

**EVALUATING RELATIONSHIP BETWEEN EMPLOYEE PERFORMANCE AND
OCCUPATIONAL SAFETY MEASURES IN SOUTH EASTERN COALFIELDS LIMITED
(SECL)**

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Abstract

This study evaluates the relationship between employee performance and occupational safety measures in South Eastern Coalfields Limited (SECL), a large coal mining operation operating in a high-risk environment. Since coal mining involves significant exposure to physical hazards, effective safety procedures are essential not only to prevent accidents, but also to ensure the continued productivity of employees. Research examines how safety training, adherence to safety protocols, availability of protective equipment, and workplace safety culture affect worker efficiency, alertness, morale, and overall job performance. The findings indicate that strong work safety measures contribute to reduced accident rates, improved work confidence and better performance results. Employees who feel that their workplace is safe show higher motivation, less absenteeism and greater operational reliability. The study highlights the importance of SECLs investing in strong safety infrastructure, regular training and a proactive safety culture to maintain productivity, reduce risk and promote sustainable workforce development.

Keywords: Occupational Safety, Employee Performance, reduced accident rates, Safety Compliance and Workplace Productivity.

Introduction

Mining, by its very nature, is a hazardous industry, and the occupational risks vary significantly between underground and surface (open-cast) mining operations. In underground mining, workers operate in confined, dark, and poorly ventilated environments, often at significant depths below the surface. This exposes them to roof collapses, rockfalls, toxic gas accumulation (such as methane and carbon monoxide), and inadequate oxygen levels, all of which can result in serious injuries or fatalities. Respiratory diseases such as pneumoconiosis or "black lung disease" are also prevalent due to prolonged inhalation of coal dust in poorly ventilated spaces (DGMS, 2023). Explosions caused by gas build-up or improper blasting procedures are another major concern, making underground mining one of the most dangerous occupations globally.

Importance Of Employee Safety And Performance In Coal Mines

1. Ensuring Worker Well-being and Life Protection

Coal mining is one of the most dangerous occupations in the world. Ensuring employee safety is not just a legal or organizational responsibility—it is a moral imperative. Frequent exposure to hazardous conditions such as explosions, roof collapses, toxic gases, and heavy machinery poses serious threats to miners' lives. A strong safety culture helps in minimizing accidents, reducing injuries, and saving lives. According to the International Labour Organization (ILO), (2022) – "Coal mining remains one of the most hazardous occupations worldwide, with high fatality and injury rates due to accidents, explosions, and unsafe working conditions.

2. Improving Employee Morale and Job Satisfaction

When miners feel that their organization prioritizes their health and safety, it boosts morale and job satisfaction. Workers are more likely to stay motivated, loyal, and engaged in their duties when they know their safety is taken seriously. This sense of security leads to higher retention rates and a more stable workforce. (Chaudhary & Yadav 2019).

3. Enhancing Operational Efficiency and Productivity

Safety and performance go hand-in-hand. Safe work environments reduce downtime caused by accidents, injuries, or unsafe conditions. When workers are confident in their safety, they can focus more effectively on their tasks, leading to better output, fewer delays, and improved overall mine productivity.

4. Reducing Financial and Legal Liabilities

Unsafe work environments can lead to serious financial consequences due to compensation claims, penalties, medical expenses, and machinery damage. Ensuring safety reduces these risks and helps companies avoid legal troubles and reputational damage.

5. Compliance with Legal and Regulatory Standards

In India, mining operations are governed by stringent safety laws regulated by bodies such as the Directorate General of Mines Safety (DGMS). Maintaining high safety standards ensures compliance with legal frameworks, which is essential for license renewals and continued operations. (DGMS. 2021)

6. Building a Safety Culture

A focus on safety fosters a culture of accountability and shared responsibility. Employees become more conscious of their surroundings, report unsafe practices, and take proactive measures, which collectively contribute to long-term safety and performance improvements.

7. Supporting Sustainable Mining Practices

Employee safety is a key component of **sustainable development** in the mining sector. A safe, healthy, and productive workforce is essential for achieving **long-term sustainability goals**, including environmental responsibility and community well-being.

Coal mining is one of the most hazardous occupations globally, and India, being the second-largest coal producer, depends significantly on the sector for energy and industrial growth. In this high-risk environment, employee safety is directly linked to organizational efficiency and workforce performance. Among the subsidiaries of Coal India Limited (CIL), South Eastern Coalfields Limited (SECL) stands out as a leading contributor to coal production, operating multiple underground and opencast mines across Chhattisgarh and Madhya Pradesh.

Impact on Employee Performance

Safety measures have a profound impact on both the physical and psychological well-being of mine workers. Research shows that when employees feel secure in their work environment, their job satisfaction, morale, and productivity increase significantly (Li et al., 2019; Haas & Yorio, 2021). In SECL's context, a safer working atmosphere reduces absenteeism, boosts motivation, and enhances workers' focus on operational tasks, leading to improved overall performance. Additionally, training programs and safety culture foster a sense of responsibility among workers, encouraging proactive behavior, fewer errors, and greater compliance with operational protocols. When employees observe that their organization prioritizes their safety, they are more likely to reciprocate with increased dedication and efficiency. Despite advancements, challenges persist in fully implementing safety measures in all units of SECL due to factors such as resource constraints, non-compliance by contract labor, and infrastructure limitations in remote mining locations. Moreover, behavioral aspects like risk perception, safety attitude, and communication gaps also affect the effectiveness of safety programs. Continuous evaluation, stronger supervision, and investment in modern equipment are essential to bridge these gaps.

Significance of the Study

The study holds considerable significance in the context of high-risk industrial environments. Coal mining, particularly in organizations like South Eastern Coalfields Limited (SECL), involves inherent occupational hazards due to the nature of underground and opencast operations. Ensuring effective safety measures is not only a regulatory requirement but also a strategic necessity to safeguard human lives and sustain productivity. This study explores how structured safety protocols, advanced monitoring

technologies, training, and employee engagement impact workers' physical well-being, psychological assurance, and overall performance. By focusing on SECL, the study also sheds light on how a leading coal producer in India is addressing safety challenges through systemic reforms. The findings have broader implications for policymaking, operational improvements, and the promotion of a safety-first culture, which ultimately contributes to reduced accidents, enhanced morale, and improved organizational efficiency across the mining sector.

Literature Review

Aiza Javed and Imran Hashmi (2025) present a comprehensive comparative analysis of occupational health and safety (OHS) practices in coal mines, focusing on the nature of hazards, their impacts on workers, and the effectiveness of existing prevention strategies. Drawing on case studies from key coal mining regions, the study categorizes physical, chemical, ergonomic, and psychosocial risks that contribute to workplace injuries and long-term health issues. The findings reveal persistent gaps in hazard identification, personal protective equipment usage, and emergency preparedness, particularly in developing mining regions. The study emphasizes that robust regulatory enforcement, workforce training, and adoption of modern safety technologies are critical to mitigating these risks.

Onifade, Said, and Shivute (2023) investigate the transformative impact of technological advancements on enhancing safety in mining operations. The study emphasizes how digitalization, automation, and real-time monitoring systems have revolutionized hazard detection, risk management, and emergency response in the mining industry. The authors highlight the integration of wearable safety devices, Internet of Things (IoT) applications, and predictive analytics as critical tools for reducing human exposure to high-risk tasks and improving decision-making accuracy. Furthermore, the research underscores the role of artificial intelligence (AI) in analyzing large datasets for proactive risk assessment and incident prevention. The study also considers challenges such as implementation costs, worker training, and technological adaptation in developing regions.

Wu et al. (2022) present a comprehensive review of how intelligent coal mining technologies have significantly contributed to improving safety levels in coal mines. The study evaluates the integration of advanced automation, artificial intelligence (AI), remote sensing, and real-time monitoring systems in modern mining operations. These intelligent systems help reduce human exposure to hazardous environments, enhance risk prediction, and facilitate proactive safety management. The paper also discusses the effectiveness of unmanned mining equipment, smart ventilation systems, and intelligent monitoring platforms in preventing accidents and improving emergency responsiveness.

This study by **Senapati, Bhattacharjee & Chau (2019)** investigates the associations between job-related hazards, personal characteristics, and the risk of occupational injuries among workers at continuous miner worksites in underground coal mines in India. Utilizing a matched case-control design, the research compares injured workers (cases) with non-injured counterparts (controls) based on variables such as work environment, safety practices, shift schedules, and individual factors like age, experience, education, alcohol use, and risk-taking behavior. The findings reveal that inadequate lighting, poor roof conditions, irregular safety inspections, and longer work experience were significantly associated with higher injury risk.

This study by **Na and Li (2019)** investigates the intricate relationships among work values, regulatory focus, and safety performance, with a specific focus on the new generation of employees in coal mining enterprises. Drawing on empirical data, the research utilizes structural equation modeling to analyze how different dimensions of work values (such as intrinsic and extrinsic motivations) influence safety performance through the mediating role of regulatory focus—classified as promotion focus and prevention focus. The findings indicate that work values significantly impact employees' safety behaviors, with prevention focus playing a stronger mediating role in promoting adherence to safety protocols.

Research Gap

Although previous studies have explored occupational safety and employee performance in industrial settings, limited research has focused specifically on the coal mining sector within the SECL. The existing literature largely emphasizes technical safety compliance and accident prevention, while not examining the direct relationship between safety measures and employee performance. There is insufficient empirical evidence on how safety training, safety culture and protective practices affect productivity, motivation and work efficiency among SECL employees. This gap highlights the need for a focused study linking occupational safety practices with measurable performance outcomes in high-risk SECL work environments.

Objective

1. *To know the relationship between employee performance and occupational safety measures.*

Research Methodology

This study has been designed to examine the relationship between occupational workplace safety, and employee performance within the organizational context of South Eastern Coalfields Limited (SECL). To achieve this, clear and measurable research objectives were formulated to guide the study’s direction and ensure relevance to the core issues of employee welfare and organizational efficiency. A structured questionnaire comprising 10 statements was developed to gather primary data from 515 employees of SECL along with demographics and general statements. The reliability of the instrument was validated using Cronbach’s Alpha, which produced a high reliability coefficient of 0.885, indicating strong internal consistency of the responses.

Results

H₀₁: There is no significant correlation between employee performance and occupational safety measures in SECL

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Table 1: Correlations between employee performance and occupational safety measures

		Employee Performance	Occupational safety measures
Employee Performance	Pearson Correlation	1	.758**
	Sig. (2-tailed)		.000
	N	515	515
Occupational safety measures	Pearson Correlation	.758**	1
	Sig. (2-tailed)	.000	
	N	515	515

** . Correlation is significant at the 0.01 level (2-tailed).

The Pearson correlation coefficient ($r = 0.758, p < 0.01$) demonstrates that as occupational safety measures improve, employee performance also increases significantly. This strong correlation suggests that employees who perceive better safety infrastructure, training, and safety culture tend to perform more efficiently and productively. Since the p-value is less than 0.01, the relationship is highly significant, leading to the rejection of the null hypothesis. Therefore, it can be concluded that there is a strong and significant positive correlation between employee performance and occupational safety measures in SECL.

Conclusion

The study highlights the significant relationship between workplace safety and the overall productivity of employees in a high-risk industry. The findings show that strong safety practices – such as regular training, use of protective equipment, compliance monitoring and hazard prevention – significantly increase employee effectiveness, confidence and morale. When employees feel safe, they concentrate better, absenteeism is lower and the quality of work is stronger, leading to better organizational performance. The study concludes that occupational safety is not only a statutory requirement, but a strategic tool for sustainable development in SECL. Strengthening the safety culture, investing in continuous safety training and ensuring strict implementation of safety protocols will further improve employee performance and contribute to operational excellence.

Suggestions

- Strengthen safety training programs: SECL should conduct frequent, up-to-date and job-specific safety training to increase employee awareness and preparedness for hazardous situations.
- Improve safety infrastructure: Regularly upgrade safety equipment, surveillance systems and protective equipment to ensure maximum safety for workers in high-risk areas.
- Foster a strong safety culture: Encourage open communication about safety concerns, reward safe behavior and build a culture where safety is seen as a shared responsibility.
- Increase supervisory oversight: Supervisors should conduct regular safety audits, enforce compliance and provide immediate feedback to reduce unsafe practices.
- Implement technology-driven safety measures: Introduce modern safety solutions such as gas sensors, real-time monitoring systems and automated alerts to reduce the risk of accidents.
- Increase employee participation: Involve workers in safety committees, decision-making and hazard identification to improve ownership of safety practices.
- Regular health and risk assessments: Perform periodic medical checks and ergonomic assessments to reduce long-term health problems and improve productivity.
- Strengthen reporting mechanisms: Create a transparent, accessible system for reporting near misses and risks without fear of punishment.
- Focus on mental wellness: Include stress management programs and counseling support to maintain physical as well as psychological safety.
- Continuous evaluation of safety policies: Review and revise occupational safety measures based on accident trends, employee feedback and technological advances to ensure continuous improvement.

Future Research Scope

Future research on the relationship between employee performance and occupational safety measures in SECLs could explore broader and more nuanced dimensions of workplace dynamics. Studies can examine the long-term impact of new technologies such as automation, real-time security monitoring and AI-based risk prediction on employee effectiveness and security compliance. Researchers can also broaden the scope to compare SECL with other coal subsidiaries to identify best practices and regional differences. In addition, future research could include psychological factors such as risk perception, stress and safety motivation to better understand human behavior in high-risk environments. A longitudinal approach will provide deeper insight into how ongoing security initiatives affect performance over time. Furthermore, integrating gender perspectives, workforce diversity and the safety experiences of contractor workers can broaden understanding in the coal mining sector and contribute to more inclusive safety policies.

Implications of the Study

The results of the study highlight that strong occupational safety measures significantly improve employee performance in SECL by reducing accidents, improving morale and promoting a safe work environment. These results show that continued investment in safety training, equipment and monitoring systems can lead to higher productivity and operational efficiency. The study also shows that employee participation in safety practices strengthens the organization's safety culture, reducing risk and increasing overall organizational performance.

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