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Risk Analysis of Disaster Management Project in Central Sulawesi Province

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ABSTRACT

Risk is the cause of unexpected conditions that can cause loss, damage, or loss. This is due to the risks contained in construction projects that can affect the productivity and quality of the project. The Central Sulawesi Province 2 School Infrastructure Disaster Management Project, located in Sigi Regency, Central Sulawesi Province, is a project that handles the construction of school infrastructure. This project is also not free from risks that can cause the project not to run as planned and suffer losses. Based on the description above, the researcher is interested in conducting a risk analysis that occurs in the Central Sulawesi Province School Infrastructure Disaster Management Project 2. The methods used in this study are data collection by distributing questionnaires, conducting data analysis, descriptive statistics, reliability tests, risk analysis, risk response and risk control. This research was carried out for 6 months, starting from preparation, implementation, data collection, and monitoring and evaluation. The outputs to be achieved in this study are scientific articles published in research journals and reports on the results of activities.

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INTRODUCTION

Construction projects are a dynamic field and contain risks. Risks can affect the productivity, performance, quality and cost constraints of the project. Risk can be said to be an unexpected consequence. Even though an activity has been planned as best as possible, it still contains uncertainty that it will run completely according to plan [Mastura Labombang, 2011].

Risk is the cause of unexpected conditions that can cause loss, damage, or loss (Flanangan & Norman, 1993). This is due to the risks contained in construction projects that can affect the productivity and quality of the project. (Suharto, 1995)

The Central Sulawesi Province 2 School Infrastructure Disaster Management Project, located in Sigi Regency, Central Sulawesi Province, is a project that handles the construction of school infrastructure which includes Learning Classrooms, Toilets, Offices and Libraries. This project is also not free from risks that can cause the project not to run as planned and suffer losses.

Based on the description above, it is necessary to conduct a risk management analysis in the project to minimize and overcome the risks that will occur. Related to this, this study aims to find out the risks that will occur (Risk Identification), conduct risk analysis (Risk Analysis), respond to risks (Risk Response) and control risks (Evaluation Risk).

Risk is a variation in things that may occur naturally in a situation (Fisk, 1997). Risk is a threat to life, property or financial gains due to the danger that occurs (Duffield & Trigunarsyah, 1999). In general, risk is associated with the possibility (probability) of events beyond expectations (Soeharto, 1995).

So risk is a variation in things that may occur naturally or the possibility of unexpected events that are threats to property and financial gains due to the hazards that occur. In general, risks can be classified according to various points of view depending on the needs in handling them (Rahayu, 2001):

Pure risk and speculative risk Where pure risk is considered an uncertainty associated with the existence of an outcome, namely loss. An example of the pure risk of work accidents in a project. Therefore pure risk is known as static risk. Speculative risk contains two outputs, namely loss and gain. Speculative risk is known as dynamic risk. An example of speculative risk in an insurance company, if the guaranteed risk occurs, the insurance company will suffer a loss because it has to bear the sum insured in the amount of the loss that occurs, but if the guaranteed risk does not occur, the company will make a profit.

Risks to objects and people, where risks to objects are risks that affect objects such as houses burning while risks to humans are risks that affect humans such as the risk of old age, death, etc.

Fundamental risk and particular risk Fundamental risk is a risk that is likely to arise in almost most members of society and cannot be blamed on one or a few people as the cause, examples of fundamental risks: natural disasters, wars. Special risk is a risk that originates from an independent event where the nature of this risk is not always catastrophic, controllable or generally insurable. Examples of special risks: plane crashes, ship crashes, etc.

METHOD

Qualitative analysis is an analysis that is carried out based on intuition, the level of expertise in assessing the amount of risk that may occur and the potential damage. Qualitative analysis is carried out by the process of determining the possibilities as seen in table 2.1 and the impact as seen in table 2.2 of the risks that have been identified. This process is carried out by determining how important it is to pay attention to certain risks and how the response will be given. Meanwhile, quantitative analysis is carried out based on real numbers (financial value) on the amount of losses that occur. The grouping of risk levels, expressed in the form of a risk matrix, is a combination of the risk level of the likelihood of an event and the magnitude of the impact (M.Z Fathoni, 2020).

Table 1. Likelihood Level (Modified from AS/NZS 4360:2004)

Level	Likelihood	Description
A	Almost Certain	It must happen, more than once a year
B	Likely	Occurs frequently, once a year
C	Possible	Usually occurs more than once in 3 years
D	Unlikely	Possible, once in 3 years
E	Rare	Almost never happens, once in 5 years

Table 2. Consequences Level (Modified from PMI, 2017)

Level	Consequences	Impact on project objective		
		Time	Cost	Quality
1	Very low	1 Week	<$100	Minor impact on secondary functions
2	Low	1-4 Week	$100 - $500	Minor impact on overall functionality
3	Medium	1-3 Months	$501 - $1k	Some impact in key functional areas
4	High	3-6 Months	$1k - $5k	Significant impact on overall functionality
5	Very High	>6 Months	>$5k	Very significant impact on overall functionality

Table 3. Risk Matrix (AS/NZS 4360:2004)

Likelihood	Consequence				
	1	2	3	4	5
A	Medium	High	High	Very High	Very High
B	Medium	Medium	High	High	Very High
C	Low	Medium	High	High	High
D	Low	Low	Medium	Medium	High
E	Low	Low	Medium	Medium	High

Risk Response Planning

Risk response planning is a process carried out to minimize the level of risk faced up to the accepted limit. Qualitatively, efforts to minimize this risk are carried out by implementing steps directed at the numbers obtained from the risk analysis process. This can be done by developing options and determining actions to

increase opportunities and reduce threats to project objectives. Includes steps to identify and assign people or groups to be responsible for risk handling.

In general, the techniques applied to handle risk are grouped into several categories, namely:

Avoiding risks, This method is done by not doing activities that bring risks. In terms of project work, it can be done by changing the project plan to eliminate risks. While not all risks can be avoided, some risks may still be avoided. But keep in mind that avoiding risk also means eliminating the opportunity to make a potential profit.

Risk reduction (risk mitigation), includes measures to reduce the chance of risk occurring. Taking early action to reduce the chance of a risk to a project will be more effective than fixing it after a risky event has occurred.

Accepting risks, accepting losses if risky events occur. This can be done if the risk posed is small. The project management or team is ready for the risks that occur by not changing the project plan. Active risk acceptance can be realized by preparing a contingency plan or backup if the risk is expected to occur.

Transfer of risk, transfer of risk to the other party.

Table 3. Risk Categories and Rankings

Risk Identification	Risk Value	Risk Categories	Rank
Is there an increase in material prices during the implementation of the project?	7,93	Medium Risk	13
Delays in the delivery of materials to the site	9,54	High Risk	6
Material quality not in accordance with technical specifications	5,68	Low Risk	22
Lack of concrete quality inspection in the field (slump test)	6,12	Medium Risk	20
The quality of the concrete used is not in accordance with technical specifications	4,59	Low Risk	23
Lack of concrete maintenance or curing	7,45	Medium Risk	15
Incomplete and limited equipment	6,38	Medium Risk	19
Equipment that is no longer viable	5,91	Medium Risk	21
Damage and loss of equipment during project execution	11,52	High Risk	1
Untimely payment by the service user	8,07	Medium Risk	12
Inaccurate cost estimation	8,53	Medium Risk	10
Poor cost control in the field	6,65	Medium Risk	17
Non-compliant technical specifications and working drawings	6,50	Medium Risk	18
Design changes due to adjustments to field conditions	10,26	High Risk	3
Changes in Technical Specifications that result in delays in project implementation	8,84	Medium Risk	8
Changes to the project implementation schedule	10,11	High Risk	5
Lack of manpower in the field	10,14	High Risk	4
Underskilled workforce	8,53	Medium Risk	9
The workforce has low productivity	9,00	High Risk	7
Labor strikes	8,21	Medium Risk	11
Labor fatigue due to overtime work	6,91	Medium Risk	16
Workers do not use PPE while working	11,28	High Risk	2
Workers have work accidents	4,17	Low Risk	24
Road access is an obstacle to the implementation of the project	7,49	Medium Risk	14
Natural disasters occur during the implementation of the project	3,49	Low Risk	25

RESULTS AND DISCUSSION

The discussion of the risks that have the highest risk value in the Central Sulawesi Province Disaster Management project will be discussed as follows:

Damage and loss of equipment occurred during the implementation of the project.

Damage and loss of equipment during the implementation of the project has a risk value of 11.52 in the high risk category and is ranked 1. The lack of maintenance and supervision of the equipment at the project site makes this risk factor with the highest risk value.

Workers do not use PPE while working.

The existence of workers who do not use Personal Protective Equipment while working has a risk value of 11.28 in the high risk category and is ranked 2nd. Workers who do not use PPE while working at the project site have a lack of awareness and are not aware of the importance of using PPE. The lack of awareness of workers in using PPE is also caused by workers feeling uncomfortable when using PPE and feeling disturbed in movement while working. Even though the contractor has provided PPE in good condition and new.

Design changes due to adjustments to field conditions.

The design change due to the adjustment of field conditions has a risk value of 10.26 in the high risk category and is ranked 3rd. The design change that occurred in this project was the change of the RKB Risha building to a conventional RKB building. This is because there are several project locations that have limited road access, so it is necessary to change the design. In addition, the availability of materials in this project is also the cause of the design change. Design changes that occur during the implementation of a project are usually called Contract Change Orders (CCO). CCO can result in losses and have a negative impact on contractors and service users.

Lack of manpower in the field

The lack of labor in the field has a risk value of 10.14 in the high risk category and is ranked 4th. The lack of labor in the field is caused by the lower wages offered by the contractor compared to other projects. The lack of labor at the project site causes work progress to be hampered and results in additional work time.

Changes to the project implementation schedule

Changes in the project implementation schedule have a risk value of 10.11 in the high risk category and are ranked 5th. Changes in the project schedule are caused by changes in the initial design of the project, changes in project specifications and there are materials that are not available in the city around the project so that it takes time to hold the material outside the city. These three things cause project delays which cause the project implementation schedule to change and there is an increase in project time.

Delay in delivery of materials to the Site

The delay in delivering materials to the project site has a risk value of 9.54 in the high risk category and is ranked 6. The delay in the delivery of materials to the project site was caused by the process of obtaining diesel fuel in the city of Palu, Central Sulawesi, which took 2 days to get the needed diesel. In addition, poor access to the project site also causes delays in the delivery of materials to the project site.

The workforce has low productivity

The workforce has low productivity, has a risk value of 9.00 in the high risk category and is ranked 7th. The workforce employed by contractors has low productivity on average, this is due to the fact that the workforce does not have good skills and has low work experience. Workers employed by contractors may also have never participated in training so that when doing work the workers tend to be less efficient in doing their work

Changes in Technical Specifications that result in delays in project implementation.

Changes in technical specifications that result in delays in project implementation have a risk value of 8.84 in the medium risk category and are ranked 8. The change in specifications that occurred in this project was the change of UPVC material to PVC. This change is based on the reduced availability of materials around the project site which results in the service user changing the material. If there are no changes, the process of shipping UPVC materials from outside the region will take a long time and result in project delays.

Risk Management

Based on the risk assessment that has been carried out, it is necessary to handle or mitigate to reduce the impact of the risk. If these risks are not handled, the project will experience something that will result in the project not running according to plan.

Damage and loss of equipment occurred during the implementation of the project.

The best way to avoid damage and loss of equipment during the implementation of the project is to carry out strict supervision of the use of tools at the project site. In addition, the contractor can conduct a routine inventory to periodically monitor the condition and availability of equipment at the project site. This risk management includes risk avoidance actions.

Workers do not use PPE while working.

In this project, the contractor has provided PPE equipment and K3 experts. Even though this already exists, workers still rarely use PPE at work. Therefore, the handling of the risk of workers not using PPE at work is to conduct continuous socialization to workers containing the dangers that can be caused by not using PPE at work. Handling this risk includes risk reduction measures (Risk Resistance)

Design changes due to adjustments to field conditions.

Design changes due to adjustments to field conditions can be prevented by conducting careful surveys and initial planning. By conducting initial planning involving stakeholders and stakeholders, it can make the planning that has been carried out will be in accordance with field conditions. This can prevent design changes due to adjustments to field conditions. This risk management includes risk avoidance actions.

Lack of manpower in the field

In this project, the contractor still lacks a survey related to the wages of workers around the project site. So that the workforce in the field is reduced. It is better that before carrying out the project implementation, the contractor should conduct a survey related to the wages of workers around the project location. So that the workforce around the project site has motivation and enthusiasm to work at the project site. Handling this risk includes risk reduction measures

Changes in the project implementation schedule.

Changes in the project implementation schedule occur due to project delays due to design changes and so on. The contractor should have good management in managing the project. Because schedule changes can be controlled by monitoring and evaluating the project periodically so that the progress of project implementation is not smaller than the progress of the project plan. Good time and cost management from the contractor can overcome delays due to changes in the project implementation schedule. Handling this risk includes risk reduction measures

Delay in delivery of materials to the Site

Mitigation actions that can be taken are planning related to material needs at each project location, conducting surveys related to stores that sell materials around the project site. This is done so that delays in the delivery of materials to the project site can be reduced and the amount of material distributed is in accordance with what is needed. This risk management includes risk reduction measures.

The workforce has low productivity

Mitigation actions that can be taken are to conduct selective recruitment. Strict recruitment is carried out to ensure that workers who will work at the project site have high productivity. Also make sure that the workers who have been recruited have SKT. Handling this risk includes risk reduction measures

Changes in Technical Specifications that result in delays in project implementation.

Changes in technical specifications can be prevented by careful planning by the service user by involving stakeholders. These preventive measures include risk avoidance.

CONCLUSION

The most influential risks in this study are damage and loss of equipment during the implementation of the project, Workers do not use PPE while working, Design changes due to adjustments to field conditions, Lack of workers in the field, Changes in project implementation schedules, Delays in delivery of materials to the Site, Labor has low productivity, Changes in Technical Specifications that result in delays in project implementation.

The handling of the above risks consists of reducing risks (Risk Recution) and avoiding risks (Risk Avoidance),

SUGGESTION

It is recommended that the contractor in carrying out the next construction project pay more attention to risk management before implementation. This aims to minimize risks, so that project goals of cost, time, and quality can be achieved. In addition, contractors are expected to provide occupational health and safety (K3) experts at the project site. Parties involved in the implementation of the project must also be more thorough in the planning and implementation stages to avoid various risks that can affect the quality of the construction project.

REFERENCES

Australian / New Zealand Standard Risk Management AS/NZS 4360:2004, Standards Association of Australia.

Fathoni, M. Z. (2020). Risk Analysis on the Lintel Set Point Manufacturing Project with Qualitative Methods (Case Study: PT. XYZ). Journal of Industrial Systems & Engineering Research and Applications. Vol. XIV No 2. August 2020: 113-126. Gresik.

Fisk, E.R. (1997). Construction Project Administration Fifth Edition. Prentice Hall. New Jersey.

Flanagan, R & Norman, G. (1993). Risk Management and Construction. Blackwell Science, London.

Labombang, M. (2011), Risk Management in Construction Projects, SMARTek Journal, Vol. 9 No. 1. February 2011: 39 – 46. Hammer.

R. Lomothey. (2018). Risk Management (The Project Manager Perspective). Thesis Karlstad Business School. Karlstad University. Sweden

Rahayu, P.H. 2001. Contractor's All Risk Insurance as an Alternative to Project Risk Transfer in the Indonesian Construction Industry. National Seminar on Construction Management 2001. Faculty of Engineering, Parahyangan Catholic University. Bandung.

Soeharto, I. 1995. Project Management from conceptual to operational. Erlangga. Jakarta