

Risk Management Analysis of Construction Projects on Time Performance

Muhammad Ma'ruf Al Matin¹, Annisa Azhar Firdausi², Hendramawat Aski Safarizki^{3*}

^{1,2,3}Department of Civil Engineering, Faculty of Engineering, Universitas Veteran Bangun Nusantara Sukoharjo, Indonesia, Jl. Letjend S. Humardani No 1, Bendosari, Sukoharjo, Indonesia

*hendra.mawat@gmail.com

Abstract. Project risk is an uncertain situation in a project so that it can lead to consequences that can hinder the achievement of the main project objectives. Risks to the project need to be identified and analyzed in order for the project to run well. The Hidayatul Qur'an Lissa'adah Islamic Boarding School construction project is a self-managed construction project that experienced delays in its implementation time based on the results of observations and preliminary interviews with the development committee. With risk management aims to identify and reduce the risks that occur in the implementation of the Hidayatul Qur'an Lissa'adah Islamic Boarding School construction project so that the project can be completed immediately. Project delays cannot be separated from the existence of several risks that cannot be avoided, but can be minimized by risk management. In this study, identification with the Cochran q-test was carried out on the risks to determine the risks that greatly affect delays in the project, then carried out an analysis of the risks that occurred with the severity index and then carried out appropriate mitigation actions against these risks, so that the project could be completed immediately. Based on tests and calculations using the Cochran q-test and severity index. The results obtained through this study are that there are 4 dominant risks in the medium and high categories, namely the risk of incorrect or incomplete design (11.39%), the risk of cash flow congestion (11.39%), the risk of problematic service providers (20.25 %) and the risk of the covid pandemic outbreak (31.64%).

Keywords: *Project Risk, Risk Management and Time Performance*

1. Introduction

Project delays are often a problem in construction work. Construction project delays can be caused by several risk factors such as improper management of materials, labor, finance, equipment and an unsupportive environment and other risks that affect project time performance resulting in losses. The existence of proper risk management can be used as a treatment to minimize the impact that occurs due to risks to the project so that the project can run according to the planned budget, the expected quality and especially the project is completed on the planned time.

The construction project of the Hidayatul Qur'an Lissa'adah Islamic Boarding School building in Karanganyar is a self-managed construction project where the project owner (owner) directly appoints a person who is an expert in the field of construction for the implementation of the project. Based on observations, the project which started in early 2019 is targeted for completion of phase 1 in mid-2021, but in practice the project has been delayed by more than 1 year, this is certainly a very serious problem and needs to be followed up through risk management.

Each project certainly has activities in implementation that are different from one another and the magnitude of the elements of uncertainty in each activity can trigger various risks and have an impact on project time performance, the risks from construction projects need to be managed appropriately so that based on this the authors are interested in conducting research related to risk management on project time performance which includes risk identification, risk analysis and mitigation actions that can be carried out with the aim of

minimizing and avoiding the risks that exist in the implementation of the construction of the Hidayatul Qur'an Lissa'adah Islamic Boarding School building so that the project can be completed immediately.

Three of the most risk factors were the three main risk factors: late delivery of expensive materials, costly equipment breakdowns, and expensive rains [1]. Final project research on "Risk Management Assessment in High Rise Building Construction Projects (Case studies: Tunjungan Plaza 6 Surabaya Project and One East Residence Apartment Project). Through this research, it was concluded that: There were 35 technical risk and management risk variables on the project [2].

Construction projects have a number of varied risks, especially in self-managed projects that involve many parties, and use a variety of resources, and face many problems of uncertainty and risk in the project, if they occur, it can reduce time losses that can cause the project to be delayed [3].

A construction project is a series of activities that are interrelated with each other with efforts to build an infrastructure building. The existence of factors of uncertainty and other unexpected things often causes failure to achieve project goals/targets in general [4].

On the ongoing project, it is necessary to have a control effort or an arrangement that can overcome the problems that exist in the implementation of project risks and uncertainties, which is called risk management.

Risk in the context of a construction project is defined as a description of the unfavorable consequences, financially or physically as a result of decisions taken or due to environmental conditions at the location of an activity [5]. The definition of project risk is defined as how many activities, events or activities that tend to cause a negative impact on the project plan, quality, performance, timing or cost [6].

Risk can be said to be a result that may occur unexpectedly. Even though an activity has been planned as well as possible, it still contains uncertainty. This risk can lead to additional costs and delays in project completion planning [7]. Risk management is a structured process and stages to reduce and avoid risks. The stages include risk identification, risk assessment, risk acceptance, risk mitigation, and allocation of risk ownership [8]. The purpose of risk management is to improve project performance from start to finish by identifying, evaluating, and controlling project risks [9].

Through several understandings from the experts above, project risk can be interpreted as an uncertain condition on the project so that it can lead to consequences that are considered unfavorable to the project and can hinder or hinder the achievement of the main project objectives, namely cost, quality, and time.

This research was conducted to determine the risk factors that occur on time performance, the level of risk levels that occur on time performance, as well as to determine the handling actions against risk responses that occur on time performance in the Hidayatul Qur'an Lissa'adah Islamic Boarding School construction project.

2. Methods

Risk Management is defined as the process of identifying, measuring and ascertaining risks and developing strategies to manage those risks. In project management, project risk management is the art and science of identifying, analyzing, and responding to risks throughout the life of the project and still ensuring the achievement of project objectives [10].

The research variables were obtained through literature studies using scientific journals and from previous research on risk management in construction projects, observations and semi-structured interviews, which will later be used as risk identification in the questionnaire. In this study using literature instruments, questionnaires and interviews.

The research method used in this study uses descriptive qualitative methods, research by describing project conditions using available data analysis. In the following study, primary data were obtained from observations, interviews and questionnaires distributed to respondents. The secondary data used included the project organizational structure, structural drawing design and project implementation documentation.

3. Results and Discussion

The research was conducted by distributing a phase 1 questionnaire containing 26 risk variables derived from scientific journals and preliminary interviews. Phase 1 questionnaire aims to identify risk factors that cause time delays in research projects. After the identification results were obtained, the questionnaire phase 2 was continued to the respondents with the aim of analyzing the level of frequency and impact of the risks that occurred. Then testing with a risk matrix to find out the risk categories contained in the Hidayatul Qur'an Lissa'adah Islamic Boarding School construction project. The results of data analysis based on testing and analysis are summarized in Table 1.

The risks that arise in the project, both from management and implementation have different levels. The magnitude of each level of risk related to the time performance of the Hidayatul Qur'an Lissa'adah Islamic Boarding School construction project is as follows.

- a. Lack of workforce skills or abilities (1,26%)
- b. Low level of labor productivity (1,26%)
- c. Inappropriate selection of construction method (2.53%)
- d. Natural conditions or weather (2.53%)
- e. Natural conditions or weather (2.53%)
- f. Damage or loss of materials (5.06%)
- g. Change order (Changes in a construction project which includes the replacement, reduction, addition or removal of work after the contract is signed) (5.06%)
- h. Poor or poor site and site conditions (5.06%)
- i. Incorrect or incomplete design (11.39%)
- j. Cash flow congestion (11.39%)
- k. Troubled service providers (20.25%)
- l. Covid pandemic outbreak (31.64%)

The dominant risks faced in the project, of course, are deemed very necessary to be addressed and action taken given the large impact on project time performance. So it is necessary to respond to risks in the form of risk management actions.

Wrong or incomplete design risk response: Incorrect or incomplete design that occurs in the project because the planned design is not in accordance with actualization in the field or is not mature enough. So it is necessary to redesign or redesign by taking into account the direct conditions that exist in the project.

Problematic service provider risk response: Ending cooperation with problematic service providers and replacing them with new ones coupled with more involvement and supervision from the development committee on the course of construction project implementation so that the project can be carried out properly.

Disaster or epidemic risk response: Applying the 3M pattern in project implementation during a pandemic, namely by using masks, washing hands and maintaining distance. Then also develop a new implementation schedule and increase the productivity level of the workers.

Response to the risk of cash flow congestion: Seeking additional financial assistance in the form of donations from donors and congregations, making project development proposals equipped with existing data for later distribution, and making infaq boxes for Islamic boarding schools.

Table 1. Recap of Research Results

No	Risk Identification	Risk	Frequency	Impact	Scale	Level	Category
X3	Incorrect or incomplete design	12	C	C	9	11,39 %	Medium
X7	Inappropriate selection of construction methods	9	SJ	R	2	2,53 %	Low
X9	Damage or loss of materials	10	J	R	4	5,06 %	Low
X15	Insufficient availability of labor	7	SJ	R	2	2,53 %	Low
X16	Lack of workforce skills or abilities	8	SJ	SR	1	1,26 %	Low
X17	Low level of labor productivity	8	SJ	SR	1	1,26 %	Low
X20	Troubled service provider	10	S	T	16	20,25 %	High
X21	Change order (change in project)	11	J	R	4	5,06 %	Low
X22	Weather conditions	11	SJ	R	2	2,53 %	Low
X23	Covid pandemic outbreak	12	SS	ST	25	31,64 %	High
X24	The bad condition of the location and site	9	J	R	4	5,06 %	Low
X26	Cash flow bottleneck	11	C	C	9	11,39 %	Medium

4. Conclusion and Recommendation

Based on the results of this risk management analysis research, it was found that several risk variables had a fairly large value compared to other risks, namely the medium-high category (medium-high). These risks occur and have a significant impact on the delay in the implementation of the Hidayatul Qur'an Islamic Boarding School construction project. There are 4 most dominant risks in the medium and high categories, namely incorrect or incomplete designs (11.39%), cash flow congestion (11.39%), problematic service providers (20.25%) and the covid pandemic outbreak (31,64%).

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