

# Implementation of Risk Management in Apartments Development Projects

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**Abstract**—Risk is difficult to predict in construction projects, so it requires a risk analysis. The first risk analysis carried out is the identification of risks to the project. This research uses qualitative methods and risk assessment and to makes a risk register. The results showed that the company carried out mitigation at certain stages, especially at extreme risk and high risk, which needed special attention because this risk would significantly impact project implementation. After mitigation, projects that have a high level of risk and inherent probability have decreased.

**Keywords**—risk management, risk register, construction risk

## I. INTRODUCTION

Apartments are considered as one of the residential solutions in densely populated areas. This is because the building is designed in a vertical direction to be occupied by many families while saving land use. Risk can give influence to the productivity, performance, quality, and cost limits of the project. Risk can be said to be a result that may occur unexpectedly. Even though the activity has been planned, it is still uncertain that it will run entirely after the plan. However, the risks in construction projects cannot be eliminated but can be reduced or transferred from one party to another. In the construction of construction projects, many uncertainties are difficult to predict, so a risk analysis is needed.

Considering that ladder work is a structural element that is no less important in building projects. Besides, doing ladder work innovation is more flexible because it does not have an extreme impact on all construction elements in a project. One of the creations made in the Tamansari Equine apartment development project, Pulomas Park Center, East Jakarta, is to redesign a conventional emergency staircase into a precast staircase construction system. In this paper, research will be conducted on how to apply risk management in apartment development projects.

Risk can be defined as the opportunity for an adverse event to occur due to the uncertainty of what will be faced. Delay is a potential change that will happen in the future due to the inability to know what will happen if an activity is carried out; Chapman and Ward [1] emphasized that it is imperative to

place uncertainty as a starting point in risk management. According to Pertiwi et al. [2], risk can be defined as the opportunity for an adverse event to occur due to the uncertainty of what will be faced. Project risk is an event or condition that, if it happens, can have a positive or negative effect on one or many project objectives [3].

Risk management includes implementing risk management planning, identification, analysis, risk response planning, and controlling risks in the project. Project risk management aims to increase the likelihood of festive project events and reduce the probability of adverse project events [3].

In ISO 31000-2018, the processes in risk management are:

- Communication and consultation
- Scope, context, and criteria
- Risk assessment:
- Monitoring and review
- Recording and reporting

The objectives of this Risk Management System Procedure are:

- I was directing and providing guidance on risk management to be applied to this company so that it can further increase the guarantee of achieving the Vision, Mission, Goals, Strategies, and Targets of the Company.
- Risk Management creates Risk Management value that contributes to the achievement of demonstrable and improved goals, such as health and safety reputation, legal and regulatory compliance, public acceptance, environmental protection, financial performance, product quality, efficiency in operations, and corporate and human governance.

A construction project is a series of activities carried out only once and are generally short-term and have a clear start and end time. In this series of activities, there is a process that processes project resources into actions in the form of

buildings. The process that occurs in this series of activities certainly involves related parties, either directly or indirectly.

**II. METHODS**

This research uses applied research methods. The information obtained is the types of risks in apartment development projects in Jakarta. The chances are grouped based on the project life cycle, including the stages of planning, operation, conception, and execution.

**III. RESULTS AND DISCUSSION**

Risk management is an approach taken to risk, namely by understanding, identifying, and evaluating a project's chances. Then consider what will be done with the impact and the possibility of transferring risks to other parties or reducing the risks. Various sources can be used to identify risks correctly, such as records, practices, and experiences of other parties in similar or relevant companies, literature studies, or modeling. In identifying risks, this company refers to the Risk Register. The risk register is a list containing the entire recapitulation of all analysis work papers and the consequences of risks. The following is the risk register for an apartment building project.

**TABLE I. RISK ASSESSMENT**

No.	Risk Events	Root Cause	Impact
1.	Design foundation used not eligible resources bearing capacity of actual soil	The ability of a subcontractor investigation of the soil is less qualified	1. Not in optimal design foundation; 2. Data on the geology of the soil does not represent.
2.	The collapse of the formwork emergency stairs	The broken scaffold shoring formwork	1. Work accident; 2. Reputase company; 3. Criminal; 4. Time of the implementation is not in accordance with the contract
3.	There is interference on drill hole	Landslide in the hole	The project is not completed in accordance with the contract

**TABLE II. THE LEVEL OF RISK INHERENT**

No.	Risk Events	Probability	Impact	Score	The Level Of Risk
1.	Design of foundation used not qualified power bearing capacity of soil, the actual	4 = Large	4 = Large	16	EXTREME HIGH
	The collapse of the formwork emergency stairs	3 = Medium	4 = Large	12	HIGH RISK
	Sliding in the hole	2 = Small	2 = Small	4	MEDIUM RISK

**TABLE III. RISK MANAGEMENT**

No.	RISK EVENTS	RISK OWNER	MITIGATION ACTIONS	THE COST OF MITIGATION (IDR)
1.	The design of the foundation that executive used not eligible resources bearing capacity of actual soil	Chief Executive	1. Selection of subcon an expert in the field of soil investigation 2. The selection of subcon ever conduct an investigation	125.000.000
2.	The collapse of the formwork emergency stairs	Chief Executive	Checking and maintenance of scaffolding that will be use as the blowtorch	367.454
3.	Sliding in hole	Chief Executive	1. Use some casing; 2. Use of bentonite with a sufficient amount	109.239.000

Table 1-3 are the risk register, there is risk assessment, the level of risk inherent, and risk management. There is an identification of risks that may occur in a construction project if it is seen that the lowest risk is at the construction stage. Based on table 2, the risk during the construction phase that often occurs is a disturbance in the drill hole. This is the highest risk occurs at the construction stage. The problem that can often happen is the foundation design that does not meet the soil bearing capacity requirements. Then another high risk occurs at the implementation stage. this risk that rarely happens in projects is the collapse of the emergency staircase formwork.

At this stage, the necessary mitigation measures will be identified to minimize the consequences of these risks. Sources of risk with a fairly large percentage of the extreme risk and high risk are safety and the environment. The construction process, in general, is an activity that carries a lot of risks. As the responsible party in the field for the duration of the construction, the project management team must support and implement programs that can guarantee or minimize work accidents or preventive measures. After being mitigated, projects with a high-risk level with an inherent probability of 70% decreased to 25% with a mitigation cost of Rp 105,307,250, and the risk level also decreased. The second-high risk with a probability of 50% after mitigation decreases to 20% with a mitigation cost of Rp. 38,038,800. It can be seen in the inherent table below.

#### IV. CONCLUSION

It is imperative to carry out risk management in every construction project to avoid losses on the project cost, quality, and schedule. Risks that are classified as extreme risk and high

risk based on the source of the most considerable risk, namely those with the largest percentage, are 70% classified as extreme risk and 50% classified as high risk. This states that apartment building project planning is not planned in detail, causing errors or inappropriate implementation. Handling risks classified as extreme risk and high risk based on the source of risk, namely redesigning the foundation design and checking and maintaining tools.

#### REFERENCES

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