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Risk Analysis in the Implementation of Phase II Development Project of the South Kalimantan Provincial Social Service Office

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ABSTRACT

In its implementation, construction projects increase yearly due to the high demand for infrastructure such as buildings, roads, and bridges. These projects are not free from risks that can affect cost, time, and quality. This study focuses on the Phase II Development Project of the South Kalimantan Provincial Social Services Office to analyze potential risks. The research method employs a quantitative approach by analyzing Probability and Impact data using the Severity Index. The results are applied to the Probability and Impact Matrix to identify dominant risks and categorize them based on the risk acceptance scale. The findings reveal 12 valid risk variables, with 10 risks categorized as medium and 2 as high. The study provides risk response recommendations to mitigate impacts on the project.

***Keywords**: Risk analysis, Severity Index, Probability and Impact Matrix, dominant risk variable.*

1. INTRODUCTION

Construction projects continue to increase in line with the needs of the community. However, its implementation is often faced with challenges in terms of cost, time, and quality, which are the main goals of project success. Risks become an inevitable part of every project, especially on a large scale, which if not managed properly can hinder the completion of work. To avoid such failures, it is necessary to implement risk management that involves identifying and analyzing risks according to the project context, so that risks can be overcome effectively.

The construction project of the South Kalimantan Provincial Social Service Office, which is part of the relocation of government offices from Banjarmasin to Banjarbaru, has been carried out in stages since 2022. In the first stage, the focus of the work is piling and foundation, while the second stage includes the upper structure, columns, floors, and dak. The project faces various types of risks, including political, technical, and human resource safety risks. Work scheduling is often disrupted by other priorities of local governments, so risk analysis is important.

This research aims to explore and manage risks that arise during the implementation of the project, in order to provide a comprehensive picture of risk management. The results of the analysis are expected to identify potential risks, determine dominant risks, and provide recommendations for appropriate response measures. Thus, this research is expected to help project owners minimize the impact of risks and increas project success.

2. THEORETICAL STUDY

Project Management

Project management is the art and science of managing resources to achieve project objectives efficiently (Husein, 2011; Pujiyono, 2008). Key elements include project objectives, activity processes, and human resources. A systematic process is needed to manage manpower, expertise, funds, and information, with the aim of ensuring smooth implementation, cost control, quality, time, and work safety (Soeharto, 1997).

Risk Identification

Risk identification aims to uncover potential risks based on their probabilities and impacts, both positive and negative (Shortreed et al., 2003). Risks can be classified into pure, speculative, object/human risk, and fundamental risk (Rahayu, 2001).

Risk Assessment

Risks are assessed based on a scale of frequency and consequences. Major risks require intensive management, while minor risks are moderately supervised (Yuliana, 2017). The level of risk is calculated by multiplying the probability by the impact (Godfrey, 1996).

Risk Control

Risk control is carried out by methods such as elimination, substitution, technical engineering, administrative control, and the use of PPE to minimize hazards (OHSAS, 2004; Mantiri et al., 2020). Risk monitoring is also important to ensure the effectiveness of these measures (Uher, 1996).

3. METHOD

This research was carried out in the Phase II Development project of the South Kalimantan Provincial Social Service Office, using purposive sampling techniques to collect data from competent parties, such as owners, contractors, and construction management consultants. Primary data were collected by questionnaires, interviews, and observations, while secondary data was obtained from project documents and literature (Godfrey et al., 1996). Risk analysis is carried out using the Severity Index (SI) method to determine the value of probability and risk impact, which is then calculated as a risk value (R = P x I) and included in the Probability and Impact Matrix to identify the dominant risk (Norken et al., 2015). Dominant risks are further analyzed to determine relevant responses, such as reducing, avoiding, or diverting risks. This study aims to improve the effectiveness of risk management of construction projects and provide recommendations on mitigation strategies to ensure the success of the project (Uher, 1996; Godfrey et al., 1996).

4. RESULT AND DISCUSSION

Based on the identification results, there are 19 risk variables arranged in the table below:

Table 4.1 Risk Variations Used

Risk Variables	Variable Code
Government Policy	P1
Damage to the Surrounding Environment	P2
Asbuilt Drawing document of previous development that is incomplete and clear	P3
Increase in fuel oil prices	P4
Increase in material prices	P5
Bad weather in the form of rain	P6
Lack of availability of tools to carry out the job	P7
Lack of project management implementation	P8
Delays in the delivery of tools and materials	P9
Machine damage	P10
Incompatibility of material use	P11
Scarcity and limitations of materials used	P12
Lack of competent workforce in the implementation of construction	P13
Lack of thoroughness in work	P14

Risk Variables	Variable Code
Lack of teamwork	P15
The occurrence of illegal levies by local community organizations	P16
Work accidents during work in the field	P17
Collapse during the construction of the superstructure	P18
Safety regulations that are not implemented	P19

Validity and Reality Test

The results of the validity test on 14 respondents showed that the value of the correlation coefficient (R-calculus) was greater than the value of the R-table (R-table = 0.532). Therefore, it can be concluded that 12 out of 19 questions asked were declared valid.

Based on the results of the reliability test, Cronbach's Alpha value for frequency is 0.917, while for impact is 0.883. Because Cronbach's Alpha score is more than 0.6, this shows that the questionnaire used has a good level of reliability and can be trusted. Thus, this questionnaire is declared reliable.

Risk Analysis

Table 4.2 Recapitulation of Data Processing Results with Severity Index (SI) Method

It	Risk Variables	Risk Probability		Risk Impact	
		Category	P value	Category	Grade D
A	**Politics**				
1	Government Policy	Enough	3	Tall	4
B	**Nature**				
1	Bad weather in the form of rain	Often	4	Tall	4
C	**Project**				
1	Lack of availability of tools to carry out the job	Enough	3	Tall	4
2	Lack of project management implementation	Enough	3	Tall	4
D	**Technical**				
1	Delays in the delivery of tools and materials	Often	4	Tall	4
2	Machine damage	Enough	3	Tall	4
3	Incompatibility of material use	Enough	3	Tall	4
4	Scarcity and limitations of materials used	Enough	3	Tall	4
E	**Human**				
1	Lack of competent workforce in the implementation of construction	Enough	3	Tall	4
2	Lack of thoroughness in work	Enough	3	Tall	4

It	Risk Variables	Risk Probability		Risk Impact	
		Category	P value	Category	Grade D
F	**Safety**				
1	Work accidents during work in the field	Enough	3	Tall	4
2	Collapse during the construction of the superstructure	Infrequently	2	Tall	4

Risk Value Calculation

The calculation of the risk level value is carried out by multiplying the Probability value (P) by the Impact (I) using the probability and impact scale contained in Table 4.12. The result of this multiplication will produce a value that is used as a reference for risk analysis. The assessment scale used refers to Wirahadikusumah, et al., 2018.

Probability						
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		Impact				

Shoes	Risk
1-5	Low
6-12	Medium
15-25	High

Figure 4.1 Risk Level Assessment Scale

Table 4.3 Recapitulation of Risk Acceptance Scale Results

No	Risk Variables	Scale	Risk Acceptance
A	**Politics**		
1	Government Policy	12	Unexpected
B	**Nature**		
1	Bad weather in the form of rain	16	Unacceptable
C	**Project**		
1	Lack of availability of tools to carry out the job	12	Unexpected
2	Lack of project management implementation	12	Unexpected

No	Risk Variables	Scale	Risk Acceptance
D	**Technical**		
1	Delays in the delivery of tools and materials	16	Unacceptable
2	Machine damage	12	Unexpected
3	Incompatibility of material use	12	Unexpected
4	Scarcity and limitations of materials used	12	Unexpected
E	**Human**		
1	Lack of competent workforce in the implementation of construction	12	Unexpected
2	Lack of thoroughness in work	12	Unexpected
F	**Safety**		
1	Work accidents during work in the field	12	Unexpected
2	Collapse during the construction of the superstructure	8	Unexpected

Risk Response

Table 4.4 Recapitulation of Causes, Risk Response, and Types of Risk Handling

Code	Cause	Risk Response	Type of Handling
P1	Political influence in construction projects leads to the possibility of delays or cancellations of previously planned projects.	Risks can be controlled by the Budget User (PA) and the commitment of the leadership in implementing the set work plan.	Risk Transfer
P2	Bad weather around the project site often causes local rain, while the surrounding location does not experience rain.	Monitor the weather based on rain predictions and live observations and provide anticipation for work that could be hampered by rain.	Risk Reduction
P7	The manpower equipment is inadequate.	Monitor equipment before and after the work is completed and prepare the necessary tools before the work begins.	Risk Avoidance
P8	The lack of the role of construction management experts leads to less effective preparation, implementation, and supervision.	The contractor has at least one competent expert in construction management, both in the field and in cost and time analysis.	Risk Avoidance
P9	Delays in the delivery of tools and materials when needed because the location of the building shop is far from the project.	The role of the project supervisor is to understand material needs so that material shortages can be avoided during the work.	Risk Avoidance

P10	The machine cannot operate when it is needed for critical work.	Where possible, jobs are replaced by labor. Meanwhile, heavy equipment repairs are carried out quickly.	Risk Reduction
P11	An error in the use of materials in one of the work descriptions in progress.	Conduct evaluations related to errors and provide directions to supervisors and workers to prevent similar mistakes in the future.	Risk Reduction
P12	Scarcity or material limitations in one of the project job descriptions.	Make sure to have a distributor or building store that can provide the required stock of materials.	Risk Reduction
P13	The workforce performs work that is not their expertise.	Determine the capacity and expertise of the workforce to ensure assignments match their abilities.	Risk Reduction
P14	Lack of thoroughness of the workforce in carrying out one of the job descriptions.	Cross-check images and volumes before implementation and supervise the work directly to improve the accuracy of the workforce.	Risk Reduction
P17	The occurrence of work accidents, such as stepping on nails, tripping over iron, or falling while carrying materials.	Maintain the safety of the project site by arranging the placement of materials and ensuring the work site is safe from the risk of accidents.	Risk Reduction
P18	The collapse of the superstructure building while it was under construction.	Selecting professional workers and conducting strict supervision by field supervisors during the construction process.	Risk Reduction

5. CONCLUSION

Based on the results of the study, it can be concluded that there are 12 risk variables identified in the implementation of the Phase II Development Project of the South Kalimantan Provincial Social Service Office. These risks include political aspects (government policy), nature (bad weather), project (availability of tools and implementation of project management), technical (delays in material delivery, equipment damage, material inconformities, and material scarcity), and safety (work accidents and superstructure collapse).

The dominant risk is grouped into two categories, namely Medium (Undesirable) and High (Unacceptable). Risks in the Medium category include government policies, equipment availability, project management implementation, equipment damage, material missuits, material scarcity, work accidents, and superstructure collapse. Meanwhile, the High category risks include bad weather and delays in the delivery of tools and materials.

This study shows that of the 12 risk variables, the risk response given is Risk Reduction in 8 variables, Risk Avoidance in 3 variables, and Risk Transfer in 1 variable. This handling strategy is expected to minimize the impact of risks on the construction project.

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