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Analysis of Risk Mitigation Measures in Housing Constraction Projects in Klaten District, Indonesia

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A B S T R A C T

The population growth in Klaten Regency has increased by 3% over the last 5 years. This causes the need for housing to become a primary need for local communities. Because of this increase, there will be many housing development projects that will definitely need to take risk control or mitigation steps in housing construction with the aim of ensuring that housing development projects comply with planning. This research uses a quantitative research approach by conducting a data survey in the form of distributing questionnaires to 30 expert respondents. Then data processing and data analysis using descriptive methods to explain the results of data processing and analysis that have been carried out. From the results of research conducted and surveys of respondents, it was found that 25 risk control steps or mitigation steps were taken by developers in dealing with risk constraints in housing development projects. And of the 25 risk control steps or mitigation steps, there are 5 risk control steps or mitigation steps that are often carried out by developers when facing risk constraints in housing development projects.

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INTRODUCTION

In a housing development project there definitely is implementation schedule also activity planning, which project activities will be based on at the time of implementation which is described in the contract document between the manager and the consumer. According to(Ishmael, 2013)that the risk factor is an uncertainty that exists, so in the course of development progress itself sometimes experiences obstacles caused by several risk factors that have not been properly managed beforehand and this will have an impact on project delays.

The impact of the risks posed will result in material losses for development project implementer and housing owners(Putra Wijaya et al., 2022). Because in general the parties involved in a development project include the owner (project owner), consultants, both planners and implementing consultants, then contractors, workers, local government, material suppliers, and the community who will be in direct contact with the construction project agenda.(Salain et al., 2019). Therefore, the concept and technical planning of a construction project must be truly mature.

Therefore, a well-structured risk management approach is expected to prevent losses from occurring(Vikaliana, 2017). Risk management includes identifying risk factors, then analyzing steps to mitigate and then controlling risks to reduce the risk of loss due to obstacles in the field.

In this research, we will discuss risk control measures that occur in housing development projects as well as risk factors. This research aims to find out the appropriate mitigation steps that are often taken by developers in Klaten Regency to deal with risk problems that occur during housing development projects.

THEORETICAL REVIEW

Risk

In the world of housing construction projects, there are definitely risk factors that can become obstacles to whether a housing project runs smoothly or not. Sometimes the planning that has been carried out often encounters unexpected field conditions(Surabaya, 2023). Therefore, it is necessary to carry out investigations related to risk factors with the aim of providing clarity about the conditions surrounding the project to find certain conclusions.

Risk Management

Housing development projects or other projects have their own risks, both high and low risks, this is because there are limitations in the project activities and expectations that can sometimes change. Therefore, risk management is needed to identify and manage risks in the construction project process. The stages in risk management include planning risk management, identifying risks, analyzing risks that occur, and monitoring risks, as well as steps to minimize risks that occur.(Susanto, 2020).

Risk Identification

Risk identification is an activity to seek information regarding the condition of a construction project due to uncertainty which leads to the emergence of a risk. The identification will make it easier for project implementers to minimize the emergence of risks.

Risk Analysis

After a risk identification is carried out, a risk analysis is carried out using previous information to see the consequences of how often and how badly the risks occur in that place.(Salain et al., 2019).

Therefore, a good systematic risk analysis can help identify and see how often risks arise at the construction project site. Also, risks that are in the high category can be a major concern, thereby clarifying the potential losses incurred(Ni Made Sintya Rani & Ni Kadek Sri Ebtha Yuni, 2021).

Risk Mitigation

After risk management is carried out, it is necessary to control the risks that occur so that losses do not occur due to obstacles in the field. If risk management discusses concepts and planning to deal with risks that occur, then risk mitigation is an effort from concepts and planning that have been carried out to control these risks.(Mawaddah, 2021).

METHODOLOGY

This research mean for men find out there is huhthe relationship between risk factors and mitigation measures due to obstacles that arise in housing projects in Klaten Regency. For this reason, this research uses a quantitative approach in its research. Quantitative research itself is an approach to testing the relationship between variables which can later be measured using instruments. Or it could be said that the quantitative approach aims to test hypotheses that have been created by conducting surveys or conducting experiments.

Then in this method, variable analysis is carried out on research that has been carried out, so that in get a data presentation in the form of complete information regarding variable-variable based on classification which have been compiled by researchers(Zaluchu, 2020). Therefore, this research uses descriptive methods where the results will be in the form of an accurate presentation of the results of the research and the variables in it (Zaluchu, 2020).

Types of Research

Type of research me used quantitative approach to testing a hypothesis already created then using descriptive research methods to explain the results of the research that has been carried out.

Object of Research

The research object is divided into two, namely population and sample, with multipurpose sampling technique.

Research Instrument

Research instruments are used to provide an overview of the research tools that will be used.

Validity Test & Reliability Test

Validity Test inanimate test whether the research tool is valid or not. And Reliability Superintendence out about consistency of the questionnaire used.

Primary Data

Primary data constitutions is in get by using survey method from respondents.

Secondary Data

Secondary data is data that is collected get it from source thirdly or through available sources such as literature studies.

The following are the stages in the research carried out:

1. The initial stage that must be carried out is that the researcher conducts a literature study to increase knowledge and a reference base for the research he wants to conduct based on previous research.
2. Then the researchers determined risk factors using risk factors in previous research. After obtaining the risk factors in previous research, the researcher identified mitigation measures based on literature studies to serve as a reference in this research, the aim of which was to determine mitigation measures in housing development projects in Klaten Regency. And from the literature study, several mitigation steps were taken to be used as research instrument variables.
3. In this third stage the researcher conducted a preliminary survey with Elasticsearch instruments that have been identified first. And at this stage the results of a preliminary survey of several respondents were also found which then carried out validity and reliability tests for men find out whether or not the research questionnaire instrument is appropriate to be used at the research stage.

   After finding the results of the validity and reliability tests with test results that were declared valid and reliable, the researchers conducted research by giving questionnaires to 30 respondents in accordance with literature studies regarding determining the number of respondents. After being given the research questionnaire, the results of the research from the respondents were found and the researchers then processed the data from the research results.
4. In this fourth stage, based on the results of the research that has been carried out, the researcher carries out analysis and discussion of the results of the questionnaire that has been previously processed. So from the results of the analysis and discussion, the researcher obtained several mitigation steps taken by developers in Klaten Regency in facing risk constraints in the field. Also from the results of the analysis of the discussion, results were found in the form of mitigation steps that were

often taken by respondents to deal with obstacles due to risks in development projects in Klaten Regency.

Then, after analyzing the discussion regarding mitigation steps for risk factors and mitigation steps that are often taken to deal with risks due to obstacles in the field, a conclusion of the research results is made. Also research suggestions that have been carried outdo it.

RESULTS AND DISCUSSION

The risk factors taken are derived from a follow-up study by previous researchers in Klaten Regency, where the researchers then tried to find out appropriate or appropriate risk control measures and are often carried out by developers in Klaten Regency in dealing with risk threats that suddenly appear in the field. In carrying out the research, the researcher conducted a literature study and produced a research instrument which then the researcher conducted a survey in the form of interviews to validate and verify the mitigation measures that had been prepared and also distributed questionnaires to respondents to look for data and information regarding appropriate or appropriate risk control measures and often carried out by developers in Klaten Regency based on research instruments that have been designed. From the results of the research, it is known that appropriate mitigation steps have been discussed in the identification of mitigation steps and also mitigation steps that are often carried out by developers in Klaten Regency to control risks are discussed in the next point.

Identify Mitigation Measures

After in conducted a preliminary survey and the results were found in the form of respondents' opinions regarding mitigation measures, then a tabulation of draft risk control measures was made for several risk factors in housing development projects sourced from literature studies and also sourced from respondents in the preliminary survey. From the results of the follow-up survey, it was found that there were 25 variable risk control measures. The following is a list of risk control steps in a housing development project:

Table. 1 Risk Mitigation Step

Risk factor	Code	Mitigation Steps Against Risk Factors
Facing bureaucratic & licensing obstacles	Q1	Provide explanations to related parties regarding the project description
	Q2	Approach the local bureaucracy
	Q3	Providing outreach to stakeholders about the projects being implemented
	Q4	The contractor must approach the local bureaucracy
	Q5	Coordinate with related parties so that the project runs smoothly
Delay in delivery of materials	Q6	Preparing alternative suppliers
	Q7	Carrying out PO (purchase orders) based on calculations of material requirements
	Q8	Ensure that the provision of materials has been carefully planned
	Q9	Making order schedules and executing material orders carefully as well as coordinating with fellow stakeholders
	Q10	Schedule material delivery in detail, including conditions regarding delivery
	Q11	Looking for alternative material delivery routes to minimize difficulties in distributing materials
Increase in material prices	Q12	Increase minimum stock in warehouse
	Q13	Order materials according to schedule needs early in time
	Q14	Increase the number of alternative material suppliers who offer readiness to provide materials
	Q15	Providing a warehouse to minimize material price increases
Low labor productivity	Q16	Monitoring workforce discipline
	Q17	Prioritize a productive workforce
	Q18	Recruiting professional workers
	Q19	Conduct contracts with workers who have skills clearly and systematically
	Q20	Ensure that the number of craftsmen is in accordance with the plan so that it is productive
	Q21	Increase supervision by adding worker heads and foremen
	Q22	Additional working hours such as overtime
Poor material quality	Q23	Conduct a survey of material shops or material providers who actually have good quality materials
	Q24	Qualify the materials required specifically before ordering
	Q25	Make more specific material requests

Source: Data analysis, 2023

From table V.12 above, developers in Klaten Regency agree that risk mitigation or control measures in housing construction projects are appropriate to be carried out as control measures for existing risks.

Mitigation Steps Often Taken by Developers

After tabulating mitigation measures that have been verified and declared appropriate by several developers in Klaten Regency, questionnaires are then distributed to respondents with the contents of the questionnaire as in table V.12 to find out the risk control measures that are often used by developers in Klaten Regency to deal with there are risks in housing construction projects in Klaten Regency. On the questionnaire that has been distributed is as follows:

Table. 2 Risk Mitigation Steps Based on Average Values

Risk factor	Code	Mitigation Steps Against Risk Factors	Average
Facing bureaucratic & licensing obstacles	Q1	Provide explanations to related parties regarding the project description	4.48
	Q2	Approach the local bureaucracy	4.45
	Q3	Providing outreach to stakeholders about the projects being implemented	4.45
	Q4	The contractor must approach the local bureaucracy	4.35
	Q5	Coordinate with related parties so that the project runs smoothly	2.42
Delay in delivery of materials	Q6	Preparing alternative suppliers	4.81
	Q7	Carrying out PO (purchase orders) based on calculations of material requirements	4.77
	Q8	Ensure that the provision of materials has been carefully planned	4.68
	Q9	Making order schedules and executing material orders carefully as well as coordinating with fellow stakeholders	4.58
	Q10	Schedule material delivery in detail, including conditions regarding delivery	4.52
	Q11	Looking for alternative material delivery routes to minimize difficulties in distributing materials	4.42
	Q12	Increase minimum stock in warehouse	3.9
Increase in material prices	Q13	Order materials according to schedule needs early in time	4.61
	Q14	Multiply networking with supplier of alternative materials that me make an offer readiness to provide materials	4.55

	Q15	Providing a warehouse to minimize material price increases	3.1
	Q16	Monitoring workforce discipline	4.87
	Q17	Prioritize a productive workforce	4.87
	Q18	Recruiting professional work	4.84
Low labor productivity	Q19	Conduct contracts with workers who have skills clearly and systematically	4.84
	Q20	Ensure that the number of craftsmen is in accordance with the plan so that it is productive	4.71
	Q21	Increase supervision by adding worker heads and foremen	4.26
	Q22	Additional working hours such as overtime	2.48
	Q23	Conduct a survey of material shops or material providers who actually have good quality materials	4.9
Poor material quality	Q24	Qualify the materials required specifically before ordering	4.71
	Q25	Make more specific material requests	4.61

Source: Data analysis, 2023

Based on the results of table V.13 in the form of respondents' responses regarding risk control measures in housing development projects above, an analysis of the mitigation steps that are often carried out by developers in Klaten Regency can be carried out in dealing with risks or minimizing risks that will & will occur in the project. So, based on the central value found from table V.13, it can be concluded that the highest average value is the central value or it can be said that mitigation measures with a high average value are mitigation measures that are often used or carried out by developers in Klaten Regency in facing obstacles. due to emerging risks.

In the first risk caused by bureaucratic and licensing obstacles, based on the table above, an average of 4.48% of developers in Klaten Regency use risk control measures in the form of provide an explanation to related parties that has been previously discussed regarding the description of the project that will be or is currently underway. This is same with research(Lestari et al., 2022), where in facing bureaucratic and licensing obstacles, mitigation steps can be taken in the form of outreach or providing explanations to related parties.

Furthermore, the risk due to delays in material delivery, an average of 4.81% of developers in Klaten Regency procure alternative suppliers to cover the risk of material delays. Where is this? suit with research(MJ & Hasibuan,

2020)which discusses the risk of cost delays as well as steps to prepare alternative suppliers to minimize the risk.

Then the risk due to increases in material prices in Klaten Regency, an average of 4.61%. 30 developer respondents took risk control steps in the form of ordering materials early according to planned needs to minimize sudden increases in material prices. Where are these results in accordance with research (Situmorang et al., 2018)the result is to order materials early to minimize sudden increases in material prices.

Regarding the risks resulting from low labor productivity, an average of 4.87% of the 30 developer respondents in Klaten Regency took action by monitoring labor discipline and prioritizing productive labor to minimize the occurrence of low labor productivity. So the results of this research same with research(Dharmayanti et al., 2022)which discusses the risk of decreased workforce productivity with mitigation steps in the form of monitoring discipline and prioritizing productive workforce to minimize this risk.

Then, regarding the last risk due to poor material quality, an average of 4.9% of the 30 developer respondents in Klaten Regency minimized the risk by conducting surveys at material shops or material providers who actually had good quality materials before implementing a project. And this is a step taken from the results of a preliminary survey and is also a mitigation step which, on average, is often taken to minimize the risk of poor material quality.

CONCLUSIONS AND RECOMMENDATIONS

Based on the research that has been carried out, it can be concluded that mitigation steps in the form of risk control against bureaucratic and licensing obstacles can be achieved providing an explanation to related parties regarding the project description is a mitigation step often carried out by developers in Klaten Regency, then approaching the local bureaucracy; provide outreach to stakeholders about the projects being implemented; The contractor must approach the local bureaucracy; Coordinating with related parties so that the project runs smoothly is an appropriate mitigation step.Furthermore, in facing problems with delays in material delivery preparing alternative suppliers is a mitigation step that is often carried out by developers in Klaten Regency, then carrying out a PO (purchase order) based on the calculation of material requirements; ensure that the provision of materials has been carefully planned; making ordering schedules and executing material orders carefully as well as coordinating among stakeholders; schedule material delivery in detail, including conditions regarding delivery; looking for alternative material delivery routes to minimize difficulties in distributing materials; increasing the minimum stock in the warehouse is an appropriate mitigation step.Then by the way ordering materials according to the schedule of needs in advance is a mitigation step that is often carried out and increases the number of alternative material suppliers who offer readiness to provide materials; Providing a warehouse to minimize material price increases is also an appropriate mitigation step in controlling risks due to material price increases.Furthermore, in facing risks due to low labor productivity monitoring workforce discipline is

a mitigation measure that is often carried out by developers in Klaten Regency, apart from prioritizing a productive workforce; recruiting professional workers; use of skilled workers and a clear contract system with workers; ensure the number of craftsmen is in accordance with the plan so that they are productive; increasing supervision by adding worker heads and foremen; additional working hours such as overtime is an appropriate mitigation step to control the risks that arise.

Based on the research results and data analysis, the suggestions that can be conveyed from this research are:

1. When searching for respondents to provide responses regarding the questionnaire, it is best to search for respondent information early.
2. Limit respondents to a maximum of 2 people from each developer, so that the data found can be more varied, informative and constructive.
3. The statements or questions asked do not need to be many, but they must be competent.

FURTHER STUDY

Furthermore conducting surveys at material shops or material providers who actually have good quality materials is a step that is often taken by developers to minimize the risk due to poor material quality and appropriate mitigation steps to control risks, namely by qualifying the specifically required materials before ordering; make more specific material requests

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