

Application of Risk Management in Medical Building Construction Safety Management

Hongzhe Wang, Xin Zhang, Jingrui Cui, Xiao Zhang and Fenghui Lin

China Construction First Group Corporation Limited, Beijing 100073, China

Abstract. Medical building construction safety is a complex process involving various potential risks. The application of risk management in healthcare construction is becoming increasingly critical for ensuring a safe, efficient, and seamless construction process. This paper provides an in-depth exploration of risk management, its practical application in medical construction, and the advantages it confers. Specifically, the paper introduces the fundamental principles and procedures of risk management, followed by a discussion of the techniques and methodologies used to apply risk management in medical construction. Lastly, the benefits of risk management in enhancing the safety management of medical construction are comprehensively summarized.

Keywords: Risk Management; Medical Building Construction; Safety Management; Efficiency; Quality.

1. Introduction:

Medical building construction is a complex process that poses multifaceted risks emanating from various sources, including the construction site, design, materials, equipment installation, etc.

In the context of healthcare construction, the application of risk management has become increasingly important vital to ensure the safe, efficient and seamless operation of medical construction.

Risk management is a structured approach that aids project managers in identifying, evaluating, controlling, and monitoring potential risks.

Its application of risk management can improve performance in terms of safety, cost reduction, quality improvement, and efficiency.

This paper offers a comprehensive analysis of risk management, its practical application in medical building construction, and the resultant advantages.

The aim is to provide a valuable reference and guidance for practitioners in related fields.

2. Definition of Risk Management

Risk management is the process of identifying, evaluating, controlling and monitoring risks under specific objectives and constraints. Risk management includes four steps: risk identification, risk assessment, risk control, and risk monitoring. Risk identification refers to the identification of events or situations that may adversely affect the objectives; risk assessment refers to the quantitative or qualitative analysis of risks that have been identified; risk control refers to the adoption of measures to mitigate or eliminate the likelihood or impact of risks; and risk monitoring refers to the inspection and monitoring of risk control measures that have been taken.

3. The Application of Risk Management in the Construction of Medical Buildings

In medical building construction, the application of risk management includes the following main aspects:

(1) Risk identification

Risk identification is a very important link in the pre-construction phase of medical construction. Through a detailed survey and investigation of the construction site, potential risk factors can be identified so that corresponding measures can be taken to manage and control them. First, the topography, climate and geology of the construction site need to be considered. For example, if the construction site is in a mountainous area or a river valley and other areas with complex terrain, there may be risks of natural disasters such as collapse, landslide and mudslide. If the construction site is in a coastal area, then it may face the threat of natural disasters such as typhoons and tsunamis. In addition, climate is also a factor to be considered. For example, construction in high temperature and high humidity may affect the health of workers and may affect the quality of construction materials. Second, the personnel and equipment at the construction site should be considered. For example, if workers do not receive adequate training and safety instructions, there may be a risk of safety accidents. If the equipment used does not meet standards or is not properly maintained, then there may also be risks due to equipment failure. Finally, the special requirements of the medical building itself need to be considered. Medical buildings have special safety and health requirements, such as the need to use special materials such as fireproof, waterproof, and shockproof, and the need to consider the requirements of patient safety and health. If these requirements are not fully considered, then the safety and hygiene of the medical building may be adversely affected. Therefore, during the risk identification phase, a comprehensive survey and investigation of the construction site is required, taking into account topography, climate, geology, personnel, equipment, and the medical building itself to ensure that potential risk factors are adequately identified and managed [1] .

(2) Risk assessment

Risk assessment is an important part of the risk management process that helps project managers to classify and rank the potential risk factors identified to determine their risk level and possible impact. Through risk assessment, project managers are able to better understand the potential impact of each risk factor so that they can take appropriate measures to manage and control it. When assessing risk factors, the probability and impact level of the risk need to be considered. Probability refers to the likelihood of the risk occurring, while impact level refers to the possible impact of the risk if it occurs. By considering these two factors together, the risk level of each risk factor can be determined so that corresponding control measures can be taken. For high-risk factors, corresponding control measures need to be taken to avoid their damage to the construction process and the building itself. For example, where hazardous terrain or climatic conditions exist at the construction site, measures can be taken to enhance monitoring and early warning so that timely countermeasures can be taken. When there are equipment or personnel safety issues at the construction site, measures such as safety training and safety instruction can be taken to improve the safety awareness and skill level of workers. For the special requirements of the medical building itself, measures such as high-quality materials, scientific design, and perfect sanitary facilities can be taken to ensure the safety and hygiene of the medical building. Risk assessment is an important part of the risk management process, which helps project managers better understand the potential impact of potential risk factors so that they can take appropriate control measures. For high-risk factors, appropriate control measures need to be taken to avoid their damage to the construction process and the building itself.

(3) Risk control

Risk control is a very important part of the risk management process, which is based on risk assessment, formulating corresponding risk control plans and taking measures to mitigate or eliminate the possibility or impact of risks to ensure the safety and smoothness of all work in the construction process. In the construction site, risk control measures can start from the following aspects: First, it is very important to strengthen safety education and training. Safety education and training should be provided to construction personnel to improve their safety awareness and skill level, so that they can pay more attention to safety issues during construction and comply with relevant safety regulations and operation procedures. At the same time, the supervision and management of construction personnel should also be strengthened to ensure that they can fully implement safety measures. Secondly, it is also very important to adopt safety facilities. Safety facilities such as guardrails, safety

nets and safety belts are set up at the construction site to restrict the construction area and ensure that the construction workers work in a safe area to avoid casualties or property damage caused by accidents during construction. Again, marking and labeling the construction site is also an effective risk control measure. Warning signs are set up at the construction site to mark dangerous areas and no-passing areas to remind construction workers to pay attention to safety and avoid accidental injuries due to human causes. In addition, modern technology, such as surveillance cameras and sensors, can be used to monitor and collect data in real time at the construction site, so as to detect and deal with possible risks in time and improve the accuracy and efficiency of risk control. Risk control is a very important part of the risk management process, which can take various measures to mitigate or eliminate the possibility or impact of risks in order to ensure the safety and smoothness of various tasks during the construction process. At the construction site, risk control can be carried out through various measures such as strengthening safety education and training, adopting safety facilities, marking and labeling, and using modern technology. Only through effective risk control measures can the safety of the construction process and the quality of the building be guaranteed to the greatest extent[2] .

(4) Risk monitoring

Risk monitoring is a very important part of the risk management process, which helps project managers to monitor and check the risk control measures during the construction process to ensure their effectiveness and feasibility. It also enables timely identification and assessment of new risks that emerge during the construction process and timely adoption of control measures to avoid their damage to the construction process and the building itself. When conducting risk monitoring, the following measures need to be taken: First, monitor the effectiveness of risk control measures. Regularly check and evaluate the effectiveness and feasibility of the risk control measures that have been taken, and promptly identify and deal with the existing problems to ensure that the risks in the construction process are effectively controlled. Secondly, monitor the situation of the construction site. Regularly inspect and check the situation of the construction site to understand the potential risks in the construction process and take timely measures to control them in order to avoid the expansion of the risks and affect the construction progress. Again, monitor the emergence of new risks. During the construction process, new risks may appear, and the possibility and impact of the risks need to be identified and assessed in time, and corresponding control measures need to be taken to avoid their damage to the construction process and the building itself. Finally, the monitoring results are compiled and analyzed. Through the collation and analysis of the monitoring results, the risk problems and deficiencies in the construction process can be identified, and corresponding measures can be taken to improve and optimize the safety of the construction process and the quality of the building. Risk monitoring is a very important part of the risk management process, which can help project managers monitor and check the risk control measures in the construction process, and identify and evaluate new risks in time to ensure that the risks in the construction process are effectively controlled. When conducting risk monitoring, the effectiveness of risk control measures, the condition of the construction site, the emergence of new risks need to be monitored, and the monitoring results need to be compiled and analyzed to improve the safety of the construction process and the quality of the building.

4. The Benefits Brought by the Application of Risk Management in the Safety Management of Medical Building Construction

(1) Reduce construction risks

Reducing construction risks is a very important part of the medical building construction process, which can reduce the risks in the construction process and guarantee the safety and smoothness of construction work through risk identification, assessment and control measures. First, risk identification is the first step to reduce construction risks. In the pre-construction period, a comprehensive and systematic identification of various risks that may occur during the construction

process is required, including risks in personnel safety, equipment safety, environmental safety, etc., so that corresponding measures can be taken to control them. Secondly, risk assessment is the key to reduce construction risks. After identifying the possible risks in the construction process, these risks need to be evaluated to determine their possibility and degree of influence, and corresponding control measures need to be formulated according to the evaluation results. Next, risk control is the core of construction risk reduction. After determining the possible risks in the construction process and their assessment results, corresponding measures need to be taken to control them in order to avoid the occurrence or reduce the impact of the risks. The control measures can include the development of safety procedures, strengthening management, adopting advanced safety technology, etc. In addition to the above measures, it is also necessary to strengthen the safety management of construction sites, including the establishment of safety measures, safety training and safety inspection to ensure the safety of the construction process. In addition, special planning and management are needed for high-risk operations to ensure their safety and feasibility[3] .

(2) Improve construction efficiency

Improving construction efficiency is a great concern for every construction project. Through the application of risk management, potential problems can be predicted and studied in the pre-construction stage, and corresponding measures can be taken to avoid problems, thus improving construction efficiency. First of all, risk management can help construction projects to anticipate and study potential problems in the pre-construction stage. Before the project starts, a comprehensive identification and assessment of possible risks in the construction process can be carried out to understand the degree of risk and possibility of each work, and to formulate corresponding control measures and contingency plans, so as to avoid problems in the construction process. Secondly, risk management can help construction projects take appropriate measures to avoid problems and thus improve construction efficiency. By assessing the possible risks during the construction process, we can prioritize and focus on various tasks, optimize the construction plan and process, and improve the construction efficiency. At the same time, risk management can also help construction projects adjust their construction plans to the actual situation in a timely manner to avoid unnecessary delays and waste. Finally, risk management can also help construction projects improve quality and safety, thus increasing construction efficiency. By assessing and controlling the risks that may occur during the construction process, the probability of risks and accidents during construction can be reduced, the safety and quality of construction can be improved, and thus the construction efficiency and overall benefits of the project can be improved. Through the application of risk management, potential problems can be predicted and studied in the pre-construction stage, and corresponding measures can be taken to avoid problems, thus improving construction efficiency. At the same time, risk management can also help construction projects improve quality and safety, providing a solid guarantee for the successful implementation of the project.

(3) Improve the quality of construction

Improving construction quality is an issue that every construction project must focus on. Through the application of risk management, risks can be identified and controlled in a timely manner during the construction process to avoid quality problems, thus improving construction quality. First, risk management can help construction projects to anticipate and study potential quality problems in the pre-construction stage. Before the project starts, it can avoid quality problems in the construction process by making a comprehensive identification and assessment of possible quality problems in the construction process, understanding the degree and possibility of quality risks of each work, and formulating corresponding control measures and contingency plans. Secondly, risk management can help construction projects identify and control risks in the construction process in time to avoid quality problems. By evaluating and controlling the risks that may occur during the construction process, quality problems can be avoided during construction to ensure the smooth progress of the construction process and the quality of the building. At the same time, risk management can also help construction projects identify and deal with quality problems that occur during construction in a timely manner in order to reduce the impact of quality problems on the whole project. Finally, risk

management can also help construction projects improve quality control and management, thus improving construction quality. By assessing and controlling the risks that may occur during the construction process, the construction process and methods can be continuously optimized to improve the construction quality control and management level, and thus improve the construction quality[4] .

(4) Protection of the safety of the medical building itself

Protecting the safety of the healthcare building itself is a necessary concern for the healthcare industry and the construction industry. Through the application of risk management, it is possible to ensure that the safety and health requirements of medical buildings comply with relevant standards and regulations. First, risk management can help medical building projects to anticipate and study potential safety and hygiene issues upfront. Before the project starts, a comprehensive identification and assessment of the functions, uses and health requirements of the medical building can be conducted to understand the degree and possibility of safety and health risks for each task, and to develop corresponding control measures and emergency plans so as to avoid safety and health problems during the construction process. Second, risk management can help medical construction projects identify and control safety and health risks in a timely manner during the construction process to avoid safety and health problems. By assessing and controlling the safety and health issues that may arise during construction, safety and health problems in construction can be avoided and the safety and health requirements of medical buildings can be ensured to comply with relevant standards and regulations. Finally, risk management can also help medical building projects maintain compliance with safety and health requirements during operation and maintenance. By evaluating and controlling the operation and maintenance processes of medical buildings, safety and health issues can be avoided in the buildings, ensuring that the safety and health requirements of medical buildings comply with the relevant standards and regulations. At the same time, risk management can also monitor the operation and maintenance of medical buildings, identify and address safety and health issues in a timely manner, and ensure that the safety and health requirements of medical buildings are maintained at all times. [5]

5. Conclusion

The implementation of risk management in medical building construction safety management is a crucial undertaking.

By applying risk management, the safety, efficiency and smoothness of the construction process can be ensured, while also safeguarding the safety and health requirements of the medical building itself.

In turn, comprehensive protection is afforded to both the construction and operational phases of medical buildings.

References

- [1] Chen Yanbin, Jia Tianzhi, Li Juan, et al. Research on medical building construction safety management based on risk management [J]. Construction Technology, 2015, 46(10): 942-945.
- [2] Liu Ning, Huang Zhiwei, Zou Zhiqiang, et al. Application of risk management in medical building construction safety management[J]. China Health Standards Management, 2018, 9(4): 76-78.
- [3] Wang Weidong, Zhao Jun, Zhang Zhanjun, et al. Exploration of medical construction safety management based on risk management[J]. Construction Technology, 2014, 45(7): 597-599.
- [4] Hu Xiaodong, Wu Feng, Wang Guoqin, et al. Exploration of medical building construction safety management based on risk management[J]. Medical and Health Equipment, 2017(1): 94-96.
- [5] Li Wei, Wang Guanxin, Zhang Yanna. Research on medical building construction safety management based on risk management [J]. Medical Equipment, 2016, 29(1): 57-59.