



Assessment of Safety Culture in Three Distinct Thermal Power Plants Sonebhadra, India

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KEYWORDS

Safety Culture, Behavior Based Safety Program, Organizational approach.

ABSTRACT:

Introduction: The safety culture of any organization plays a crucial role in preventing workplace accidents and promoting a safe working environment. The purpose of this assessment is to evaluate the safety culture building in a thermal power plant located in Sonebhadra district, India. The assessment includes a review of the safety management system, safety policies and procedures, and safety training programs implemented in the plant.

Objectives: The study's primary goal is to identify the programmes and activities being undertaken by the organisation to improve the safety culture at the plant.

Methods: One of the crucial methods for demonstrating management commitment to safety and creating a safety culture inside the company is safety observation (SO), which involves encouraging positive behaviour changes towards voluntarily adhering to safe practises. The practice of the safety observation process by the leadership team and line function, necessary documentation, compilation, and analysis of these observation data enables the organization to establish a behavioural Improvement system, demonstrate management commitment, and ensure awareness of and compliance to safety rules by the employees and contractor's employees.

Results: Based on the Behaviour Based Safety analysis done on the six attributes, it can be observed that employees' behavior is getting changed positively. The analysis shows that the focus on safety has increased, and employees are taking more responsibility for their safety and that of their colleagues.

Conclusions: The assessment indicates that the thermal power plant located in the Sonebhadra district has a strong safety culture. However, continuous efforts are required to maintain and improve the safety culture and prevent workplace accidents. It is recommended that the plant regularly review and update its safety management system, policies, and procedures to address any new safety risks that may arise.

1. Introduction

The safety culture of any organization plays a crucial role in preventing workplace accidents and promoting a safe working environment. The purpose of this assessment is to evaluate the safety culture building in a thermal power plant located in Sonebhadra district, India. The assessment includes a review of the safety management system, safety policies and procedures, and safety training programs implemented in the plant.

The safety management system in the plant is well structured and encompasses various safety protocols such as hazard identification, risk assessment, incident reporting, and investigation. The safety policies and procedures are comprehensive and cover all aspects of safety, including electrical safety, fire safety, and personal protective equipment. The safety training programs are designed to educate employees about potential hazards and safety procedures to minimize risks.



The plant has a safety committee comprising representatives from various departments that meets regularly to review safety performance and identify areas for improvement. The committee ensures that safety policies and procedures are followed, and corrective actions are taken promptly in case of any safety violation.

The plant has also implemented various safety initiatives to promote a safety culture. These include safety campaigns, safety drills, safety audits, and safety awards. The safety campaigns aim to create awareness among employees about safety practices, while safety drills prepare employees to respond to emergencies effectively. Safety audits help identify potential safety hazards, and safety awards recognize employees who demonstrate a high level of safety awareness.

The evaluation shows that the thermal power plant has a strong and well-established safety culture. Comprehensive safety management systems, rules, and procedures are in place, and safety training initiatives are successful in enlightening staff members about best practises. The facility has a remarkable safety record, and the safety committee and safety initiatives work to further promote a safety culture.

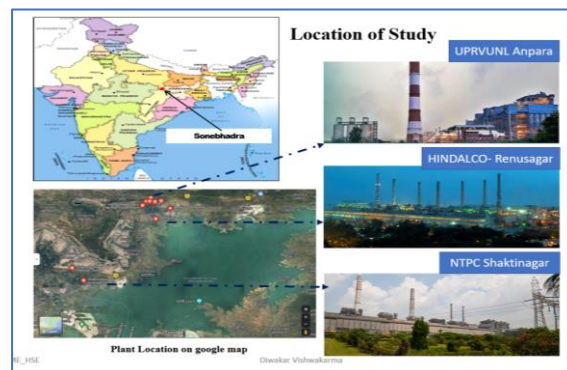
2. Objectives

The study's primary goal is to identify the programmes and activities being undertaken by the organisation to improve the safety culture at the plant.

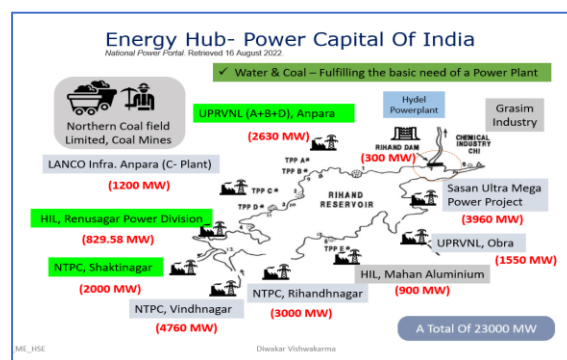
3. Methods

One of the crucial methods for demonstrating management commitment to safety and creating a safety culture inside the company is safety observation (SO), which involves encouraging positive behaviour changes towards voluntarily adhering to safe practises. The practice of the safety observation process by the leadership team and line function, necessary documentation, compilation, and analysis of these observation data enables the organization to establish a behavioural Improvement system, demonstrate management commitment, and ensure awareness of and compliance to safety rules by the employees and contractor's employees. It also provides opportunities to visualize trends towards the probability of potential injury. Well-structured safety observation process in any organization enhances the credibility of its safety

commitment and also demonstrates clear focused strategy to continually improve safety. [34]



(a)



(b)

Fig. 1. (a) Study Location; (b) Power Pant situated in Rehand reservoir. [34]

While visiting all three units defined in the scope of work, meet with the employees and especially the SHE (Safety Health and Environment) section representative, and understand the safety management system adopted to build a safety culture building.



Fig. 2. Approaches to assessing safety behavior [34]



The effectiveness of the observation process lies in interactive conversation and listening. Following the six-step process.

1. Pay attention, decide how to catch the person's attention, and safely halt the unsafe behaviour.
2. Describe how the worker behaved safely.
3. Go over the following with the employee:
 - Potential repercussions of the risky act; Safer ways to perform the task.
 - Discuss other safety issues of the job.
4. Obtain the worker's consent to continue working safely.
5. Thank the employee.

Table:1 Approaches to identify and capture key Behaviour:[33][34]

Reaction of People	Position of People	Personal Protective Equipment	Tools & Equipment	Procedures	Orderliness Standard
Uneasiness	Striking Against	Right for the Job	Right for the Job	Is Standard Practice?	Is the workplace Orderly?
Stopping or changing work	Struck by	Eyes & Face	Used Correctly	Adequate for the Job?	Are Standards known, Understood & followed?
Adjusting PPEs	Caught Between	Ears	In Safe Condition	Standard/Procedure Available	Are Materials & Tools put away properly?
Switching to Correct	Falling	Head	Type of tools used	Awareness of Standard/procedure	Segregation/shorting of waste
Leaving the Worksite	Posture	Hand, Leg	Damaged tools	Adherence to the correct procedure?	Cleanliness of workplace
Others	Inhaling	Respiratory	Tools/Equipment Choosing criteria	Procedure communicates?	Self -Discipline

Table 2: Findings of Safe and at-risk Behaviour Observation in Particular Power Plant: :[34]

S. No.	Attributes	Nos. of Schedule Observations	HIL-Renusagar Power Division		ATPP (Anpara Thermal Power Plant)		NTPC, Shaktinagar	
			Observation		Observation		Observation	
			Safe	at Risk	Safe	at Risk	Safe	at Risk
1	Reaction of people	24	1277	104	820	67	832	87
2	Position of people	21	917	117	732	38	752	60
3	Procedures	30	1406	22	412	57	590	40
4	Tools and Equipment	18	972	34	210	89	377	41
5	PPEs (Personal Protective Equipment/ Safety Gear)	40	1550	18	130	88	210	32
6	Orderliness Standard (5S/Housekeeping)	26	524	15	34	12	37	9

4. Results

Based on the Behaviour Based Safety analysis done on the six attributes, it can be observed that employees' behavior is getting changed positively. The analysis shows that the focus on safety has increased, and

employees are taking more responsibility for their safety and that of their colleagues.

In terms of following procedures, there is a significant improvement in employees' behavior. They are now following procedures correctly, which reduces the risk of accidents and injuries. Additionally, there is an increase



in reporting incidents and near-misses, which helps identify potential hazards and improve safety measures.

There is also an improvement in communication between employees and management regarding safety. Employees are more confident in communicating safety concerns, and management is taking the necessary actions to address these concerns promptly. This open communication culture contributes to an overall safer work environment.

Furthermore, there is a positive change in the use of personal protective equipment (PPE). Employees are now using PPE correctly and consistently, reducing the risk of injuries or exposure to hazardous materials.

The analysis also reveals a change in attitude towards safety. Employees are now more proactive in identifying potential hazards and taking the necessary actions to eliminate or reduce them. This proactive behavior helps prevent accidents and promotes a safety culture in the workplace.

Last but not least, the organization's overall safety culture has improved. Employees actively participate in creating and maintaining a safe workplace, with safety increasingly being given first priority.

In conclusion, the Behaviour Based Safety analysis shows that the employees' behavior has positively changed in all six attributes. This change in behavior contributes to an overall safer work environment, reducing the risk of accidents and injuries. It is crucial to continue monitoring and improving safety measures to sustain this positive change and ensure the well-being of employees.

5. Discussion

The assessment indicates that the thermal power plant located in the Sonebhadra district has a strong safety culture. However, continuous efforts are required to maintain and improve the safety culture and prevent workplace accidents. It is recommended that the plant regularly review and update its safety management system, policies, and procedures to address any new safety risks that may arise.

After analysing the safety practices and conditions in the three selected thermal power plants, it can be concluded

that the Renusagar Power Plant has better safety practices and conditions as compared to NTPC Shaktinagar and Anpara thermal power plants in terms of Behavior-based Safety development. Regarding the behavior-based safety analysis, the employees' behavior was found to have positively changed in all six attributes, which are hazard recognition, reporting, risk assessment, communication, compliance, and safety leadership.

As for the condition of existing safety signs, Renusagar and Saktinagar Power Plants again stand out with the maximum number of safety signs used in different workplaces and storage areas to warn workers about potential hazards.

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