

EVALUATION OF OCCUPATIONAL HEALTH AND SAFETY MEASURES FOR EMPLOYEES IN THERMAL POWER PLANTS UTILIZING STATISTICAL METHODS

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Abstract: Workplace health and safety are among the most vital assets for businesses, individuals, communities, and nations. As a result, Occupational Safety and Health (OHS) programs are crucial strategies within organizations to safeguard employee well-being and safety, which in turn enhances organizational productivity (WHO, 2013). This study aimed to evaluate the influence of occupational health and safety practices on employee performance at a thermal power plant. The research was based on two theoretical frameworks: the goal-freedom alertness theory and the distractions theory. A descriptive research design was employed, focusing on some respondents from the thermal power plant. Primary data were gathered using structured questionnaires through a drop-and-pick method. The questionnaires were divided into three sections: Section A gathered background information from respondents, Section B focused on occupational health and safety practices, and Section C assessed employee performance. The data collected were analyzed using descriptive statistics, including means and standard deviations, with the assistance of the Statistical Package for the Social Sciences (SPSS) version 22. Inferential statistics were performed through regression analysis to evaluate the impact of OHS on employee performance. The results revealed that Occupational Health and Safety Practices (OHSP) have a significant effect on employee performance at the thermal power plant, as indicated by a p-value of 0.000 at a 95 percent confidence level. This suggests that the model utilized in this study was significant. Consequently, the study recommends that the thermal power plant should invest in and enhance OHSP across all organizational dimensions to achieve better employee performance.

Keyword: Occupational Health and Safety (OHS), Employee Performance, Thermal Power Plant, Workplace Safety

Introduction: Organizations have both ethical and legal obligations to establish safe and healthy workplaces that promote the overall welfare of their employees. The execution of health and safety initiatives differs according to factors such as the size of the organization, its geographical location, the demographics of its workforce, and the specific nature of the work performed. In this regard, occupational health aims to improve working conditions within the organizational framework (Dyck, 2015). Taderera (2012) asserts that occupational health is primarily focused on fostering and sustaining optimal levels of physical, social, and mental well-being among employees in their respective roles. Considering the substantial losses and challenges posed by occupational health issues and diseases across various industries, it is essential to acknowledge that occupational safety and health (OSH) has become a key priority for numerous organizations. This emphasis is propelled by the increasing frequency of workplace accidents and fatalities (World Health Organization, 2002). Naidoo and Willis (2012) outline several benefits that organizations can derive from promoting employee health and safety in the workplace. These advantages encompass improved employee performance and productivity, heightened motivation and job satisfaction, a better corporate reputation, and decreased employee turnover rates. The implementation of safety protocols within organizations is crucial for accident prevention, thereby ensuring a more efficient workflow, which is vital for enhancing both productivity and employee morale. Boyd (2013) argues that enhanced employee performance can contribute to greater organizational effectiveness. Furthermore, Boyd (2013) points out various positive results of a safe and healthy work environment, including reduced medical and insurance costs, lower employee compensation rates, and diminished direct payments that may result from disruptions in certain operational processes. Occupational Health and Safety (OHS), as defined by Amazon (2014), represents a multidisciplinary area that examines workplace interactions within organizations. Mejia (2013) highlights that Occupational Health focuses on health challenges arising from diverse working conditions and environments, which can accumulate and ultimately jeopardize employee well-being. Additionally, Nutbeam (2013) emphasizes the importance of recognizing that occupational safety aims to prevent workplace accidents and minimize health-related incidents that may pose immediate threats to employees. Mejia (2013) further notes that Occupational Safety and Health (OSH) encompasses a broad spectrum of workplace factors, primarily concentrating on the emotional and physical welfare of employees, thereby underscoring its importance. Effective management of workplace health and safety requires initiatives to reduce the frequency of job-related injuries and accidents. Health and safety are regarded as advantageous elements that acknowledge both the social and personal resources of an

organization, alongside its physical capabilities. In this regard, Raphael, Brown, Renwick, and Rootman (2014) elaborate that OSH is perceived as the ability to ensure that an organization's goals are clearly defined and accomplished by addressing the personal needs of employees in their everyday lives.

Cassio (2014) posits that employee performance is determined by the quantifiable results obtained from various tasks or activities within a specified timeframe. Furthermore, Bernadin (2012) describes employee performance as a set of behaviors that correspond with the goals of the organization or its specific departments where employees are involved. In contrast, Cassio (2014) highlights that employee performance entails nurturing a cooperative workforce that understands the organizational objectives that must be fulfilled. In recent years, many organizations have aimed to develop a culture focused on performance, which primarily includes the adoption of various strategies to improve individual contributions to the overall success of the organization (Dessler, 2014). As a result, the human resources department is responsible for ensuring employee health and safety, with the goal of motivating them, enhancing their performance, and increasing job satisfaction. Gilley et al. (2013) contend that organizations must improve their performance by incorporating workplace safety and health standards, which are crucial for achieving this goal. The objective of this research was to evaluate the influence of occupational health and safety practices on employee performance within a thermal power plant.

Literature Review: The Goal-Freedom Alertness Theory, introduced by Kerr in 1954, offers an in-depth perspective on how psychologically rewarding work environments can lead to safe work performance. It highlights that employees are more inclined to maintain safety in a positive workplace when managers and supervisors actively strive to reduce accidents, hazards, and illnesses. This theory posits that organizations that promote safe working conditions and provide increased autonomy are essential for establishing realistic and achievable goals, which subsequently improves performance quality. It emphasizes the necessity for managers to motivate their employees to undertake tasks that are feasible by enhancing their skills in problem-solving, vigilance, and proactive identification of issues (Clement, 2012). Additionally, the theory indicates that the psychological dimensions of the work environment must also cater to the emotional needs of employees to sustain their alertness, thus minimizing accidents and improving both safety and overall organizational effectiveness. The Distractions Theory, introduced by Hinze in 1997, asserts that employee safety and health are affected by situational elements that can be analyzed from two

different perspectives. The first perspective examines hazards stemming from unsafe physical environments, while the second considers the distractions that employees face from matters unrelated to their immediate tasks (Clement, 2012). This theory highlights the importance of identifying hazards as a key component in the successful implementation of strategies aimed at preventing accidents and injuries. However, research shows that workers often fail to notice a considerable number of hazards in their workplace. In this regard, Ayers (2016) contends that it is vital for employers to comprehend the factors that affect hazard recognition and employee performance as a fundamental approach to improving safety outcomes. Given the complex, distinctive, and constantly evolving nature of operations in organizations such as thermal power plants, studies have provided anecdotal evidence indicating that distractions can adversely affect employee performance, resulting in negative safety outcomes, including injuries. According to Hinze's theory, employees face an increased risk of accidents when they are sidetracked by various factors. It is crucial to acknowledge that a major drawback of this theory is its insufficient empirical validation, which accounts for the lack of revisions intended to improve this theoretical model. On the other hand, a significant advantage of the theory lies in its capacity to address the distracting and widespread stimuli that largely lead to accidents in organizations (Ayers, 2016). In this regard, the theory advocates for the establishment of safe and unobstructed work environments, initiatives that not only decrease the incidence of accidents but also boost employee performance.

2.3 Occupational Health and Safety Practices

This code of practice forms the basis for the implementation of an Occupational Health and Safety (OHS) Program within an organization and can support management throughout the development process. According to the Workers' Safety and Compensation Commission (2017), OHS practices are vital for employers with twenty or more employees. An OHS practice encompasses the formulation, execution, and documentation of policies and procedures aimed at managing OHS within the organization. To effectively oversee OHS, various practices must be embraced, including occupational health and safety surveillance, safety committees, employee assistance programs, employee wellness initiatives, health and safety policies, health inspections, employee training on OHS, and health and safety audits. The initial practice is OHS Surveillance, which entails methods for detecting occupational hazards and health-related concerns. This includes environmental assessments, medical surveillance, biological monitoring, and epidemiological techniques (Price, 2007). Organizations should establish systematic monitoring of safety and health conditions in the workplace, which involves scrutinizing work practices and environmental factors

that may impact employee health. These surveillance programs also include monitoring workers for potential hazards (ILO, 2015).

Methodology: It presented a summary of the research approach, outlined the research tools utilized, and provided an in-depth explanation of the different methods applied throughout the data gathering process.

- **Research Design:** As stated by Creswell and Clark (2012), research design functions as a systematic framework or blueprint that directs the gathering and examination of data. The current study utilized a descriptive research design, which necessitates that the researcher observe and document a phenomenon along with its features (Umar, 2008). This method was selected because it allowed the researcher to accurately portray the data and characteristics associated with the population and phenomenon being studied.
- **Population of the Study:** According to Patton (2012), the population of a study comprises a collection of events, services, groups of items, elements, and individuals being examined. This particular study focused on all employees of a thermal power plant.
- **Sample design:** According to Mugenda (2008), a sample size refers to a small group or sub-group selected from the overall population. The stratified random sampling method was employed, categorizing employees into their respective departments.

Table 1 Sample

No.	Department	No. of Employees	Sample
1.	Business Strategy	28	6
2	Infrastructure Development	379	21
3	Network Management	231	11
4	Street Lighting	217	24
5	Customer Service	35	6
6	Regional Coordination	15	4
7	Company Secretary	7	2
8	Supply Chain	31	6
9	Internal Audit	10	2
10	Human Resource and Administration	42	8

11	Finance	12	2
12	ICT	40	8
	Total	1047	210

Source: Deepnagar Thermal Power Plant, Human Resource Department 2024

➤ **Data Collection Method:** The Deepnagar Power Plant, also known as the Bhusawal Thermal Power Station, is a coal-fired energy facility situated in Deepnagar, which means 'City of Lights'. It is located around 8 kilometers from Bhusawal city in the Jalgaon district of Maharashtra, India, and is operated by MAHAGENCO. The Bhusawal Thermal Power Station has an installed capacity of 1420.00 MW. The following is an extensive summary:

- Location: Deepnagar, Jalgaon district, Maharashtra, India.
- Type: Coal-fired thermal power station
- Operator: MAHAGENCO.
- Installed Capacity: 1420.00 MW.
- Units: The Bhusawal Thermal Power Station consists of multiple units, including Bhusawal-C Thermal Power Station Unit 2 (Unit C5), Bhusawal-C Thermal Power Station Unit 1 (Unit C4), Bhusawal-B Thermal Power Station Unit 2 (Unit B3), Bhusawal-A Thermal Power Station Unit 1 (Unit A1), and Bhusawal-B Thermal Power Station Unit 1 (Unit B2), as documented by Global Energy Monitor.
- Coal Consumption: In the 2006–07 period, the Bhusawal Thermal Power Station consumed 2,400,000 tonnes of coal.
- Proximity to Ordnance Factory: The power station is located near the Ordnance Factory in Deepnagar. Coal-fired thermal power plants require substantial coal resources. For example, the Bhusawal Thermal Power Station consumed 2,400,000 tonnes of coal during the 2006-2007 timeframe. Approximately 80 percent of India's domestic coal output is designated for these thermal power plants, and coal transportation constitutes 42 percent of the total freight revenue for Indian Railways.

Data was primarily collected through the distribution of questionnaires, which were segmented into three distinct sections. The first section aimed to gather general background information about the respondents. The second section included questions pertaining to occupational health and safety practices, while the third section explored various aspects of employee performance. The

questionnaires were distributed using a drop-off and pick-up approach. Data collection took place over a week, after which the responses were compiled and prepared for analysis.

Data Analysis: The analysis of data was conducted using descriptive statistics, which encompassed standard deviation, percentages, mean values, and frequencies. Subsequently, regression analysis was employed to evaluate the impact of OHSP on employee performance. The findings were illustrated through tables and graphs.

Results: An examination of various occupational health and safety practices reveals that OHSP are actively enforced at Deepnagar Thermal Power Plant. This is corroborated by the notable and moderate levels of consensus among respondents regarding the execution of various health and safety initiatives at the facility. Therefore, it can be concluded that Deepnagar Thermal Power Plant has made considerable strides in minimizing workplace accidents, in accordance with the assertion that occupational safety is essential for preventing incidents and alleviating health risks that could threaten employees. These findings also align with the perspective that OHS practices, such as safety protocols, risk management, first aid training, and health regulations, positively influence organizational commitment. Furthermore, the analysis of different facets of employee performance indicates that all assessed performance metrics are relevant. In particular, work efficiency was rated the highest, followed by performance measures, quality of performance, and quantity of work. The results imply that employees at Deepnagar Thermal Power Plant are exhibiting commendable performance and efficiency in their roles, thereby contributing significant value to both the organization and themselves. As a result, the company should establish effective reward systems to motivate employees to enhance their performance. This is consistent with observations that employees who are willing to put in extra effort are generally more motivated and achieve better outcomes. The regression analysis model assessing the influence of Occupational Health and Safety Practices (OHSP) on employee performance at Deepnagar Thermal Power Plant reveals that OHSP significantly contributes to employee performance and can be effectively employed to predict performance levels. These findings are consistent with previous research, which demonstrated that the implementation of occupational health and safety measures positively influences employee performance, supporting the assertion that workplace health and safety standards improve employee performance, thus allowing organizations to achieve enhanced performance results.

Conclusions: In light of the findings presented, the research has reached the following conclusions: It is imperative for Deepnagar Thermal Power Plant to prioritize compliance with occupational health and safety standards, as this is vital for enhancing employee performance. Failing to promote and enforce these standards may result in a decrease in employee performance. This assertion is corroborated by the regression model analysis, which demonstrated a significant P-value, underscoring the considerable influence of occupational health and safety practices on employee performance. The research revealed that Deepnagar Thermal Power Plant has adopted a majority of occupational health and safety initiatives, acknowledging that employee performance is a continuous and adaptable process that involves all levels of staff within the organization. Although many elements of the occupational health and safety practices received high evaluations, some were rated only moderately, indicating that the company should invest resources to improve these practices. The study concluded that effective occupational health and safety programs yield significant improvements in safety, enhanced working conditions, and the implementation of preventive measures, leading to considerable human and economic advantages.

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