

## RECOGNITION AND AWARENESS OF SAFETY KNOWLEDGE MANAGEMENT IN CONSTRUCTION INDUSTRY

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### ABSTRACT

*A greater emphasis on safety knowledge management is necessary for improved project results in the construction sector due to the industry's complex and ever-changing operating environment. Prioritizing safety via systematic knowledge management is now an essential necessity in the face of technological breakthroughs, strict laws, and increasing project complexity. Ten of the most prominent Indian construction companies active in the international market had their safety managers and heads surveyed. Having learned about the advantages of safety KM, every organization views it as a strategic asset for their business. Organizations ranked email, the internet, small-group meetings, and brainstorming sessions as the top methods for sharing safety information. The construction industry sees safety knowledge management as an investment for the future and the present since it may reduce hazards, increase efficiency, and save lives.*

**Keywords:** Knowledge management, Awareness, Recognition, Organizations, Performance

### I. INTRODUCTION

It is impossible to stress the critical necessity of safety in the construction industry's fast-paced, always changing environment. In order to guarantee the safety of workers, the stability of buildings, and the overall success of projects, a thorough and methodical approach to safety knowledge management is essential, especially as construction projects become more complicated and multi-faceted. Fostering a culture of safety that goes beyond conventional limits in the construction sector has become critically dependent on the recognition and understanding of safety knowledge management. Throughout a project's lifespan, safety knowledge management in the construction industry include finding, collecting, organizing, and sharing pertinent safety information. Compliance with regulations, identifying hazards, assessing risks, reporting incidents, and implementing best practices are all part of this broad category. Integrating knowledge management concepts is essential in the construction sector due to the high-risk nature of the work and the need for a proactive and adaptable safety strategy.

Realizing that construction sites are always changing is the first step in recognizing the need of safety knowledge management. Every project has its own set of circumstances, from

crowded cities to isolated locations, and every one of those situations has its own set of dangers and difficulties. Achieving project goals without sacrificing the well-being of those engaged becomes more important as stakeholders in the construction sector face the growing complexity of projects. Acquiring, sharing, and utilizing safety information is crucial in this regard.

Conversely, being aware goes beyond just being cognizant of the need of safety knowledge in building projects; it emphasizes actively and intelligently comprehending that function. Responsibility must be inculcated in every everyone involved, from engineers and project managers to workers and subcontractors. Continuous improvement of safety procedures and the growth of a safety-centric culture are encouraged by an awareness-driven approach, which promotes a proactive mentality.

There are many potential dangers in the construction business, from the obvious physical risks on the job site to more subtle environmental and ergonomic concerns. To reduce these dangers and encourage a preventative mindset, it is important to raise people's consciousness of safety information management. The industry can build a strong foundation of safety knowledge to guide future projects by using the combined expertise of project teams and drawing on previous experiences.

Although safety knowledge management is crucial, there are a number of obstacles that the construction sector must overcome before it can be effectively implemented. Due to their temporary character, building projects pose one of the main challenges. Teams form for certain tasks and then dissolve when those tasks are over, which might result in the loss of important information. since of the industry's dependence on temporary labor, this problem is made worse since workers typically take their knowledge and expertise with them when they move from one project to another. Another distinctive feature of the construction industry is the wide range of skills and backgrounds represented among its employees. An important part of good safety knowledge management is helping newbies catch up to more seasoned workers. The sector may reap the advantages of its workers' combined experience and expertise via training programs, mentoring efforts, and the use of technological platforms that enable the transfer of information between generations.

In the construction business, technological improvements are crucial for raising awareness and acknowledgment of safety knowledge management. Thanks to digital platforms, cloud-based systems, and mobile apps, we can now communicate and share information in real-time. In addition to making it easier to share safety information, these technologies also make it possible to incorporate safety procedures into project management software without any hitches. By providing immersive experiences that reflect the ever-changing problems of construction sites, augmented and virtual reality (AR/VR) technologies augment safety training and simulation even further. Recognition and understanding of safety knowledge management are also greatly aided by regulatory frameworks. More and more, governments and industry groups throughout the globe are stressing the importance of strict safety

regulations on building sites. A strong knowledge management system is required to monitor, execute, and update safety procedures in order to be in compliance with these criteria. Stakeholders are highly motivated to prioritize safety knowledge management due to their understanding of their legal duties and the possible repercussions of non-compliance.

## II. REVIEW OF LITERATURE

Patel, Umesh et al., (2021) The ever-increasing need for buildings, residences, and workplaces is driving the construction sector forward. There are a variety of health concerns in the construction sector due to its dynamic nature. To guarantee a safe and healthy workplace, protection is therefore essential in the construction industry. According to safety experts, the majority of injuries in the workplace are caused by dangerous behaviors. One way to effectively avoid accidents and keep the accident rate low on construction sites is to manage these behaviors. The construction business places a far higher premium on safety. The purpose of this review article is to discuss ways to improve construction site safety. The main purpose of the research is to identify the most important aspects that influence the effectiveness of construction safety management when it is implemented. The purpose of this review paper is to identify and address significant issues in the construction industry by providing a range of solutions pertaining to different work-related factors that impact the safety performance of projects. There are a lot of casualties and permanent injuries because individuals aren't well-informed. Problems have arisen with the conventional approach to construction safety management. Data is readily available as a result of the exponential growth in the quantity of data that is accessible. Due to its efficacy in data collection, identification, and processing, sensor-based technology is believed to include a new era of methods for construction safety management. This review study aims to identify and evaluate construction project safety controls with the purpose of reducing and controlling health and safety (H&S) risks to construction workers. In order to reduce the occurrence of accidents on construction sites, this article detailed the many safety and control measures that may be implemented utilizing sensor-based technologies. They talk about what goes wrong and how drones may make construction sites safer..

M.D., Deepak & Mahesh, Gangadhar (2020) It is essential to pay greater attention to safety on building sites in order to reduce the accident rate. There seems to be a lack of information dissemination about safety in the construction sector, since there are ongoing issues with industry understanding of safety hazards, procedures, and practices. Furthermore, research on knowledge management techniques to enhance safety culture in the construction sector and reduce the likelihood of accident recurrence is lacking. In order to better understand the construction industry's most important players' perspectives on safety culture, this research seeks to shed light on the often-overlooked parts of knowledge management. Finding and quantifying components of a knowledge-based safety culture is, hence, the goal of this research. Key stakeholders in the construction sector are the subject of this article, which focuses on the deployment of a knowledge-based safety culture evaluation instrument that is

dependable, valid, and sensitive. In order to get information from experts in the field, a questionnaire survey was used as the research tool. In all, 106 separate businesses involved in the Indian construction sector contributed 199 replies. To compare and discover discrepancies in stakeholder views about workplace safety, statistical methods such as ranking analysis, t-test, correlation analysis, and ANOVA test are used. From the point of view of important players in the construction sector, this research aids in identifying and ranking essential components of a knowledge-based safety culture. In terms of safety culture, this helps pinpoint the most important but often-overlooked factors among the main players. This research adds to the growing body of evidence that the knowledge component is critical to building a culture of safety throughout the construction sector. The study's findings may help important players in the construction sector assess and improve their safety performance. This study's findings provide fresh information for evaluating factors that might enhance construction worker safety. Those involved in occupational health and safety management, whether as academics or practitioners, should find this study interesting..

Smyth, Hedley et al., (2019) The industrialized world has seen a stagnation in health and safety (H&S) statistics. H&S and project management often work hand in hand. Improving contractors' and subcontractors' roles as system integrators and suppliers, respectively, requires a higher level of dedication. Operational meetings at the company and project levels stress the building of awareness and the exchange of information on health and safety efforts, near misses, and accidents. Email notifications, Yammer, and intranet sites—all of which are often based on safety management systems—help with this. Data processing is the foundation of these systems. The literature on knowledge management systems reveals that they are underdeveloped in the construction industry, which hinders their ability to transform information into practical knowledge. H&S prioritizes information exchange above knowledge application, according to empirical data gathered from primary contractors and subcontractors in this study. H&S is therefore unrelated to the emerging KMS..

Saeed, Yousif (2017) Finding and evaluating construction project safety management practices that attempt to reduce and control hazards to workers' health and safety is the primary goal of this study. In order to compare and contrast the viewpoints of experienced experts working on various building sites, a questionnaire is utilized to gather a broad variety of responses. To begin gathering data from similar research, one must do literature reviews. The literature studies served as a foundation for the questionnaire's theoretical framework about safety management. According to these studies, there are a lot of deaths and serious injuries in the construction business. As a result of injuries and the resulting decrease in productivity, this is intolerable in today's society. Numerous variables contribute to the high accident rates in the construction industry, according to this study. These include insufficient safety training, unsafe design, worker behavior, the inherent health and safety risks of the job, and an absence of familiarity with site regulations.

Hallowell, Matthew (2012) Injury and sickness rates in the construction business are almost five times higher than the overall industry average, even though safety performance has improved over the last 30 years. One possible explanation for the high incidence of injuries and illnesses on construction sites is the ever-changing and unpredictable nature of these jobs. In order to overcome these obstacles, construction organizations need to be flexible and adept in finding, recording, storing, and sharing safety information. Eleven case studies were carried out with a geographically distributed sample of general contractors in the United States to examine the implementation of safety-knowledge management systems in the construction sector. Experience modification rate (EMR), a relative metric for safety performance, was used to stratify the sample. The case studies show that construction companies get their safety information from all over, but their knowledge storage and transfer systems aren't very good, so employees can't get the information they need to fix serious safety issues right away. Formal procedures, such as data-entry systems that record responses to safety problems from seasoned employees and safety mentorship, helped high-performing firms manage tacit safety knowledge. Other creative approaches include collecting workers' tacit knowledge about safety during safety stand-downs via interviews and archiving such information in exclusive training movies.

### III. RESEARCH METHODOLOGY

Ten major Indian building contractors participated in the study. We used a purposive sample technique to choose these service providers. Because of their presumed level of familiarity with their organizations' safety KM policies and practices, the survey was sent out to safety managers of chosen Indian contractors. The poll was conducted over the course of two months, from November 2020 to December 2020, and it lasted for around an hour. The survey questionnaire was administered via face-to-face interviews. A few of the questions used Likert scales, while others were free-form. The weighting of the replies is equal in all pertinent questions.

A pilot research including two major contracting firms was carried out prior to the main survey by sending the questionnaire to them. Finding out whether the questionnaire was suitable and easy to grasp was the main objective. Over the phone, we informed the contractors about the goals of the research. After their consent was obtained, the questionnaire was sent to them via email. In addition to reviewing the survey's layout and design, respondents were requested to fill out the questionnaire.

### IV. DATA ANALYSIS AND INTERPRETATION

#### Development of safety knowledge management strategies

To begin, in order to build a KM strategy, it is necessary to determine the objectives of KM operations and then come to a consensus on the best way to accomplish these objectives. Companies who don't have KM systems in place will be left behind in the market by those

that do as they won't be able to effectively attain the levels of reuse required by the marketplaces in which they operate. Also, bigger, more dispersed businesses may better serve their customers by tapping into the wealth of safety information stored in different parts of the company and making it available to them quickly.

**Table 1 Recognition of safety knowledge management as strategic asset**

Question	Companies responds	
	Yes (%)	No (%)
1. Does your firm consider safety knowledge as a strategic asset?	100	0
2. Are you personally aware of any circumstance in your firm in which costly errors have been made due to inadequate safety knowledge?	80	20
3. Is there some kind of safety knowledge management system available in your organisation?	90	10

In answer to the first question, all participants have confirmed that their organization considers safety expertise a strategic advantage. This shows that everyone agrees on how important it is. In the second question, we learn that 80% of people had first-hand experience with situations when a lack of safety awareness led to expensive mistakes; this highlights the seriousness of the risks involved in ignoring these precautions. Additionally, 90% of businesses have a safety knowledge management system, which shows that they are taking the initiative to organize and share important safety information amongst themselves..

### Awareness of safety knowledge management benefits

The safety KM drivers were the subject of the survey's request for feedback. Table 2 displays the perceived advantages that safety KM may provide to the firm in several domains. On a scale from 1 (very important) to 5 (very important), the statistics show the rating impacts for each element. Reducing accidents, sharing tacit knowledge, fostering continuous development, improving efficiency, and being flexible were the most critical drivers that participants addressed. Developing innovative products and services and making better decisions were two of the most often cited advantages of safety KM, while participants ranked safety work as the second most significant benefit. The varied tasks, expertise, procedures, competence, and experience of the specialists and building organizations were the primary causes of these variations.

**Table 2 Awareness of safety knowledge management benefits**

Particulars	Average score
Develop new product and services	4
Employees experience	4.25
Decision making improvement	4.25
Disseminate best practices	4.5
Reduce rework	4.5
Feel of safe work place	4.5
Flexibility	5
Efficiency improvement	5
Encourage continuous improvement	5
Share tacit knowledge	5
Reduce accident	5

The widespread recognition of KM's advantages is being propelled by the demands for innovation, enhanced market efficiency, and contented customers. Customer dissatisfaction and poor profitability are outcomes of the sector's disjointed structure, which hinders project execution performance. Nevertheless, being conscious is a collective accomplishment that is interwoven with many systems of practices, beliefs, goods, blueprints, and images, along with other manipulated and mandated assets. Consequently, the context of knowledge implementation and the communication styles of project managers impact the perceived value of KM. From the standpoint of safety KM, there were differing opinions among building companies.

### **Tools for managing safety knowledge**

The need to enforce KM across a number of complementing technologies has been recognized by several organizations. All the way through the KM life cycle, from creation to usage, several technologies have been identified to make life easier. It should be mentioned, however, that not every one of these is CIT. Furthermore, one may make the case that businesses should not start by identifying a tool but rather identify specific KM challenges, and then choose the best technology to address those issues. The study findings showed that there is a wide variety of techniques that construction businesses use to improve their safety knowledge management. The construction enterprises' consideration of safety KM tools is shown in Table 3.

**Table 3: Tools for managing safety knowledge**

Particulars	Average score
Video type	3.7
Communities of practices	4
Training and Education	4
Intranet	4
Databases	4.30
Consultancy	4.70
Small group meeting (2-4)	4.70
Brainstorming	5
Internet	5
Email	5
Others (whatsapp, apps, etc.)	4

The most effective method for sharing information on construction safety equipment and their relative importance was a combination of online forums, small-group meetings, and brainstorming sessions. Instead of letting each employee keep this knowledge as an individual asset, which can be lost when employees leave the organization, the value of utilizing key employees' safety knowledge to make it an organizational asset was demonstrated by the need for tacit knowledge sharing and dissemination of best practices. It's possible that the perceived greater importance of tacit knowledge over explicit information contributed to the preference for face-to-face encounters over alternative knowledge codification techniques.

## V. CONCLUSION

Recognizing and being aware of safety knowledge management is very critical in the construction sector. Safety must be prioritized via efficient information management in this age of constantly changing technology, strict laws, and ever-increasing project complexity. The first step towards a safer construction business is realizing how critical it is to consistently record, share, and use safety information at every stage of a project. Stakeholders in the construction sector may help create a safer and more sustainable future by encouraging a mindset of constant learning, taking the initiative to identify risks, and working together to



solve problems. Protecting the environment, delivering projects that last without sacrificing safety, and ensuring the well-being of the workforce are all moral obligations that go beyond legal or regulatory requirements. Safety knowledge management is an investment in the future and a present for the construction industry. It has the ability to reduce hazards, increase efficiency on projects, and save lives. Going ahead, let us all take it upon ourselves to be the vanguard of safety knowledge management, turning it into an actual practice that influences the building industry's values for years to come.

## REFERENCES: -

1. Patel, Umesh & Raichura, Chintan & Pitroda, Dr. Jayeshkumar. (2021). CONSTRUCTION SAFETY MANAGEMENT IN CONSTRUCTION PROJECT. 9. 435-440.
2. M.D., Deepak & Mahesh, Gangadhar. (2020). Influence of knowledge-based safety culture in the construction industry: A stakeholder's perspective. *International Journal of Workplace Health Management*. 14. 111-128. 10.1108/IJWHM-11-2019-0150.
3. Smyth, Hedley & Roberts, A & Duryan, Meri & Xu, J & Toli, A & Rowlinson, Steve & Sherratt, Fred. (2019). Health & Safety and Knowledge Management in construction.
4. Li, R.Y.M. & Wing, Chau Kwong & Lu, Weisheng & Ho, Daniel & Shoaib, Muhammad & Meng, Li. (2019). Construction Hazard Awareness and Construction Safety Knowledge Sharing Epistemology. 10.1680/icsic.64669.283.
5. Chellappa, Vigneshkumar & Li, R.Y.M. & Salve, Urmi & Lias, Roode. (2019). A knowledge-based approach for enhancing safety awareness and fall prevention in the construction industry. 10.1080/09720510.2020.1736320.
6. Saeed, Yousif. (2017). SAFETY MANAGEMENT IN CONSTRUCTION PROJECTS. *The Journal of The University of Duhok*. 20. 546-560. 10.26682/sjuod.2017.20.1.48.
7. Mohammed, Y.D. & Md Tamrin, Shamsul & Ishak, Md. (2017). Assessing Workers Safety Management Knowledge on Construction Site. *International Journal of Engineering Research and Science*. 3. 20-26. 10.25125/engineering-journal-IJOER-MAY-2017-8.
8. Hallowell, Matthew. (2012). Safety-Knowledge Management in American Construction Organizations. *Journal of Management in Engineering*. 28. 203-211. 10.1061/(ASCE)ME.1943-5479.0000067.



9. Minicis, Margherita & Di Gravio, Giulio & Fagnoli, Mario. (2011). Knowledge Management integration in Occupational Health and Safety systems for construction industry. INTERNATIONAL JOURNAL OF PRODUCT DEVELOPMENT. 14. 165-185. 10.1504/IJPD.2011.042298.
10. Minicis, Margherita & Di Gravio, Giulio & Fagnoli, Mario. (2010). Occupational health and safety knowledge management system. 1085-1096.