

The Factors of Risk Management Effect at Slope Construction Site

Puspa Liza Ghazali¹, Dede Ansyari Guci², Eni Noreni Mohammad Zain³, Hamidah Che Abdul Hamid⁴, Roslida Abdul Razak⁵, Juliana Arifin⁶, Sharifah Arni Syed Jaaffar⁷, and Norizan Remli⁸
^{1,2,3,4,5,6,7,8}Faculty of Business and Management, Universiti Sultan Zainal Abidin, 21300 Kuala Nerus, Terengganu, Malaysia

²Faculty of Economy, Universitas Prima Indonesia, Medan, Indonesia

³Faculty of Entrepreneurship and Business, Universiti Malaysia Kelantan, 16100 Kota Bahru, Kelantan, Malaysia

Email: ¹puspaliza@unisza.edu.my, ²dedeansyariguci@unprimdn.ac.id, ³noreni@umk.edu.my, ⁴hamidah3366@yahoo.com,

⁵roslida@unisza.edu.my, ⁶julianaarifin@unisza.edu.my, ⁷sharifaharni@yahoo.com, ⁸norizanremli@unisza.edu.my

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Abstract

This study focuses on the factors of risk management effect at slope construction site.

Purpose – This paper seeks to identify the factors of risk management effect at slope construction site.

Methodology/approach – The study utilized using qualitative approach were held via interview method. The interview was conducted to five agencies with each agency represented by JKR, civil engineer, worker, consultancy construction, academic. Each factor to start a business has a construct for question items that have an answer scale of 1 to 10. There are several other constructs that are needed to answer the question items. **Findings** – It was found that, factors that need to be considered in risk management for slope stabilization work are Identify the scope of work clearly & in detail, Use of Competent Workers/ Skilled Workers, Machinery & Machines are well maintained, Access & Work Platform, Use of Personal Protective Equipment (PPE) and Worker Culture & Attitudes.

Keywords: Risk Management, Slope, Construction Site, Uncertainty

INTRODUCTION

Site characterization and subsequent determination of soil strength parameters constitute an important part of the embankment construction site. Spatial variability present in the soil at different 3D locations with different measurements indicates values that vary with location. Spatial variability is a natural and unavoidable property of all soil volumes that introduces uncertainty. (Griffith et al., 2009). Geotechnical engineering is always subject to great uncertainties. This is because soil properties exhibit large variations and it is difficult to estimate spatial variations across soils. A geotechnical engineer's job is to make decisions under uncertainty. Surveys can only be carried out selectively and most soil volumes remain unexplored. This is an important distinction between geotechnical design and structural design involving materials of manufacture. In geotechnical design, material properties are determined rather than specified (Orr & Day, 2002).

One of the most important parameters for evaluating stability is the shear resistance that a flooring can recruit during shear. In order to assess slope stability, it is important to characterize and consider in design all different types of uncertainty associated with geotechnical design features and the computational models in which they are used. Therefore, the factor of risk management effectiveness at the embankment construction site is important.

In reducing losses and improving profitability, risk management is essential for construction

activities. This is supported by Wood and Ellis (2003) that risk management aims to add value to project delivery and improve efficiency during practice. According to Nyangwara & Datche (2015), construction organizations must have a clear mission and vision to develop, execute, and measure their results. It is vital to understand risk management knowledge among construction practitioners to practice risk management in handling their projects (Zaini et al., 2011). Having effective risk management leads to many advantages for the construction manager (Bannerman, 2008). For example, identifying the best alternative course of action can increase confidence in meeting project goals, improve the odds of success, reduce surprises, and lead to more accurate estimates (due to reduced uncertainty). resulting in reduced duplication (with team awareness of risk management measures). Therefore, the main objective of this study is to identify the key risk factors affecting building construction projects so that risks can be properly managed.

I. LITERATURE REVIEW (if any)

Construction work is a risky industry compared to other business activity. According to Thabit and Younus (2018), the construction industry covers a wide range of various activities right from a large scale to a small scale, such as constructing tiny houses and constructing malls that are large scale. It is found that around 28% of construction accidents were related to falls, 17% to falls from height, and 2.8% to electrical shocks (Dede Ansyari Guci et al, 2022). Harsh working conditions and high turnover rates have a negative impact on workplace safety. Multiple transactions are expected to take place in the same area, causing congestion and a lack of coordination that can affect the safety of individual workers. All of these factors lead to a dramatic increase in work-related injuries and deaths (Senouci et al., 2015). On-site injuries and deaths cause distress to workers and their families, causing project delays and additional costs through lost productivity, schedule disruptions, and accident investigation and reporting. Therefore, an extensive literature search was conducted for this study to identify common risk factors in construction projects.

Several researchers have identified risk factors in construction projects. Thabit and Younus (2011) used Heinrich's domino theory to conduct research to explain the root causes of randomness in the work environment. The causes of accidents were human, administrative, environmental, work and material factors. A study by Abd Karim et al. (2012) identified 25 risk factors, which he classified into five groups: construction, policy and contracting, financial, design and environmental. On the other hand, Senouchi et al. (2015) analysis of questionnaire responses found that 18 of the selected safety risk factors (out of a total of 38) were intolerable and required special attention and caution. These risk factors were categorized into project type, management, personnel, government regulations, and hazardous site conditions. In their study, Nyangwara & Datche (2015) identified eight factors that influence the performance of construction projects in Kenya's coastal areas. These factors include cost, time, quality, productivity, customer satisfaction, regular and community satisfaction, people and environment. These factors are important for improving the performance of construction projects.

METHOD

Research methods are to finds start-up business factors that also known as the main of this study. In addition, the study utilized using mix mode approach which is qualitative approach and mathematical approach. Qualitative approaches were held via interview method. Interview is about to find the factors of how-to success in this field and to know the weightages of the

factors. The interview was conducted to five agencies with each agency represented by JKR, civil engineer, worker, consultancy construction, academic. According to Rabiee (2004), the number of participants between six to eight are enough to achieve numerous perspectives, while the optimum number for the participants involvement in interview is between eight participants to show a greater potential in interviewing such topic (Krueger & Casey, 2000). The information from the interview will be taken as data for developing mathematical modelling formulation. After obtained the factors in risk management frameworks of construction field site in interview of the expertise, we also can find each factor has the weightages from the interview. These weightages are very important for the calculation of the composition index in mathematics. Each factor to start a business has a construct for question items that have an answer scale of 1 to 10. There are several other constructs that are needed to answer the question items. Construction entrepreneurs (contractors) who want to start a field works need to answer the questions of each construct. The calculation of the index that gives high marks indicates that the level of success in this field is high or vice versa. At the end of research, the construction of mathematical modelling in risk management index frameworks can used excel or also can calculate manually.

RESULT AND DISCUSSION

The factors which had found in the study that needed to be considered in risk management for slope stabilization work as follows:

1. Identify the scope of work clearly & in detail.

- Make learning on documents related to the scope of work. To enable the overall work plan to be drafted. (Taking into account the 5 main M factors: Manpower/ Machinery/ Money/ Material/ Management).
- Management on construction sites includes: Material management/ Financial Management/ Safety Management/ Workforce management/ Quality Management & etc.
- Each of these branches of site management needs to be well managed because it influences the overall performance of work progress @ the quality of work on site.

2. Use of Competent Workers/ Skilled Workers.

- Appointed labor workers must be competent & know clearly about the scope of work related so that safety risks can be reduced to a minimum.
- Have Work experience and plays an important role in terms of the level of sensitivity of employees to any possible hazards related to safety aspects.

3. Machinery & Machines are well maintained.

- The use of machinery & machines that are maintained regularly according to the schedule can reduce the risk of damage / failure during operation. Furthermore, able to reduce the risk of unforeseen accidents due to failure of machinery & machines.
- The use of well -maintained machinery and machines can affect the perspective and level of comfort of employees related to the safety aspects of the job
- Machinery maintenance costs only involve a fixed/ predictable amount. But for the cost of repairing machinery & machines, it involves a large amount/ change²/ unexpected.

4. Access & Work Platform

- Each site, has a different slope surface, access path to the construction site and a different construction site environment². Therefore, work safety risks also vary according to the conditions of the site itself. Therefore, the project manager needs to play a role by evaluating & making the best decisions² so that a safe work plan can be formulated.

- For the purpose of carrying out work² on the surface of the slope soil. Safe Work Platforms should be installed in accordance with the safety requirements & installation specifications of the temporary work platform structure. (Ropes should be installed as required on site).

5. Use of Personal Protective Equipment (PPE)

- The use of PPE is mandatory throughout the execution of work on the slope surface area & throughout the construction site period. It aims to reduce the risk of fatal accidents/ injuries during on-site work activities.

6. Worker Culture & Attitudes

- Safe work planning, recruitment of skilled workers, well maintained machinery & machines, safe access & work platform and application of PPE is indeed the responsibility of the site manager to supervise and ensure each of the following is enforced and applied as best as possible on the construction site.

- However, the culture and attitude of employees towards safety aspects also need to be given attention. This is because they are the ones who face various types of safety risks during on -site work activities.

- The level of employee safety awareness can be increased through 2 methods. That is through the camp method (fine) & through the sharing of safety briefings.

To interview the expertise risk management for contractor works at slope construction site field, there are 8 participants needed to take part in the interview to rearrange the factors as showed in the Table 1.

II.

III. Table 1. Result of Interview to rearrange the factors

Participant (s)	Work As	Arrangement
1	Experience Labour Worker	1. Identify the scope of work clearly & in detail. 2. Use of Competent Workers/ Skilled Workers. 3. Use of Personal Protective Equipment (PPE) 4. Machinery & Machines are well maintained. 5. Access & Work Platform 6. Worker Culture & Attitudes
2	Consultant Worker	1. Identify the scope of work clearly & in detail. 2. Use of Competent Workers/ Skilled Workers. 3. Use of Personal Protective Equipment (PPE) 4. Machinery & Machines are well maintained. 5. Worker Culture & Attitudes 6. Access & Work Platform
3	Experience Assistant Site Supervisor Worker	1. Identify the scope of work clearly & in detail. 2. Use of Competent Workers/ Skilled Workers. 3. Machinery & Machines are well maintained. 4. Use of Personal Protective Equipment (PPE) . 5. Access & Work Platform 6. Worker Culture & Attitudes
4	Experience Site Supervisor Worker	1. Current weather 2. Identify the scope of work clearly & in detail. 3. Use of Competent Workers/ Skilled Workers. 4. Machinery & Machines are well maintained. 5. Use of Personal Protective Equipment (PPE) . 6. Access & Work Platform 7. Worker Culture & Attitudes

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5	Coordinator Manager	1. Identify the scope of work clearly & in detail. 2. Current weather. 3. Use of Competent Workers/ Skilled Workers. 4. Machinery & Machines are well maintained. 5. Use of Personal Protective Equipment (PPE). 6. Access & Work Platform 7. Worker Culture & Attitudes
6	Consultant in Construction Company	1. Identify the scope of work clearly & in detail. 2. Use of Competent Workers/ Skilled Workers. 3. Machinery & Machines are well maintained. 4. Access & Work Platform 5. Current weather 6. Use of Personal Protective Equipment (PPE). 7. Worker Culture & Attitudes
7	Engineering in Construction Company	1. Identify the scope of work clearly & in detail. 2. Use of Competent Workers/ Skilled Workers. 3. Machinery & Machines are well maintained. 4. Access & Work Platform 5. Current weather 6. Use of Personal Protective Equipment (PPE) . 7. Worker Culture & Attitudes
8	Professional Engineer (IR) in Construction Company	1. Identify the scope of work clearly & in detail. 2. Use of Competent Workers/ Skilled Workers. 3. Machinery & Machines are well maintained. 4. Access & Work Platform 5. Current weather 6. Use of Personal Protective Equipment (PPE) . 7. Worker Culture & Attitudes

CONCLUSION

The arrangement of the factors of risk management (Ghazali, 2017) effect at slope construction site that can be conclude from the interviews all the expertises as: Identify the scope of work clearly & in detail. Use of Competent Workers/ Skilled Workers. Machinery & Machines are well maintained. Access & Work Platform. Current weather. Use of Personal Protective Equipment (PPE). Worker Culture & Attitudes. As we become more particularly concerned about the risk management effect at slope construction site, construction company should have a backup procedure in place, such as coverage or life assurance coverage (Ghazali et.al, 2019, 2017, 2012a, 2012b & 2012c).

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