A Study on safety management in building construction by incorporating RFID technology

Dhrisya. K. R. ¹ & Dr. R. Thangaraj ²
¹PG student, Nehru Institute of Technology, Coimbatore.
²Head of the Department, Civil Department, Nehru Institute of Technology, Coimbatore.

Abstract: Safety is one of the important factors which should be considered in building construction. Building construction is a vast area of occupation, where accidents and hazards are very common, so special consideration should be given to safety in the construction field. This paper is focusing on safety improvement in building construction. The critical success factors which influence the safety are identified. SPSS software is used for analysis of the data collected. Here the solution is based on RFID (Radio Frequency Identification) technology.

Keywords: safety, Critical Success factors, SPSS, RFID

1. Introduction

Construction industry is one of the largest industries which involve a large number of employees. The most important fact is that the construction industry is one among the most hazardous industries. The workers involved in building construction are highly vulnerable to potential hazards. It is very important that an efficient safety culture should be developed in construction field. In this study the major causes of accidents is identified and is ranked based on their criticality. The data collection is by questionnaire method and the data collected is analyzed by SPSS (Statistical package for social science) software. The results obtained from the SPSS software was compared with analytical research. The suitable measures for safety are also recommended in the study based on the critical factors. This study aims at understanding the needs of building construction industry by process improvement perspectives and matches these needs with expected outcomes of safety management in construction. The objective of this study is to create useful and scientific knowledge about process improvement and safety management for building construction industry.

2. Need and Scope of the Project

Accident prevention has become the increasingly important aspect which could be a major cause of concern in the construction industry. Therefore any effort to identify and explore possible ways of preventing and controlling and mitigating accidents should be encouraged. This study focuses mainly on the identification and prevention of accident in the construction industry. Safety management can be implemented in different types of construction projects and site environment such as: transportation, water, power plant, industrial and residential projects. Furthermore, this study will attempt to cover site and office based operations of construction projects. Opinions of site engineer, contractor and supervisors, is important to reflect their ideas and perspectives about safety improvement.

3. Methodology

In this project the data analysis by SPSS (Statistical package for social sciences) software was well studied and the critical factors which will identify by ranking in SPSS software would be studied and the to tackle it a mitigation tool or method RFID (Radio Frequency Identification) is to be used. SPSS can be recognized as a useful tool for evaluating the performance of the organizations. SPSS is well employed in other industries also. Survey through questionnaires found effective because relative case of obtaining standard data appropriate for achieving the objectives of this study. The rank for each technique was determined by using the mean and standard deviation values computed from the respondent’s data. The questionnaire survey was conducted to determine the importance of critical success factors for safety management which was perceived by contractors, supervisors, site engineers working within the construction industry.
4. Analysis of Data

The data collected by questionnaire survey can be analyzed by using SPSS (Statistical package for social science). The data obtained will be entered in to the software and the standard deviation and mean will be obtained as outcome. Based on this the factors can be ranked according to their criticality. The rank was provide according to the higher mean value, if both the mean values are equal then we considered the lesser standard deviation value is taken as higher rank. The results obtained from SPSS will be moreover accurate.

5. Results and Discussion

The results are obtained from SPSS software will be in the form of mean, standard deviation and rank were given to each factor accordingly. This section discusses the results of the collected data for critical success factors for the safety program implementation. The Mean, Standard deviation and Rank obtained are summarized. The most critical factors that affect the safety are enlisted in this section

6. RFID in Construction Field

Construction sites are challenging environments to manage with the many critical issues in asset management, tool tracking, production safety and worker safety. To meet these challenges, more construction companies and site contractors are integrating Radio Frequency Identification (RFID) technology in their day-to-day operations in construction sites and projects. In construction field, radio frequency identification technology has contributed to the automation of several construction works, improving their efficiency, safety and reducing the associated costs. After reviewing, there exist several drawbacks and limitations that cause contractors to choose other available technologies. The communication between devices makes collaborative tasks and the sharing of information about works in progress or the maintenance of certain components easier than past. Therefore, new developments in the field of communication in construction integrating RFID based-technologies are expected in the future. The wireless communication protocol of the Active equipment can satisfy requirement of RFID communication rate in construction sites. Also, the new safety device of active alarming RFID tag provides not only personal protection but also real time sensing and monitoring for safety management. The location identification module of the Active equipment can provide work route tracking in construction field. Active RFID reader can read approximately 3m to 50m radius. The active tag can help you identify not only the real time location of worker but also notify whether they are in dangerous zones or areas so that actions could be performed to prevent accidents and hazards. General contractors are usually using RFID technology to manage building safety and access at
the construction site. The solution, provided enables the contractor to ensure that all individuals are safely evacuated during an emergency, prevent site access by the personnel who are unauthorized, and control access to clean spaces on the project site. Construction work is a dangerous land based job. This works include many hazardous tasks and conditions such as working at height, excavation, noise, dust, equipment, fire etc. Construction work has been increasing in developing and undeveloped countries all over the world nowadays. Due to increase in this type of work occupational fatalities have increased. Within the field of construction it is important to have safe construction sites. In this project the data collected is to be analyzed by SPSS software and the factors are ranked based on their criticality. The solution will be recommended. The solution is by the application of RFID (Radio Frequency Identification). This project aims at understanding the needs of construction industry from process improvement perspectives and matches these needs with the expected outcomes of safety management in construction. The objective of this study is to create useful and scientific knowledge about Process Improvement and safety management for construction industry. This study helps to understand the most critical factors that affect the safety in building construction safety and the new methods to overcome safety problems.

7. Solution

The solution is found out based on the critical factors obtained from the analysis by SPSS software. The solution should such that it will enhance the safety in building construction by considering the critical factors. In this project solution will be by using RFID (Radio Frequency Identification) in the construction site. For that the details about the RFID is collected. The method of installation of RFID for building construction safety should be investigated and studied thoroughly for its installation in the site for promoting safety in building construction. The RFID is to be collected and implemented.

8. Conclusion

Construction work is a dangerous land based occupation. This works include many hazardous tasks and conditions such as working at height, excavation, noise, dust, equipment, fire etc. Construction work has been increasing in developing and undeveloped countries all over the world. With an increase in this type of work occupational fatalities and hazards are increased. Within the field of construction it is important to have safe construction sites. In this project the data collected is to be analyzed by SPSS software and the factors are ranked based on their criticality. The solution will be recommended. The solution is by the application of RFID (Radio Frequency Identification). This project aims at understanding the needs of construction industry from process improvement perspectives and matches these needs with the expected outcomes of safety management in construction. The objective of this study is to create useful and scientific knowledge about Process Improvement and safety management for construction industry. This study helps to understand the most critical factors that affect the safety in building construction safety and the new methods to overcome safety problems.

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10. References


