The Academic
International Journal of Multidisciplinary Research

An Online Peer Reviewed / Refereed Journal
Volume 3 | Issue 12 | December 2025
ISSN: 2583-973X (Online)
Website: www.theacademic.in

Occupational Hazards and Safety Interventions: Evidence from Selected Factories

Mr Syed Babu HB

M.Com Co-ordinator, Sri Siddhartha First Grade College, Tumkur, Email: syedbabuhb@gmail.com

Dr. Siraj Basha R

Assistant Professor, Dept. of Management, Karnataka State Open University

Email: sirajbasha.pg@gmail.com

DOI : https://doi.org/ 10.5281/zenodo.18229519

ARTICLE DETAILS

Research Paper

Accepted: 21-12-2025

Published: 10-01-2026

Keywords:

Industrial accidents, safety measures, small-scale industries, workplace safety, Tumakuru District, occupational health, OSH Code 2020

ABSTRACT

Industrial accidents pose significant risks to workers, productivity, and organizational sustainability, particularly in small-scale factories. This study investigates the **types of accidents** and **safety measures** adopted by **ten selected small-scale industries** in **Tumakuru District, Karnataka**. A descriptive research design was employed, with **200 respondents** comprising employees and management staff. Data were collected using structured questionnaires, interviews, and observations of safety practices, and analyzed using descriptive statistics such as percentages and mean values. The study reveals that **mechanical injuries** are the most common type of accident, while awareness of personal protective equipment (PPE) and statutory safety regulations, including the OSH Code, 2020, is moderate. Gaps were identified in periodic safety training, emergency preparedness, and formal hazard reporting systems. Factories with active management involvement and safety committees demonstrated better compliance and lower accident rates. Based on these findings, the study suggests **regular safety training, strengthened PPE usage, systematic safety audits, emergency drills, and enhanced management commitment** to cultivate a strong safety culture. The study provides valuable insights

for policymakers, industry managers, and safety professionals aiming to reduce workplace accidents and promote sustainable industrial growth in the region.

Introduction:

Human resource management is needed in every organization that is interested in Growing, Stabilizing, Diversifying, Renewing, and developing, become more effective in improving its system and services, to change and become more dynamic playing leadership roles. Unless the valuable human resources is properly mustered, trained and developed, organization effectiveness would not be achieved. Human resource management has emerged as the most spectacular field of management in India. Management is the process of getting things done with, and through other people. The management process includes Planning, Organizing, Directing, Leading, and controlling, activities to accomplish organizational objectives.

For every twenty seconds of working minutes of every hour throughout the world someone dies as a result of an industrial accident this was how the seriousness of industrial accidents described by the director general of the British council. In his message of good wishes to the Seventh National Conference on industrial safety and health organized by the national safety council, India.

In industry the safety programs are common. One should be aware, nevertheless that industry is not the only area where safety programming is found or is needed. Safety began as result of occupational injuries occurring at the time. It continues to be prominently associated with the hazard control problems found in industry.

Basic safety programming are organizing for achievement, detail given about the operating plan, inspecting operations using guards and protective devices as accost resort and providing education and training to employees. Safety is acknowledged management responsibility. Admittedly everyone has responsibility for their own safety, as well as that of other whom their actions may affect.

Meaning and Concept of Safety Measures:

Safety measures refer to the set of preventive actions, protective equipment, procedures, and systems designed to minimize the risk of accidents and ensure the physical and mental well-being of employees at the workplace. They encompass engineering controls, administrative practices, personal protective equipment (PPE), emergency preparedness, and continuous training of workers. According to the

Factories Act, 1948, and the Occupational Safety, Health and Working Conditions (OSH) Code, 2020, safety is defined as a state in which risks to persons, property, and the environment are reduced to an acceptable level through systematic identification, assessment, and control of hazards. Thus, safety measures go beyond compliance; they constitute a proactive strategy for risk management and sustainable industrial growth.

Importance of Safety Measures in Factories:

The importance of safety measures in factories can be understood at multiple levels. First, they safeguard the health and life of workers, who are the backbone of any industrial unit. Second, they protect employers from legal penalties, compensation claims, and reputational damage. Third, well-implemented safety programs reduce downtime caused by accidents, thereby improving productivity and efficiency. Studies have consistently shown that organisations investing in safety culture witness higher employee satisfaction, reduced absenteeism, and improved operational performance. In the broader sense, safety measures also align with national development goals by reducing the economic burden of occupational injuries and fostering a responsible industrial ecosystem.

Safety Measures in Different Organisations:

Different types of organisations adopt safety measures depending on the nature of their operations, level of hazard exposure, and statutory requirements:

- **Manufacturing and Engineering Industries**: Emphasis is placed on machine guarding, lock-out/tag-out procedures, use of PPE (helmets, gloves, goggles, earplugs), proper ventilation, and regular maintenance of equipment.
- **Chemical and Hazardous Process Industries**: Special precautions include hazard communication, storage and handling protocols for chemicals, installation of gas detectors, firefighting systems, and compliance with Hazard Analysis and Critical Control Point (HACCP) or HAZOP standards.
- **Construction Industry**: Safety harnesses, scaffolding standards, fall-protection equipment, site demarcation, and safety signage are critical.
- **Textile and Small-scale Industries**: Focus lies on ergonomics, dust and noise control, provision of first-aid, and training on handling minor mechanical equipment.

- **IT and Service Organisations**: Though accident risks are relatively lower, measures include ergonomic workplace design, fire safety, electrical safety, and occupational health awareness.

These examples indicate that while the intensity of safety measures differs across sectors, the underlying objective remains the same - to prevent accidents, protect workers, and ensure business continuity.

Review of Literature:

1. **Unnikrishnan, S., & Sane, A. (2015)** – *Safety management practices in small and medium enterprises in India*. *Safety Science, 75*, 123–130.

   This study examines safety management systems in Indian SMEs, highlighting gaps in training, PPE use, and hazard reporting. It provides a model for assessing factory-level safety practices in your study.

2. **Vinodkumar, M. N., & Bhasi, M. (2009)** – *Safety climate factors and its relationship with accidents in the chemical industry in Kerala, India. Journal of Loss Prevention in the Process Industries, 22*(3), 327–333.

   Investigates how safety climate (worker perception, management commitment) affects accident rates; relevant for understanding behavioural factors in Tumakuru factories.

3. **Vinodkumar, M. N., & Bhasi, M. (2010)** – *Safety management practices and safety behaviour in chemical process industries. Accident Analysis & Prevention, 42*(6), 2084–2092.

   Highlights effectiveness of safety management systems, training, and audits; provides a framework to evaluate compliance in local factories.

4. **Burke, M. J., Sarpy, S. A., Smith-Crowe, K., et al. (2006)** – *Relative effectiveness of worker safety and health training methods. American Journal of Public Health, 96*(2), 315–324.

   Reviews training approaches and their impact on worker knowledge and behavior; useful for assessing employee awareness in your study.

5. **Yadav, S. S., et al. (2019)** – *How safe are industries in India? Ascertaining occupational injuries using capture–recapture methods. International Journal of Occupational and Environmental Health, 25*(1), 44–52.

Highlights under-reporting of industrial accidents in India, suggesting triangulation of data sources for accurate assessment.

6. **Saha, R. K., et al. (2018)** – *Occupational health in India: Current status and challenges. Indian Journal of Occupational and Environmental Medicine, 22*(1), 1–8.

   Provides an overview of occupational health policies, hazards, and regulatory gaps; useful for linking your findings to national safety frameworks.

7. **Directorate General of Factory Advice Services & Labour Institutes (DGFASLI, 2023)** – *Annual Report on Industrial Safety and Health in Factories.*

   Presents national-level statistics and guidelines for occupational safety, serving as a benchmark for your local study.

8. **Karnataka State Disaster Management Authority (KSDMA, 2019)** – *Tumkur District Disaster Management Plan (DDMP).*

   Identifies industrial hazards in Tumakuru and suggests risk mitigation strategies; provides context for local relevance of your study.

9. **Mutegi, T. M., et al. (2023)** – *Workplace safety and employee productivity: Evidence from manufacturing. Cogent Business & Management*.

   Demonstrates the link between safety practices and productivity outcomes; useful to justify the importance of implementing safety measures in factories.

10. **Noh, J. (2022)** – *The impact of corporate culture on industrial accidents in high-risk industries. Safety Science*.

    Shows that management commitment and organizational culture significantly influence accident rates; reinforces the need to assess both management and worker perspectives.

Objectives of the Study:

1. To examine the types and frequency of accidents occurring in selected factories within Tumakuru District.
2. To analyze the safety measures currently adopted by these factories for preventing workplace accidents.

3. To assess the awareness and compliance level of workers and management regarding safety practices and legal requirements.
4. To provide suitable suggestions for strengthening occupational safety measures and reducing accidents in the industrial sector of Tumakuru District.

Scope of the Study:

The present study focuses on assessing industrial accidents and the safety measures adopted by selected factories within Tumakuru District, Karnataka. The research is geographically limited to the Tumkur region and encompasses ten small-scale industries situated in and around the district. By concentrating on small-scale units, the study seeks to highlight both the challenges and best practices related to workplace safety in industries that often face resource and infrastructure constraints.

The study is designed to be conducted over a period of two months, during which data will be collected through employee questionnaires, management interviews, and inspection of factory safety records. The findings are expected to provide insights into the types and frequency of workplace accidents, the level of compliance with statutory safety norms, and the effectiveness of preventive measures implemented. While the study is localized to a specific district and a limited number of industries, the results will offer valuable guidance for managers, policymakers, and safety professionals aiming to improve occupational safety practices in similar small-scale industrial settings across the region.

Research Methodology:

- **Research Design:** Descriptive study to examine industrial accidents and safety measures.
- **Area of Study:** Ten small-scale factories in and around Tumakuru District, Karnataka.
- **Sample Size:** 200 respondents (employees and managers).
- **Sampling Technique:** Purposive sampling to select respondents with exposure to safety practices.
- **Data Collection Methods:**
    - Structured questionnaires for employees and managers.
    - Semi-structured interviews with management.
    - Observation of safety equipment, signage, and compliance.

- Secondary data from factory records and literature review.

- **Duration of Study:** Two months.
- **Data Analysis:** Descriptive statistics (percentages, mean values) and presentation through tables, charts, and graphs.

Table 1: Distribution of Respondents' Perception of the Most Common Type of Accidents in Selected Factories:

Options	Frequency (n=200)	Percentage (%)
a) Electrical shocks	20	10%
b) Mechanical injuries	130	65%
c) Chemical burns	30	15%
d) Fire accidents	20	10%

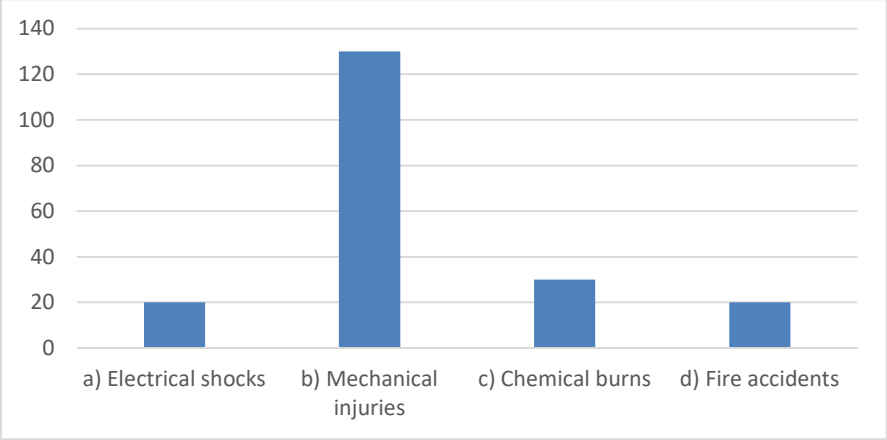


Table 2: Respondents' Understanding of the Primary Purpose of Personal Protective Equipment (PPE);

Options	Frequency (n=200)	Percentage (%)
a) Increase productivity	15	7.5%
b) Reduce workplace hazards	150	75%
c) Lower production cost	20	10%
d) Improve worker morale	15	7.5%

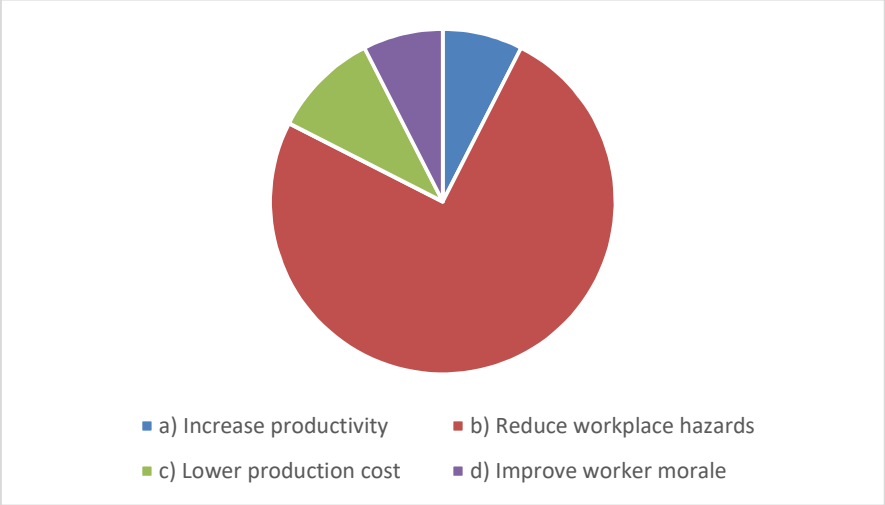
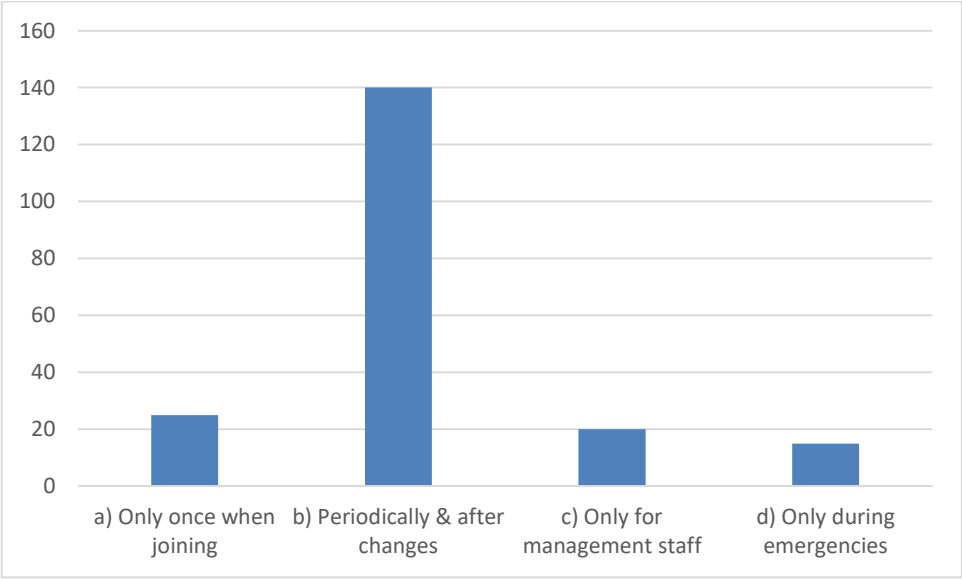


Table 3: Respondents' Views on Frequency of Safety Training in Factories:

Options	Frequency (n=200)	Percentage (%)
a) Only once when joining	25	12.5%
b) Periodically & after changes	140	70%
c) Only for management staff	20	10%
d) Only during emergencies	15	7.5%



Findings

- Majority of respondents (65%) reported that mechanical injuries are the most common type of accidents in small-scale factories.
- 75% of respondents understood that personal protective equipment reduces workplace hazards, indicating moderate awareness among workers.
- 70% of respondents agreed that safety training should be conducted periodically and after process changes; however, some factories conduct training irregularly.
- 65% of respondents were aware of the OSH Code, 2020, but a significant portion (35%) had limited knowledge about statutory safety requirements.
- Many workers reported lack of a formal system for reporting minor accidents or near-misses.
- Observation revealed that only some factories conduct regular fire drills, and emergency exits/signage were not consistently maintained.
- Factories with active safety committees and regular audits had lower accident frequency compared to those with limited management involvement.
- Workers who actively followed safety protocols experienced fewer accidents, highlighting the role of behavioral safety practices.

Conclusion:

The study reveals that industrial accidents remain a significant concern in small-scale factories within Tumakuru District, with mechanical injuries being the most frequent type. While many employees are aware of personal protective equipment and safety protocols, gaps exist in training, hazard reporting, and emergency preparedness. Factories with proactive management and a strong safety culture demonstrate lower accident rates, emphasizing the importance of both structural and behavioral safety measures. The findings underscore the need for regular safety audits, periodic training, and strict adherence to statutory regulations to prevent workplace accidents. By implementing the suggested measures, small-scale factories can not only safeguard the health and well-being of employees but also enhance operational efficiency, reduce production downtime, and promote sustainable industrial growth in the region.

Suggestions:

- Conduct regular and refresher safety training programs for all employees, including new joiners and management staff.
- Ensure proper availability and mandatory use of personal protective equipment (helmets, gloves, goggles, safety shoes).
- Implement systematic safety audits to identify hazards and enforce corrective measures promptly.
- Conduct fire drills at least twice a year and maintain clear emergency exits and signage.
- Establish a simple, formal mechanism for reporting accidents, near-misses, and unsafe conditions.
- Encourage factory management to actively participate in safety committees and promote a culture of safety.
- Organize workshops to increase safety awareness and promote safe working practices among employees.
- Factories should strictly adhere to provisions under the OSH Code, 2020 and Factories Act, 1948.
- Introduce basic engineering controls like machine guards, ventilation systems, and proper storage for chemicals to reduce accidents.
- Regularly monitor accident trends and provide feedback to employees and management to prevent recurrence.

References:

- Burke, M. J., Sarpy, S. A., Smith-Crowe, K., Chan-Serafin, S., Salvador, R. O., & Islam, G. (2006). Relative effectiveness of worker safety and health training methods. *American Journal of Public Health, 96*(2), 315–324. https://doi.org/10.2105/AJPH.2004.059840
- Directorate General, Factory Advice Services & Labour Institutes (DGFASLI). (2023). *Annual report on industrial safety and health in factories*. Ministry of Labour and Employment, Government of India.
- Government of India. (2020). *The Occupational Safety, Health and Working Conditions Code, 2020*. Ministry of Labour and Employment. https://labour.gov.in/

- International Labour Organization. (2019). *Safety and health at the heart of the future of work*. Geneva: ILO. https://www.ilo.org/global/topics/safety-and-health-at-work/lang--en/index.htm
- Karnataka State Disaster Management Authority (KSDMA). (2019). *Tumkur district disaster management plan (DDMP)*. Government of Karnataka. https://ksdma.karnataka.gov.in/
- Saha, R. K., et al. (2018). Occupational health in India: Current status and challenges. *Indian Journal of Occupational and Environmental Medicine, 22*(1), 1–8. https://doi.org/10.4103/ijoem.IJOEM_31_18
- Unnikrishnan, S., & Sane, A. (2015). Safety management practices in small and medium enterprises in India. *Safety Science, 75*, 123–130. https://doi.org/10.1016/j.ssci.2015.02.002
- Vinodkumar, M. N., & Bhasi, M. (2009). Safety climate factors and its relationship with accidents in the chemical industry in Kerala, India. *Journal of Loss Prevention in the Process Industries, 22*(3), 327–333. https://doi.org/10.1016/j.jlp.2008.09.003
- Vinodkumar, M. N., & Bhasi, M. (2010). Safety management practices and safety behaviour in chemical process industries. *Accident Analysis & Prevention, 42*(6), 2084–2092. https://doi.org/10.1016/j.aap.2010.06.008
- Yadav, S. S., et al. (2019). How safe are industries in India? Ascertaining occupational injuries using capture–recapture methods. *International Journal of Occupational and Environmental Health, 25*(1), 44–52. https://doi.org/10.1080/10773525.2018.1555096