

Risk project management analysis

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1 Risk project management analysis

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Abstract. The purpose of this study was to know the risk of project management analysis. Performance Indicator Project is a temporary activity that has been established beginning of its work and the time of completion to achieve specific and unique goals and outcomes that aims to produce a useful or value-added product or novelty. In a project no risk will always be attached to it. A project will be confronted by many unanticipated risks so the success of a project to achieve its project objectives should be based on clear risk management from planning to completion of the project. PT.XYZ is a company engaged in construction. Currently PT. XYZ is working on a car plant development project. The risks considered at this stage of project planning are considered to be the same, the way to deal with each risk does not consider the impact of risk and does not have a clear mechanism in its mitigation arrangements. Problems arise when a risk occurs at the time of project execution that there is a mistake in determining the level of interest of the risk so that it effects on the mitigation. The impacts associated with the project are increasing the cost and time of the project so that it is not in accordance with the project planning that has been estimated previously. So, the purpose of this study is to assist the project team in implementing risk management on the project by determining the level of risk importance, taking into account the magnitude of the impact of the risk and determining the mitigation of the risk by involving the Probability Impact Matrix (PIM).

1. Introduction

A project is a temporary activity that has been established beginning of its work and its completion time to achieve specific and unique goals and outcomes that aim to produce a useful or value-added product or novelty. In a project no risk will always be attached to it. A project will be confronted by many unanticipated risks so the success of a project to achieve its project objectives should be based on clear risk management from planning to completion of the project [1].

Risk management defined a systematic process of identifying, analyzing and resolving the project's risk issues, including maximizing the probabilities and consequences of positive events and minimizing the probability and consequences of adverse events against project objectives [2]. Project risk cannot be eliminated but can be avoided, accepted, transferred depending on the type of risk and impact on the sustainability of a project. If a risk occurs on a project and the project is not [3].

Performance Indicator Project is a temporary activity that has been established beginning of its work and the time of completion to achieve specific and unique goals and outcomes that aims to produce a useful or value-added product or novelty. In a project no risk will always be attached to it. A project will be confronted by many unanticipated risks so the success of a project to achieve its project



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objectives should be based on clear risk management from planning to completion of the project. PT.XYZ is a company engaged in construction. Currently PT. XYZ is working on a car factory development project called "New Model Building HPM". In this project PT.XYZ considers project risk at the project planning stage. Risk identification is done by determining the list of risks that may arise on the project, but each risk condition is considered equal and the way of handling for each risk does not consider the impact of risk and does not have a clear mechanism in its mitigation arrangements. Problems arise when a risk occurs at the time of project execution that there is a mistake in determining the level of interest of the risk so that it effects on its mitigation. Based on the problem, it causes increase of project cost and time so that there is inconsistency with project planning. therefore, the purpose of this study is to assist the project team in implementing risk management on the project by determining the level of risk importance, taking into account the magnitude of the impact of the risk and determining the mitigation of the risk by using some relevant methods.

2. Literature review

Risk management

Risk management is an approach to risk by understanding, identifying and evaluating a project's risks. Then consider what will be done to the impact posed and the possibility of transferring the risk to the other party or reduce the risk that occurred. Risk management is all a series of risk-related activities of planning, assessment, handling or risk response and risk monitoring [1].

2.1. Probability Impact Matrix (PIM)

Probability Impact Matrix (PIM) is used to generate a relative ranking of risk events, combining the probability steps expressed as the percentage probability that will occur or the frequency and impact in one or more dimensions. PIMs that can be used to analyze threats and opportunities, the matrix can be used to define a Probability-Impact score for each risk event, enable events to be prioritized, and to plan risk events to provide graphical representations often known as risk maps or risk profiles [4].

3. Research methods

Problem identification

The identification stage is the introduction of a problem on a construction project running on PT. XYZ so that the problem is defined as a statement that concerns a variable or relationship between variables in a project risk condition that is related to time, cost and project resources.

3.1. Data collection

Based on the variables in a project condition resulting from the identification stage of the problem, then the data collection through the literature and the results of previous research by studying, researching and reviewing various literature sourced from books, texts, journals, readings that are related to the risk management of a project.

3.2. Risk management planning

At this stage a decision is made to carry out risk management activities for a construction project in PT.XYZ and regulate its implementation techniques. Determining the types and types of risk management so relevant to the type of project available, providing adequate resources and time in risk management activities and establishing agreed upon basis in the risk evaluation process.

3.3. Identification of project risk factors

After obtaining the appropriate literature on the issues to be raised in this study, the next step is to identify the risk factors for the New Model Building HPM project for the scope of the construction project/profile construction project in PT.XYZ. The stages are as follows:

- **Project risk investigation:** This stage of a project risk is defined, involving macro risks within the scope of project planning and project construction profile in PT.XYZ i.e. the risk that will affect the estimated cost, time, project resources. Project managers work with risk management teams using brainstorming and problem identification techniques to identify potential problems.
- **Construction Project Planning:** This stage is the stage in which a construction project is planned to define the scope of the "New Model Building HPM" project work in PT.XYZ and the estimated cost, time, and project resources as reflected in the project planning documentation.
- **Completion:** This stage is the stage where the project planning document "New Model Building HPM" in PT.XYZ is a list of project work carried out the analysis and identification of the possibility of risk on each job. In addition to the project planning document the risk identification process can be obtained from interviews with project managers to see the risks that have occurred in past projects for similar projects implemented by PT.XYZ.

3.4. Risk assessment

Several possible risks arising within the scope of subsequent project planning are assessed risk by scenario analysis i.e. techniques for assessing risks from a list of potential risks in the event of undesirable events, the end of events, important benefits or impacts of damage, probability of occurrence, occurrence of events and interactions with other parts of the project. Risk assessment is documented in the form of risk assessment form. At this stage the risk will be classified according to the severity of risk and resulted in the form of risk assessment matrix format, so that from this matrix will be seen the risk priority that must be considered. Furthermore, it will be determined the level of risk interest by using Probability Impact Matrix (PIM) interviews to project managers in determining alternative actions as decisions of each risk (mitigation) risk according to their level [5].

3.5. Development of risk response

Based on the results of the risk assessment stage that is a risk event has been identified and assessed then at this stage made the decision to respond appropriately risk events and determine the person in charge in accordance with SOP and the task of responsibility on the project team. Each risk event that has been assessed will be determined by the person in charge. In general, the strategy of response to these risks are reduce risks, avoidance of risks, moving risk, risk sharing and accepting risk.

3.6. Stage monitoring and control of risk response

At this stage executed the execution of risk response strategies, monitoring of risk-causing events, and monitoring actions undertaken by project personnel

4. Result

The project identified in this case is the "New Model Building HPM" project implemented by PT. XYZ which is a construction project planned to be implemented within 10 months. As for the risks of the project will be carried out risk analysis to further be determined plan handling of any possible risks that occur in the implementation of the project.

4.1. Risk management planning

In the implementation of the project can occur things that are not expected to be called a risk. If these risks occur then the project cannot realize its objectives i.e. in terms of time, the cost and quality of the project is not precisely achieved. So that the project goal can still be achieved then PT. XYZ in this case the Project Team develops a project risk plan that determines how the risk management process and approaches are used.

4.1.1. *Organization chart of accident and calamity.* This section illustrates the project organizational structure for relationships between specific project team sections in risk management.

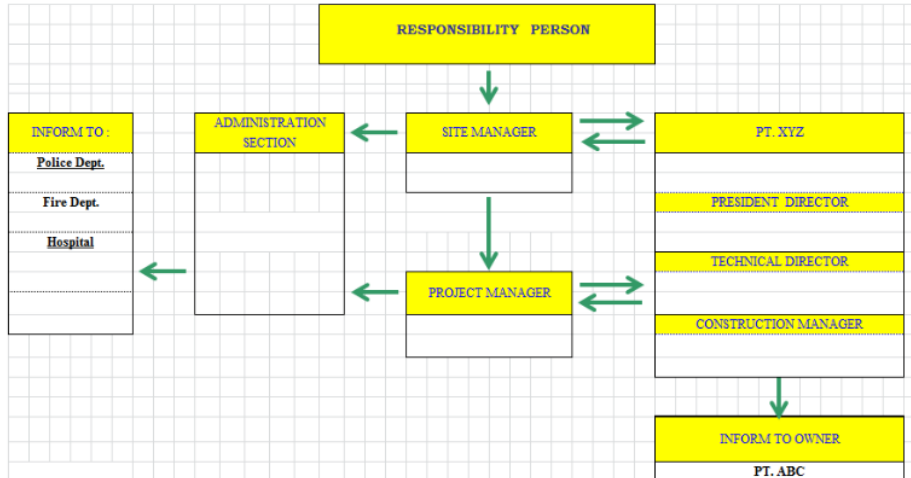


Figure 1. Organization chart of accident and calamity PT.XYZ.

4.1.2. *Site safety organization chart*

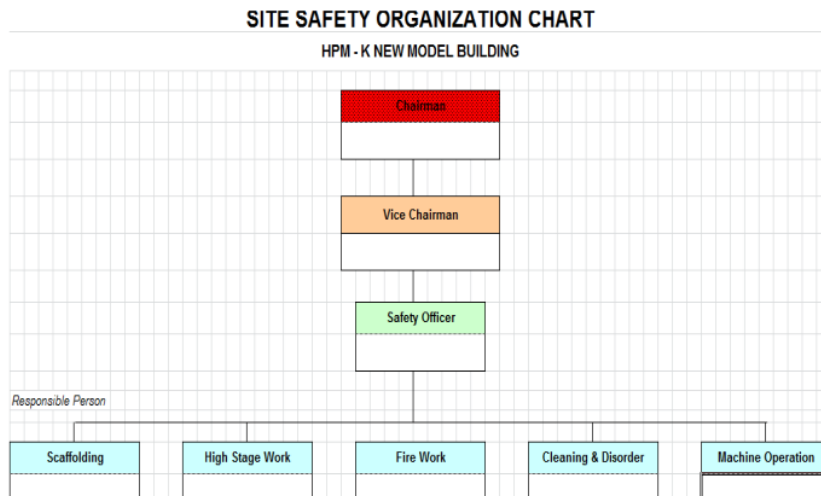


Figure 2. Site safety organization chart PT.XYZ.

4.2. Identification of project risk factors

At this stage a risk assessment is carried out that affects the project and documents its characteristics based on interview techniques related to the "New Model Building HPM" project. Results from previous project management planning and project data are used as input for this phase projects.

Table 1. Project Risk List of "New Model Building HPM"

No	Risk Name	Risk Code
1	Physical Field	
	1.1. Material that is not in accordance with the required specifications	R1
	1.2. Material defects or damaged	R2
	1.3. Loss of material	R3
	1.4. Lack of material	R4
	1.5. Unpredictable weather	R5
	1.6. Coordination with difficult communities	R6
	1.7. Access to project environments that are not supported	R7
	1.8. Field preparation	R8
	1.9. Lack of employees, labor, equipment, time and cost	R9
2	Delays and Disputes	
	2.1. Implementation of inefficient work	R10
	2.2. Delays caused by other parties	R11
3.	Direction and Supervision	
	3.1. Error in documentation	R12
	3.2. Communication gap	R13
	3.3. Planning error	R14
	3.4. Inaccuracy in the selection of consultants or contractors	R15
	3.5. Uninsured things beyond control	R16
	3.6. Work accident	R17
	3.7. Protests from certain organizations	R18
4.	External Factors	
	4.1. Government policies and regulations on taxes	R19
	4.2. Labor strikes	R20
5.	Payment	
	5.1. Limited funding	R21
	5.2. Disadvantages and measurement errors and calculations	R22
	5.3. Currency exchange rate fluctuations	R23
	5.4. Inflation	R24
	5.5. Equipment replacement cost	R25
6.	Law	
	6.1. Legislation changes	R26
	6.2. Legal understandings	R27

4.3. Risk assessment

Any risks generated from the risk identification stage will then be assessed by providing an assessment scale using Boston's rectangular matrix (Boston Square Matrix). The shape of the Boston Square Matrix can be seen in figure 3.

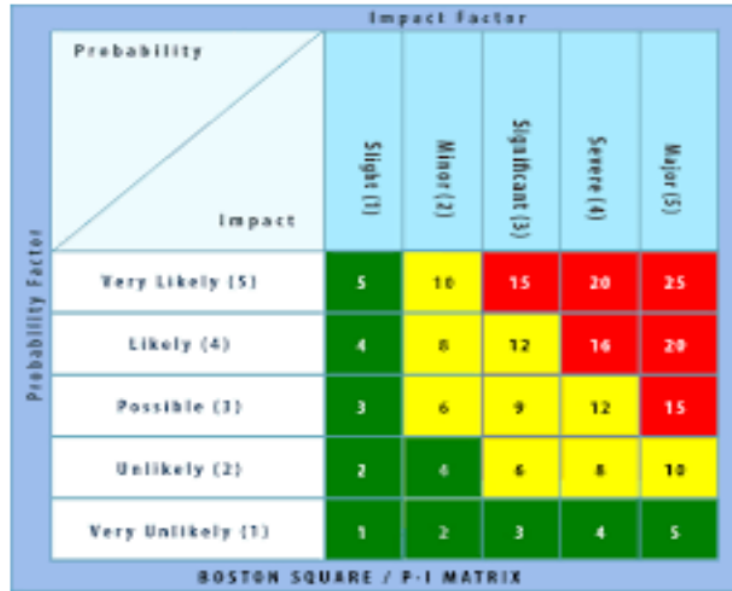


Figure 3. Boston square matrix.

The impact assessment criteria can be seen in table 2.

Table 2. Impact assessment criteria.

No	Assessment	Consequences
1	Slight	The impact is not significantly felt, financial loss is meaningless
2	Minor	Need direct handling on the spot, financial loss becomes the cost of additional expenditure (overhead)
3	Significant	Need to be handled by the executor, financial loss is quite meaningful
4	Severe	Failure, decreased productivity, significant financial loss, need special handling
5	Major	Mistakes affect other, need handling by director, big loss, need special handling

Table 3. Category of risk level.

No	Risk Code	Level of Risk Interest	Risk Level	Consequences
1	R1	6	Significant	Need to be handled by the executor, financial loss is quite meaningful
2	R2	6	Significant	Need to be handled by the executor, financial loss is quite meaningful
3	R3	9	Significant	Need to be handled by the executor, financial loss is quite meaningful
4	R4	9	Significant	Need to be handled by the executor, financial loss is quite meaningful
5	R5	16	Severe	Failure, decreased productivity, significant financial

Table 3. Category of risk level.

No	Risk Code	Level of Risk Interest	Risk Level	Consequences
				loss, need special handling
6	R6	4	Minor	Need direct handling on the spot, financial loss becomes the cost of additional expenditure (overhead)
7	R7	4	Minor	Need direct handling on the spot, financial loss becomes the cost of additional expenditure (overhead)
8	R8	4	Minor	Need direct handling on the spot, financial loss becomes the cost of additional expenditure (overhead)
9	R9	16	Minor	Need direct handling on the spot, financial loss becomes the cost of additional expenditure (overhead)
10	R10	4	Minor	Need direct handling on the spot, financial loss becomes the cost of additional expenditure (overhead)
11	R11	4	Minor	Need direct handling on the spot, financial loss becomes the cost of additional expenditure (overhead)
12	R12	1	Minor	Need direct handling on the spot, financial loss becomes the cost of additional expenditure (overhead)
13	R13	1	Minor	Need direct handling on the spot, financial loss becomes the cost of additional expenditure (overhead)
14	R14	9	Significant	Need to be handled by the executor, financial loss is quite meaningful
15	R15	9	Significant	Need to be handled by the executor, financial loss is quite meaningful
16	R16	4	Minor	Need direct handling on the spot, financial loss becomes the cost of additional expenditure (overhead)
17	R17	6	Significant	Need to be handled by the executor, financial loss is quite meaningful
18	R18	2	Minor	Need direct handling on the spot. (<i>overhead</i>)
19	R19	6	Significant	Need to be handled by the executor, financial loss is quite meaningful
20	R20	12	Severe	Failure, decreased productivity, significant financial loss, need special handling
21	R21	16	Severe	Failure, decreased productivity, significant financial loss, need special handling
22	R22	16	Severe	Failure, decreased productivity, significant financial loss, need special handling
23	R23	12	Severe	Failure, decreased productivity, significant financial loss, need special handling
24	R24	16	Severe	Failure, decreased productivity, significant financial loss, need special handling
25	R25	6	Significant	Need to be handled by the executor, financial loss is quite meaningful
26	R26	4	Significant	Need to be handled by the executor, financial loss is quite meaningful
27	R27	1	Minor	Need direct handling on the spot, financial loss becomes the cost of additional expenditure (overhead)

4.4. Development of risk response

At this stage the decision is made to respond appropriately to the risk event and to determine the person in charge in accordance with the SOP and the task of responsibility on the project team. This decision is based on the type of risk response that is reduction, avoidance, transfer, sharing and accept risk. The results of this step are in Table 4.

Table 4. Risk response.

No	Risk Code	Risk Level	Type of Response
1	R1	Significant	Accept the Risk
2	R2	Significant	Reduction
3	R3	Significant	Accept the Risk
4	R4	Significant	Avoidance
5	R5	Severe	Avoidance
6	R6	Minor	Reduction
7	R7	Minor	Accept the Risk
8	R8	Minor	Accept the Risk
9	R9	Minor	Reduction
10	R10	Minor	Reduction
11	R11	Minor	Reduction
12	R12	Minor	Accept the Risk
13	R13	Minor	Accept the Risk
14	R14	Significant	Avoidance
15	R15	Significant	Avoidance
16	R16	Minor	Risk Transfer
17	R17	Significant	Avoidance
18	R18	Minor	Avoidance
19	R19	Significant	Accept the Risk
20	R20	Severe	Avoidance
21	R21	Severe	Avoidance
22	R22	Severe	Avoidance
23	R23	Severe	Avoidance
24	R24	Severe	Accept the Risk
25	R25	Significant	Accept the Risk
26	R26	Significant	Accept the Risk
27	R27	Minor	Accept the Risk

Where in accordance with SOP for person in charge related to risk response are as follows:

- Responsibility Person
- Site Manager
- Project Manager
- Administration Section

Based on the level of risk and type of response for each risk in table 5 is an example of mitigation or technical handling for some risk examples.

Table 5. Examples of risk handling.

No	Risk	Risk Level	Handling
1	Weather that cannot be predicted	Significant	Observe daily weather predictions, stop work that is affected by the weather and do other jobs that are not affected by the weather.
2	Material defects	Significant	The establishment of a team of quality materials to ensure the quality of materials and suppliers in the process of procurement of materials.
3	Loss of material	Significant	Immediately purchase missing materials, perform better surveillance.
4	Lack of material	Significant	Doing work that can be completed without having to wait for material supply of material late, looking for material in other suppliers.
5	Weather that cannot be predicted	Major	Observe daily weather predictions, stop work that is affected by the weather and do other jobs that are not affected by the weather.

4.5. Monitoring and control of risk response

Monitoring and control of risk responses is the process of safeguarding identified risks, monitoring risks, and identifying new risks, ensuring the implementation of risk plans, and evaluating their effectiveness in reducing risk. Implementing risk monitoring and control is an ongoing process for project life and sustainability.

5. Conclusion

Based on the results of risk analysis and identification that have been done then this risk management can provide an overview for the project team in risk considerations, by measuring the level of risk importance so that the basis in decision-making, risk response and mitigation of the appropriate project when the risk actually occurred project. Being a new form of evaluation and change strategy in subsequent project planning, to be a cost and time project appropriate to the estimation process of project planning.

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