of employees and the society.

Risk measures at work place:

OHS laws and regulations by every sector are compulsory at workplace but these health & safety measures are distinct in every industry. Tyre manufacturing industries have a set of health and safety measures to prevent risk from hazards: such as risk assessment by identifying and evaluation of hazards, sufficient training on usage of equipment to prevent and extinguish fires and deal with other calamities, sufficient first aid equipment and assistance, demo video for emergency evacuation, sufficient training on usage of machineries and tools in a safe manner, adequate facilities for proper exhaustion/emissions of fumes, dust and other impurities at the workplace are very important measures.

Adequate lighting facilities and regular maintenance of machineries and equipment to ensure safe operation, proper medical attention for injured employees, adequate ventilations facilities , good design, regularly maintained and inspection of internal mixers, bulk powder handling equipment and other machineries, using dust suppresses chemicals to avoid dust, maintenance of an effective temperature control process, alarm and beeping sound facilities with good working condition when crisis situation arises at the workplace and effective fire prevention measures, regular safety training programs, labeling of danger symbols and signs boards to avoid accidents, labeling of safety data sheets (SDS) on hazardous substances and dangerous goods to reduce risk, clearly marked and accessible fire escape routes, body bar guard to all machines, talc and solvent exposure control chemical exposures,

gasses and vapors, effective preventive measures to avoid accidents from manual handling, slips and trips, good working condition, effective health and safety measures being adhered to the OHS rule and regulations, responsibilities of both employees and employers.

#### Role of Employer in OHS:

Employers are responsible to protect health and safety of employees at the workplace by providing and maintaining a good working environment with safe and without risks to health: Employers must consult with employees regarding the health and safety issues.

Especially when identifying or evaluating the hazards or risks and determining the controlling risks, deciding on the sufficiency of facilities for employees, evolving procedures to resolve OHS issues. Evolving procedures are: Employee consultation, information and training to employees, monitoring employees' health and working conditions and exchange of information with workers about their health, safety and welfare, giving opportunities to express their views and deciding the membership of health and safety committees.

Employers are responsible to set up a representative group and Health and safety representatives, health and safety committees to help employees and employers work together to bring about a safer workplace by carrying out and reviewing OHS measures, rules and procedures, employers are also must try to resolve the issues through their HSR (Health and safety representatives) using their agreed internal procedures, employer must prohibit the workplace discrimination and employers must permit the entry of authorized representatives of registered employee organizations (ARREO) to inspect substances, plants or things at the workplace.

**Role of Employees in OHS:** The Occupational health and safety act 2004 discussed about role or duties of employees towards occupational health and safety: Section 25 specifies. Workers must take at least reasonable care for their own health and safety, like should not be busy in behavior that could harm people,

should not take short cuts which could decrease the level of safety, cooperation with employers to comply with OHS requirements; Employees should follow: the workplace safety policies and procedures, instructions and advice, employees should attend health and safety training, workers must use equipment provided by the employer such as personal protective equipment or work or stations such as helmets, safety boots, hearing protection or high visibility vests, coveralls, shirts, aprons, face shield, gloves, goggles etc. employees can help to avoid risks at workplace health and safety by notifying the employer of any hazards, employees should not remove any machine guards or other safety devices.

#### SWOT Analysis of OHSE:

##### Strengths:

□ OHS at work ensures a safe working environment and improves workplace safety and reduces workplace injuries and illness at work and OHS measures build awareness about Occupational health and safety.

□ OHS saves and reduces the cost of the company and lack of personal turnover and increase employees' physical and mental wellbeing and OHS improves health and safety performance and improves business efficiency.

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□ OHS improves confidence in employees and employers and increases employee satisfaction and it will help to improve workers relations, morale and productivity.

□ OHS boost corporate and social responsibilities and companies can be morale competitive and legal compliance.

##### Weakness:

□ Lack of legal knowledge and awareness in OHS and many companies are not complying with OHS legislations and regulatory framework and compliance are not so stringent in developing countries and OHS

regulations still have not evolved in many industries.

- Industry thinks to make profit in terms of money, rather than workers safety, it is difficult to prioritize first and Shortage of qualified Health and safety officers.

- Non - disclosure of a near miss report, many industries fail to encourage reporting such incidents, leading to injury, fatalities and other loss and hesitate to report unsafe behavior and unsafe situations to proper authorities.

- Lack of all employees' involvement and disregard for PPEs, employee negligence in OHS and lack of motivation and low level of workers participation in OHS procedures and lack of training and education.

#### Opportunities:

- Adoption of ISO 45001 occupational health and safety standards in Industry.

- Need to identify and assess the risks and opportunities and improving worker consultation and participation.

- Modification such as working process, alleviation of repetitive and monotonous work and Collaboration of forums to review the issues of occupational health and safety.

- Near miss incident or non-conformity investigation and corrective actions and enhancing the incident investigation process and inspection and auditing functions and maintenance of documented information relating to the risks, process and actions by the organization.

- Accomplishment of ergonomic and other occupational injury prevention - related assessment.

- Introduction of new technology and continuous improvement of the occupational health and safety culture of the industry.

#### Threats:

- Unfavorable external conditions for the implementation and challenge of

accomplishing the health and safety regulations.

- OHS comes with an associated cost to the company.

- Imposition of fines and penalties.

- Threat of reputational damage.

#### Challenges faced by Tyre industries during the Covid – 19:

There are many Occupational health and safety considerations important to the Psychological and Physical health of workers during the Covid - 19 Pandemic. Workplaces are important sites of transmission for Covid - 19. Hence controlling the spread of Covid - 19 is essential. Workers and employers should support minimizing the risk of exposure by adopting new work practices during the Covid - 19 pandemic. These fast spreading pandemic tentacles across the world and its impact on all aspects of society including the tyre industry, all automobile and component manufacturers were shuttered around the world. In FY2021 the performance and growth of the tyres industry was weak due to Covid - 19 Pandemic.

The demand for tyres has reduced from the auto sector, the price of raw materials such as rubber, crude derivatives like carbon black and synthetic rubber were increased and overall financial performance of the industry would be 12 - 14% for FY2022 lower as compared to 16.34% reported in FY2021 due to impact of Covid - 19 and higher raw material cost. The Covid - 19 Pandemic has devastated every manufacturing industry across the globe and in India the tyre industry predicts a loss of nearly 500 crore during the pandemic. Auto and tyre manufacturers closed down their production facilities. During this pandemic major tyre companies like Apollo tyre ltd, JK tyres industries, MRF limited, CEAT tyres, Michelin, Bridgestone, Nokian tyres, Goodyear tyre and rubber company etc are started to complying with the state and central government regulations to ensure safety and wellbeing of employees.

Tyre industries have taken many precautionary measures to ensure health, safety and wellbeing

of its employees. During the pandemic outbreak to maintain social distance many workers were instructed to work from home, senior management salary was cut by 25% , many tyre manufacturing plants were suspended to fight against Covid - 19 and faced supply chain disruption and difficulties with storage space. As a precautionary measure tyre industries sanctioned temporary leave to its workers, many facilities closed which has affected the lives of employees. The auto industry body; “Society of Indian automobile and component manufacturers” (SIAM) stated that during this pandemic many production facilities got shut down and faced a loss over 2,300 crore per day and with the spread of Covid - 19 Pandemic the situation has worsened for the tyre companies. Demand for tyres is anticipated to keep low even post lockdown and takes some time to get the business on track. But the industry is expected to bounce back in FY2022 with effective OHS measures, unlocking of travel restrictions across the state, rapid Covid vaccination drive and regularity in economic activities.

Major changes in Human resource management and Occupational health and safety:

Human resource management is a division of an organization that focuses on manpower management and provides direction and leadership for ensuring a health & safety working environment for employees. According to business directory health & safety are procedures and organized efforts for recognizing workplace hazards and reducing accidents and exposure to dangerous situations and substances.

Human resource management plays a crucial role in promoting workplace health and safety. It is of great relevance for human resource professionals to have a comprehensive understanding of how safe their workplaces are for employee health and safety. Human resource management is responsible to handle management commitment, leadership and accountability, they involve in policy and strategic objectives, managing manpower resources and organization documents are Critical responsibility of HR professionals and

to promote workplace health and safety they are always conscious with hazard and effective management process, planning, implementation and monitoring, auditing and review of the workplace.

- Development of Occupational health and safety policy and effective training on Occupational health and safety, establishments of Occupational health and safety statutory compliance register, which helps to evaluate and monitor the compliance of the organization to OHS regulatory/statutory requirements.

- Organizing an OHS committee including first aids, fire marshals as per the regulatory requirements, providing Occupational health and safety training programs including refresher courses, fire drills etc.

- Providing adequate safety signs such as fire point, fire exit, safety notices on use of PPEs and Employee medical examination and Human resource professionals are also responsible to establish effective safety and security metrics to determine the impacts of safety and security programs and practices that contribute to the business, integrating occupational health and safety in the employee's induction process.

- Implementation of ISO45001 standards for OHS management administered and implemented the safety program and adequate monitoring and updating of a safety program and build awareness of health & safety benefits and importance of health and safety policies and procedures and its impact on co - workers and each individual employee in a company, and proactive safety culture, training and development to prevent injuries, incidents and other issues, and inspections, site analysis, employee's suggestion, making workers healthy and safe a core organizational value. Human resource professionals are becoming increasingly responsible for organization safety and security matters such as OSH act compliance, policies and procedures for protecting trade secrets, the risk of violence in the workplace, safety program development and general workplace access.

Important metrics may include: Injuries and illness rates, worker's compensation incidence rates and cost per employee, safety and security team initiative completion rate, worker's compensation severity rate, compliance training, observation of safety behavior and safety and security committee activities, near-miss responses, trend analysis and six - sigma. Metrics can demonstrate the accident prevention and associated investments, security risk reduction are having a positive impact on the business. Human resource risk management and its consequences on workplace safety and security means evaluating operational, strategic, employee and compliance related risks is a broad process and involves determining how best to handle the identified risks and their potential impact and conceive strategies to control exposures. Human resource professionals responsible to face some specific risk issues for workplace safety and security include environmental health, communicable disease prevention (Pandemic viruses - Covid 19) and violence.

Human resource professionals are not expected to acknowledge all the technical aspects of OHS, they can play an important role in communicating, administering, championing and facilitating the process. The first step in establishing effective Occupational health and safety practices is awareness, without awareness both employees and employers will not be able to act successfully to ensure proactive health and safety in the workplace. Hence it is important to continuous improvements of best practices to make more individuals aware of their Occupational health and safety rights and responsibility.

### **CRITICAL ILLNESS AND DISEASES IN TYRE INDUSTRIES:**

Occupational health and safety measures in tyre manufacturing facilities have always remained and continue to be of the extreme importance. But still rubber and tyre industries workers are facing major illness or diseases due to workplace exposures and excess mortality from stomach, lung, bladder, hematopoietic and

other cancers. Specific chemicals cannot be attributed; manual handling is the biggest cause around 40% of reportable accidents in the tyre and rubber industries, hit by moving or falling objects by heavy loads including tyres and inadequate security of loads can cause serious injuries and fatalities, serious fatalities and injuries by slips and trips, rubber dust and fumes, risk of permanent tinnitus or hearing loss, physical and psychological stress because of repeated exposure to loud noise in tyre manufacturing industries, risk of fires at sites of storage, handling and treatment of rubber based product, shredded and crumbed tyres to risk of human health and life, exposure to fumes, rubber dust, solvents, toxic substances, vapor, chemical reactions and more volatile chemicals.

### **Conclusion:**

Issues and challenges in tyre manufacturing industries are accepted due to chances of various exposures. However both employees and employers including the safety team, HR management, unions, and government are responsible for promoting a healthy and safe workplace. The present study focuses on Occupational health and safety measures, issues and challenges, roles and responsibilities of authorized departments in maintaining a hazard free working environment. The continuous improvements and technological development in manufacturing process and at workplace with involvement of top management, HR professionals, safety team, policies and practices, OHS rule and regulations; Tyre industries effectively facing the issues and challenges to protect their workers health and safety at workplace. This study emphasizes SWOT analysis, Pros and cons, challenges and issues of tyre manufacturing industries.

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