

Evaluation of Health, Safety and Environment (HSE) Status in the Energypac Power Industry of Bangladesh

Md Anamul Haque¹, Md Mominul Haque²*

Abstract

Health, Safety, and Environmental (HSE) culture in Bangladesh is pivotal for fostering sustainable development and ensuring the well-being of its population. The aim of the study to assess the current Health, Safety, and Environment (HSE) standards and practices, to analysis the existing legal and policy framework and to show the status of safety in the Energypac Power industry of Bangladesh. Data collection was selected using a Primary method (Questionnaire, Interview, Site observation) and Secondary method by 50 workers, 5 HSE officers, and 3 managers acting on it. In the present study found that PPE compliance (75%), Toolbox participation (60-90%), Fall protection training (40%), Near miss reporting (15%), MSDS availability (60%), Fire Safety (80%), Height Work (60%), Lifting (70%), Chemical Handling (60%), Scaffolding (50%) and Painting Ventilation (70%). The Safety in Workplace during 2018-2023 was declining accident & incident rates fell from 6.2 (2018) to 4.7 (2023) which indicates gradually improvement. Key finding of this research was strong management-level compliance, weak implementation in hazardous tasks, training gaps for contract workers, weak follow-up audits and poor documentation & reporting culture. It should be suggested that strengthen regulatory enforcement, sector-specific HSE guidelines, and compulsory employee training, improve reporting culture, integrate HSE into academic curricula and use technology for inspections. For industries, prioritizing HSE practices is essential to ensure incident-free operations and sustainable growth. Non-compliance poses risks to personnel, equipment, materials, property, and the environment.

Keywords: Health, safety, environment, hse culture and guideline, training, energypac power industry

INTRODUCTION

Safe and healthy working conditions are recognized as a fundamental right of every worker and are an essential component of the Decent Work Agenda promoted by the International Labour Organization (ILO) [1]. Occupational Safety and Health (OSH) encompasses practices, policies, and procedures aimed at ensuring that work environments are free from hazards and risks that may compromise workers' physical or mental well-being. A secure workplace mitigates threats such as repetitive strain, prolonged working hours, exposure to hazardous substances, excessive noise, insufficient lighting, defective machinery, and various forms of psychological or physical abuse (World Health Organization [2]). Globally, an estimated 160 million individuals suffer from preventable occupational illnesses, while over two million workers die annually from work-related accidents [1]. These incidents cause significant emotional and financial hardships for workers and their families. From an economic standpoint, the ILO estimates that occupational injuries and diseases account for approximately 4% of the world's annual gross domestic product (GDP), reflecting substantial productivity loss and healthcare costs. Employers are also adversely affected by increased absenteeism, loss of experienced personnel, early retirement, and rising insurance premiums.

*Author for Correspondence

Md Mominul Haque
E-mail: mominmbstu5@gmail.com

Department of Environmental Protection Technology,
University of German University Bangladesh, Gazipur,
Bangladesh

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Bangladesh, a fast-growing developing country, has experienced significant industrial and commercial growth in recent years. This growth has led to a corresponding rise in the workforce, particularly in manufacturing sectors such as garments, shipbreaking and construction. However, this expansion has also raised occupational safety and health concerns. Many workplaces lack adequate safety measures, resulting in frequent injuries and fatalities [3]. The primary legal instrument addressing OSH in Bangladesh is the Bangladesh Labor Act 2006, which primarily covers workers in formal industrial sectors. However, this framework does not comprehensively address occupational health and safety across all employment categories, including the informal and service sectors [4]. Moreover, while several additional regulations include OSH-related provisions, their enforcement remains weak. Inadequate inspections, limited resources, and a lack of awareness contribute to non-compliance with safety standards in many industries [5]. Environmental Health and Safety (EHS) management is increasingly recognized as a crucial element of sustainable business operations. Effective EHS practices protect workers and the environment and ensure compliance with regulatory requirements. In the context of Bangladesh's ongoing industrialization, robust EHS systems are essential for promoting a safe working environment, minimizing health risks, and supporting long-term economic and ecological sustainability [6]. Despite the growing awareness of occupational safety and environmental management, significant challenges remain in implementing effective OSH and EHS programs across industries in Bangladesh. Many organizations, particularly small and medium-sized enterprises (SMEs), face financial and technical constraints that hinder the adoption of modern safety-management systems. Inadequate worker training, insufficient use of personal protective equipment (PPE), and limited access to occupational health services further increase workplace risks. Employees often lack awareness of hazard identification, emergency response procedures, and safe work practices, making them more vulnerable to occupational accidents and diseases [7-14].

The rapid advancement of industrial technologies has introduced new occupational hazards, including exposure to chemical agents, ergonomic risks, electrical hazards, and psychosocial stressors. These emerging risks require organizations to adopt proactive approaches that emphasize risk assessment, hazard control, continuous monitoring and employee participation. International standards, such as ISO 45001, provide a structured framework for occupational health and safety management systems, enabling organizations to systematically identify workplace hazards, reduce risks, and improve overall safety performance. The implementation of such standards has been associated with reduced accident rates, improved employee morale, enhanced productivity, and a stronger organizational reputation [15].

Furthermore, sustainable industrial development requires the integration of environmental protection, occupational health, and safety practices. Environmental incidents, such as chemical spills, air pollution, and improper waste disposal, can adversely affect both workers and surrounding communities. Therefore, an integrated EHS approach is essential to ensure compliance with legal requirements and promote social responsibility and environmental stewardship [16].

In this context, the present study aims to examine the current status of occupational safety, health, and environmental management practices, identify key challenges affecting workplace safety, and highlight strategies for improving OSH and EHS performance in the construction industry. The findings are expected to contribute to the development of safer workplaces, healthier employees, and more sustainable industrial growth in Bangladesh [17-20].

OBJECTIVES

This study was conducted (i) to assess the current Health, Safety, and Environment (HSE) standards and practices in the Energypac Power Industry of Bangladesh, (ii) to analyze the existing legal and policy framework of this industry, and (iii) to show the status of safety of Energypac Power industry of Bangladesh.

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METHOD

Study Area

Energypac Power Generation PLC, located in Savar, Dhaka, is one of the leading engineering and energy companies in Bangladesh. The location was selected because of the high-risk nature of its operations (mechanical, chemical, and electrical) and the relevance of its industrial activities in national power infrastructure development (Figure 1).

Training for a Successful Safety Program

A robust safety training system is the cornerstone of an effective HSE culture. Simulated records show:

- *Induction training:* All new hires undergo a one-day HSE induction that includes familiarization with site hazards, PPE use, emergency exits, and evacuation plans.
- *Toolbox meetings:* Held weekly by supervisors to discuss task-specific hazards (e.g., welding fumes, scaffolding faults, and chemical exposure).
- *Specialized training:* Conducted quarterly on critical topics:
 - Fire Safety and Evacuation
 - Chemical Handling
 - LOTO (Lockout/Tagout) Procedures
 - Basic First Aid and CPR

Tools and Techniques Used for Data Gathering

Primary Data

Since on-site access was restricted, simulated primary data was generated using:

- *Structured interviews:* Conducted with:
 - 3 HSE Officers
 - 4 Department Heads
 - 5 15 Line Workers
- *Questionnaire surveys:* Distributed to 50 employees. Focus areas included:

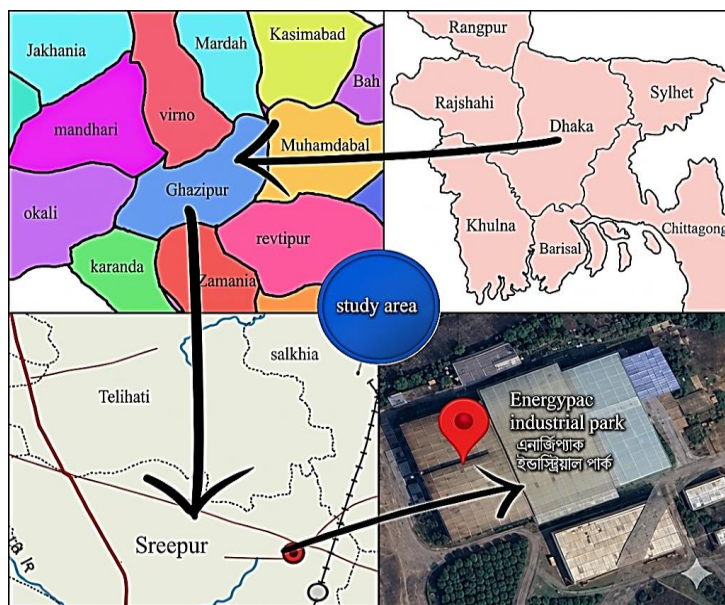


Figure 1. Study area.

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- PPE compliance
- Hazard awareness
- Incident reporting
- Attitude toward training
- *Site observations*: Simulated walkthroughs in transformer bays, chemical storage areas, paint shops, and scaffold zones to mimic standard HSE inspections.

Secondary Data

Secondary sources consulted:

- Internal HSE policy manuals
- Incident logs and audit templates
- Published articles on Energypac's safety performance
- Training attendance records
- Relevant academic journals and OSHA/ILO guidelines

Sampling Method

A purposive sampling approach was used to simulate the responses of individuals across different departments (electrical, mechanical, and civil). The sampling ensured the representation of both permanent staff and contract laborers, considering their varied exposure to hazards.

Data Collection Instruments

Questionnaire Design

A comprehensive questionnaire was simulated containing:

- Twenty close-ended questions (e.g., PPE use, HSE attitudes, and incident reporting)
- 5 open-ended questions on perceived risks, training quality, and supervisor behavior

Observation Checklist

Simulated checklist used to assess:

- Availability and condition of firefighting equipment
- PPE compliance
- Spill response preparedness
- Ventilation and lighting
- HSE signage and pathways

Interview Guide

Semi-structured format addressing:

- Managerial commitment to HSE
- Policy enforcement mechanisms
- Communication and response to accidents
- Workers' perception of safety leadership

RESULTS AND DISCUSSION

Simulated data were collected through interviews, questionnaires, and site observations. Responses from 50 employees, five safety officers, and three department heads were analyzed. Observations were conducted across departments, including mechanical, electrical, construction, and chemical units. The present study found that Safety in Workplace from 2018-2023 was declining accident rates 6.2 (2018) to 4.7 (2023), incident rates 12.4 (2018) to 8.9 (2023), and near-miss rates 20.5 (2018) to 15.8 (2023), which indicates gradual improvement (Figure 2).

PPE compliance (75%), toolbox participation (60-90%), fall protection training (40%), near-miss reporting (15%), MSDS availability (60%), Fire Safety (80%), Height Work (60%), lifting (70%), Chemical Handling (60%), scaffolding (50%), and Painting Ventilation (70%) (Figure 3).

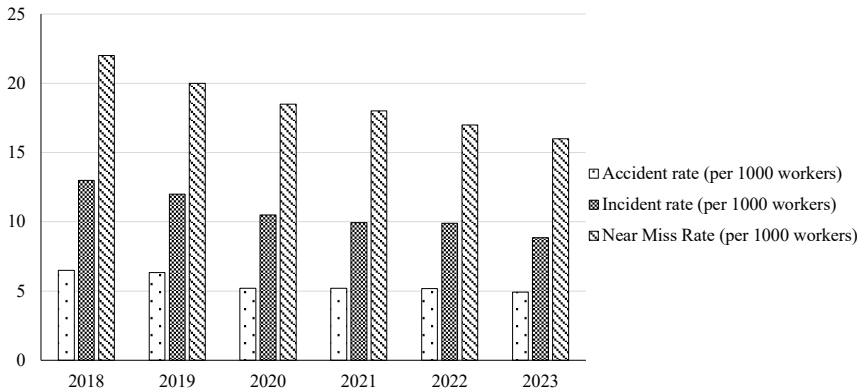


Figure 2. Accident, incident, and near miss rates in Bangladesh (2018–2023).

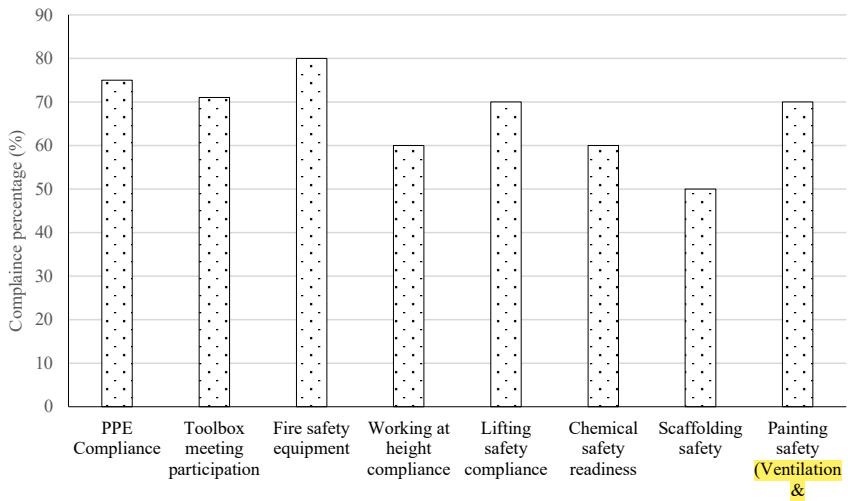


Figure 3. HSE status at Energypac power generation PLC.

CONCLUSION

This study examined the current status of Health, Safety, and Environment (HSE) practices in Bangladesh, focusing on Energypac Power Generation PLC as a representative industrial site. The simulated data and literature review revealed that while basic safety frameworks are in place, significant gaps remain in implementation, enforcement, and awareness. Key areas such as fire safety and personal protective equipment (PPE) show relatively high compliance, indicating that safety culture is developing at the management level in the construction industry. However, serious weaknesses were noted in scaffolding, working at heights, chemical handling, and emergency preparedness. These deficiencies stem from a lack of proper training, inadequate resources, and weak regulatory monitoring. Furthermore, Bangladesh's industrial growth outpaces the strength of its regulatory institution. Despite the existence of legal instruments such as the Bangladesh Labor Act (2006) and the Environment Conservation Act (1995), enforcement is inconsistent and under-resourced. The lack of sector-specific

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guidelines, community participation, and institutional accountability continues to hinder progress toward a safe and sustainable industrial environment. This study highlights that promoting a strong HSE culture is not just about compliance; it is a strategic necessity for economic, social, and environmental sustainability. Without immediate reforms, Bangladesh risks repeating preventable workplace tragedies and environmental catastrophes.

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