

INFORMATION SYSTEM OF PROJECT RISK MANAGEMENT IN CV. CITRABUANA

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CV. CITRABUANA is a company associated with construction. From the several projects that have been done before, the company has problems in terms of risk, while the risks that have been experienced by the company are uncertain weather, material prices that suddenly rise, loss of material in the project location, accidents of labor, sick workers, long traffic jams and material cars that cannot enter the project location. The cause of these risks is that the parties from the building material store did not confirm the increase material prices, high vehicle volumes, and vehicle entry and exit to the project location, which did not allow the entry of large cars carrying the materials, traffic jams, lacking of the material stock at the building material store, the workers that not careful while working. From the description of the risks above, the Field Manager is difficult to determine the level of risk that arises. The next problem is that the Field Manager has difficulty finding out the costs caused by the risks that arise. In this study, using the Probability Impact Matrix (PIM) method to determine the level of risk that arises, using this method can answer the problem of the difficulty in determining the level of risk that arises. And the Expected Monetary Value (EMV) method to find out the costs needed when the risk arises. Judging from the results of the explanation problems above, it is necessary to have a project risk management information system that can help the Field Manager in determining the level of risks that arise and determine the cost required due to risk. Before the existence of this system, the company is still handling risks in accordance with the risk reports that come in, it resulted the Field Manager sometimes not right in handling the risks that arise. With the existence of this system, the Field Manager can handle the right risk based on the level of importance of the risk.

Keywords: project risk management, level of risk importance, costs incurred due to emerging risks, Probability Impact Matrix, Expected Monetary Value.

1. PRELIMINARY

CV. CITRABUANA is a company engaged in construction in Soreang Kab. Bandung.

Based on the interview with Mr. Dede Sukarsa as the Responsible FAQ Classes CV. CITRABUANA stated that at this time Fields Responsible difficulty in determining the level of importance of risk

Happen. In a project that implemented the company, there is a risk that appears simultaneously on the same day. During Fields Responsible conduct risk management based on risk reported in advance with consideration see previous projects, so do not know the impact of these risks is large or small. However, in addition to the emergence of a risk at the same time, the difficulty Courses Responsible in determining the cost entailed when risks arise, it resulted in the planned costs are not in accordance with the realization. During this time the company has done a risk control, such as the use of cash to cope with additional costs according to plan. However, as usual, using the company's cash on an ongoing basis,

The information system is a combination of human, computer, information technology, and procedures, which processes the data, to achieve certain goals. [1]. A management information system is interconnected systems associated with data processing output desired by the user [2]. This project is an activity that is professional to produce the desired results. [3]. Project management is an activity that includes project planning, project implementation, project control, and coordination of the project from start to finish project for the right time, the corresponding cost and right quality [4]. Project risk is an event that happens when the project is underway, but it happens erratic and unpredictable. If there is a positive or negative effect on the project, it meant nothing to do with the scope of the project, the project schedule and project quality cost project [6]. Web server is a service in running the software or applications on the world wide web (www) [8]. PHP is a web-based programming language [9]. black-box testing methods discuss the functional purpose of the application, therefore the black-box testing is considered appropriate in application development [10].

2. RESEARCH RESULT

2.1 Research Methodology

The research methodology used in this research is descriptive research methodology.



Picture 1 Research methodology

2.2 Risk Management Project

Project risk management is a process that has been traced to plan a project that will be done, to identify projects to be carried out, which analyzes the project and respond to the risks involved in this project. [1]

Table 1 List of Risk

No.	Risk List
1	Unpredictable weather
2	Material prices suddenly rise
3	Long traffic jam
4	Car materials can not enter the project site
5	The loss of material on project location
6	material delays
7	Labor accidents
8	Labor pain

2.2.1 Risk Management Plan

Risk management plan is a process for managing a risk that the project progresses.

2.2.1.1 Risk Management Plan: Inputs

In the analysis of risk management, have some input.

1. Project Scope Statement

In this study, the authors use projects that have been completed by the company.

Table 2 Project Scope Statement

name of Job	Starti ng Job	Wo rk Don e	Price (USD)	VAT 10% (USD)	Total (USD)
Rehab / Maintena nce Jl. Soreang Indah Complex	April 3, 2018	May 17, 2018	90,000,372	9000037	99,000,409

2. Budget plan

Budget plan on the rehabilitation project / maintenance Jl. Soreang Indah Complex.

Table 3 Budget Plan

Commentary	Vol	Sat	Total price
Mobilization	1:00	Ls	4,007,000.00
Safety and traffic management	1:00	Ls	1,905,000.00
Aggregate Base Class A	2:26	M3	637,648.25
Lapis absorbing binder - Liquid Asphalt	18:12	Ltr	263,143.49
Plywood Adhesives - Asphalt Cait	319.29	Ltr	4,637,020.95
Laston Lapis Aus (AC-WC)	59.51	tonne	78,550,560.00
Total Price Work			90,000,372.68
Tax			9,000,037.27
Total Number of Jobs			99,000,409.95
Total Rounded			99,000,409.00

3. Plan Project Schedule

Plan project schedule in rehab / maintenance Jl. Soreang Indah Complex

Table 4 Plan Project Schedule

No.	Job description	Sunday
1	Mobilization	Week 1, week 3 and week 4
2	Safety and traffic management	Week 1 to Week 6
3	Aggregate Base Class A	Week 1 and Week 2
4	Lapis absorbing binder - Liquid Asphalt	Week 1 and Week 2
5	Plywood Adhesives - Liquid Asphalt	Week 3 and Week 4
6	Laston Lapis Aus (AC-WC)	Week 4 to Week 6

2.2.1.2 Risk Management Plan: Output

At the time-frequency, incidence risk is 1-5 times, then this description is not often, 6-10 times, the statement frequently and 11-15 times, then his statements very often. To determine the output of the analysis process of risk management can be seen in Table 5.

2.2.2 Risk identification

Risk identification is the process by which process comprises determining the risk may affect the viability of the project, and keep records on this risk.

2.2.2.1 Risk Identification: Inputs

At the risk identification process has some input.

1. Risk Management Plan

The data used in the risk management plan can be seen in Table 5.

2. Budget plan

Data used in the budget plan can be seen in Table3

3. Plan Project Schedule

The data used in planning the project schedule can be seen in Table 4.

4. Organizational structure

Project organization is a picture of the structure of human resources involved in the project.

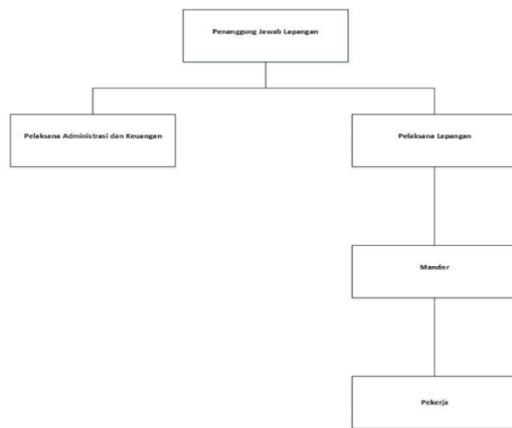


Figure 2 Project Organization Structure

2.2.2.2 Risk Identification: Output

To determine the output of the risk identification process can be seen in Table 6.

2.2.3 Qualitative Risk Analysis

Qualitative risk analysis is a process to put a value on a qualitative risk analysis, which here gives the value of the interest risk that arises when the project is underway, which will be used for analysis and response to the risks of the project, and the possibility of the emergence of these risks and impacts.

2.2.3.1 Qualitative Risk Analysis: input

In qualitative risk analysis, have some input.

1. Risk List

The data used in the risk list can be seen in Table 1.

2. Project Scope Statement

The data used in the project scope statement can be seen in Table 2.

3. Risk Management Plan

The data used in the risk management plan can be seen in Table 5.

2.2.3.2 Qualitative Risk Analysis: output

1. Risk identification

The data used in risk identification can be seen in Table 1.

2. Determining the Value Impact and Likelihood

Once you have a list of risk, then the risk will be assessed based on the probability and impact value ..

Table 7 Boston Square Matrix

Possibility	Very high	5	10	15	20	25
	High	4	8	12	16	20
	moderate	3	6	9	12	15
	Low	2	4	6	8	10
	Very Low	1	2	3	4	5
		Very low	Low	moderate	High	Very high
		Impact				

For the assessment of the impact and probability can be seen in the following table.

Table 8 Assessment Criteria Due / Impact

Value	appraisal	Result / Impact
1	Very low (Slight)	The impact is not so perceived, and also does not affect the duration of the work / project.
2	Low (Minor)	Need immediate treatment, and also increase the duration of the work.
3	Medium (Significant)	Courses need to be addressed by the Executor, the delay duration of work is quite significant.
4	High (Severe)	The existence of a significant delay, and the productivity of work decreases.
5	Very High (Major)	Error impact on other processes, need handling by the Responsible field, and the addition of the duration of the work; ..

Table 9 Measurement Probability

Value	Parameter	Possibility
1	Very Low (Slight)	Rare, and occurs only when certain conditions only.
2	Low (Minor)	Sometimes happens, and when it occurs in certain conditions.
3	Medium (Significant)	Can happen, and when it occurs in certain conditions.
4	High (Severe)	Occur in certain circumstances only.
5	Very High (Major)	It often happens, and when it occurs in certain conditions.

Based boston matrix, of any risk assessment is made into a scale that is scale level of risk, the value of which is from 1 to 25.

Table 10 Level Risk Scale

Scale	value Risk
1-5	Low
6-14	moderate
15-25	High

Table 11 Level of Risk Scale

No .	type Risk	Risk Codes	Possibility	Impact
1	External Risks			
1.1	Unpredictable weather	R1	3	3
1.2	Material prices suddenly rise	R2	5	5
1.3	Long traffic jam	R3	4	4
1.4	Car materials can not enter the project site	R4	2	5
2	Risk Tools and Materials			
2.1	The loss of material on project location	R5	2	4
2.2	material delays	R6	2	4
3	Labor Risk			
3.1	Labor accidents	R7	4	4
3.2	Labor pain	R8	2	2

3. Determining the Importance of Risk

The next stage is to determine the value of the interest level of risk using Probability Impact Matrix. The level of interest risk is calculated using the formula Risk Exposure.

Table 12 Interest Rate Risk Calculation Results

Risk Codes	type of Risk	Possibility	Damap	Importance	Risk level
External Risks					
R1	Unpredictable weather	3	3	9	moderate
R2	Material prices suddenly rise	5	5	25	High
R3	Long traffic jam	4	4	16	High
R4	Car materials can not enter the project site	2	5	10	moderate
Risk Tools and Materials					
R5	The loss of material on project location	2	4	8	moderate
R6	material delays	2	4	8	moderate
Labor Risk					
R7	Labor accidents	4	4	16	High
R8	Labor pain	2	2	4	Low

4. Handling Risk

Based on the results of risk assessment, risk management will then be carried by personnel in charge of Field

Table 13 Risk Control Measures

Risk Codes	type of Risk	Risk level	Risk Management Measures
R1	Unpredictable weather	moderate	Adding manpower or more hours.
R2	Material prices suddenly rise	High	Doing agreement to store building
R3	Long traffic jam	High	Setting a good traffic
R4	Car materials can not enter the project site	moderate	Did a survey and tell the store building to use smaller vehicles
R5	The loss of material on project location	moderate	Increase oversight of project location material
R6	material delays	moderate	To coordinate the shop building
R7	Labor accidents	High	Provide guidance to workers to always be cautious
R8	Labor pain	Low	Utilizing the existing workforce with overtime, if they do not do more labor kekejar

Based on the results of risk analysis using Probability Impact Matrix, the results of the risk analysis used in the evaluation phase.

2.2.4 Quantitative Risk Analysis

Quantitative risk analysis is a process in stages that are numerical analysis or analyzes of the numbers as a result of the risk of existing projects, affect the objectives of the project ..

2.2.4.1 Quantitative Risk Analysis: Inputs

In qualitative risk analysis, have some input.

1. Project Scope Statement

The data used in the project scope statement can be seen in Table 2.

2. Risk List

The data used in the risk list can be seen in Table1

3. Risk Management Plan

The data used in the risk management plan can be seen in Table 5.

2.2.4.2 Quantitative Risk Analysis: Output

1. Risk identification

From table 1, obtained the list of risks. For a quantitative risk analysis stage, the risk list have risk which can be detrimental in terms of cost.

Table 14 Results Recap Risk Identification

Risk Codes	type of Risk
R1	Unfavorable weather
R2	The loss of material at the site
R3	Labor accidents
R4	Labor pain
R5	Material prices suddenly rise
R6	material delays

2. Expected Monetary Value Calculation Method

Method Expected Monetary Value (EMV) is a method to calculate the value - the average expenditure that may or may not occur. If the EMV positive value, then it shows the possibility of the project, whereas if the value of EMV is negative, then it shows the threat or threats that may hurt the company when carrying out the project. EMV is the formula [6]

$$\text{EMV} = \text{Probability} \times \text{Consequence}$$

Information :

EMV = Cost required when the risk occurs

probability = The probability of risk

consequence = The impact of risk

Scoring the probability and consequences of each risk is done by collecting data through interviews with Mr. Dede Sukarsa as Responsible Fields CV. CITRABUANA which refers to the probability scale table quantitative analysis, can be seen in Table 15 and 16.

Table 17 Calculation of Cost of Risk Using EMV

Risk Codes	type of Risk	Risk level	Probability (%)	Consequences (USD)	EMV (USD)
R1	Unfavorable weather	moderate	70	- 2,500,000	- 1,750,000
R2	The loss of material at the site	moderate	70	- 2,300,000	- 1.61 million
R3	Labor accidents	High	100	- 3,500,000	- 3,500,000
R4	Labor pain	Low	30	- 250,000	- 75,000
R5	Material prices suddenly rise	High	100	- 4,500,000	- 4,500,000
R6	material delays	moderate	70	- 2,500,000	- 1,750,000
Total (USD)					- 13.185

Risk Codes	type of Risk	Risk level	Probability (%)	Consequences (USD)	EMV (USD)
					million

2.2.5 Risk response

Risk response is an action to plan a response or the response to the risks that occur, which aims to reduce the impact on the project objectives.

2.2.5.1 Risk Responses: Inputs

In the process of risk tangapan, have some input

1. Risk List

The data used in the risk list can be seen in Table 1

2. Risk Management Plan

The data used in the risk management plan can be seen in Table 5.

2.2.5.2 Risk Response: Output

To know *output* of the risk response process, can be seen in Table 18.

2.2.6 Monitoring Risk

Monitoring risk is an menganalisis and planning process for the new risks arise unforeseen, look for the source of the risks identified, the analysis dealing with risks emerging without previously predicted, monitor the risks that may occur, and assess the risk of a given response.

2.2.6.1 Monitoring Risks: Inputs

At the risk monitoring process, have some input.

1. Risk Management Plan

The data used in the risk management plan can be seen in Table 5.

2. Risk List

The data used in the risk list can be seen in Table 1

2.2.6.2 Monitoring Risk: Output

To view the output of the risk monitoring process can see the table below.

Table 19 Output Monitoring Risks

N o.	type of Risk	Risk response	Risk level	Risk strategy	Information
1	External Risks				
1. 1	Unpredictable weather	Adding manpower, overtime	moderate	Risk is reduced	appropriate recommendations
1. 2	Material prices suddenly rise	Enter into agreements to building stores in advance	High	Risks Reduced	appropriate recommendations
1. 3	Long traffic jam	Setting a good traffic	High	Risks Reduced	appropriate recommendations
1. 4	Car materials can not enter the	Do a survey first	moderate	Risks Reduced	appropriate recommendations

N o.	type of Risk	Risk response	Risk level	Risk strategy	Information
	project site				
2	Risk Tools and Materials				
2. 1	The loss of material on project location	Increased scrutiny on material	moderate	Acceptable Risk	appropriate recommendations
2. 2	material delays	To coordinate with the shop building	moderate	Risks Reduced	appropriate recommendations
3	Labor Risk				
3. 1	Labor accidents	Provide guidance to workers to be careful in work	High	Risks Moved	appropriate recommendations
3. 2	Labor pain	Overtime, increase labor	Low	Risks Moved	appropriate recommendations

2.2 Analysis of User Needs

Users of this system is Responsible Fields and The Field, following the permissions of each user:

1. Responsible Field

Responsible field can manage risk management, see the report data, and manage data evaluation

2. Field Executive

The Field can view project data, manage reports and view data evaluation

2.3 Analysis Database

Database analysis is an analysis stage to describe a desired system in the form of tables that are related.

Figure 3 Design Database



2.4 Functional Needs Analysis

Analysis of functional requirements is a step that describes the process of a functional system built-functional along with that of the risk management information system in CV. CITRABUANA

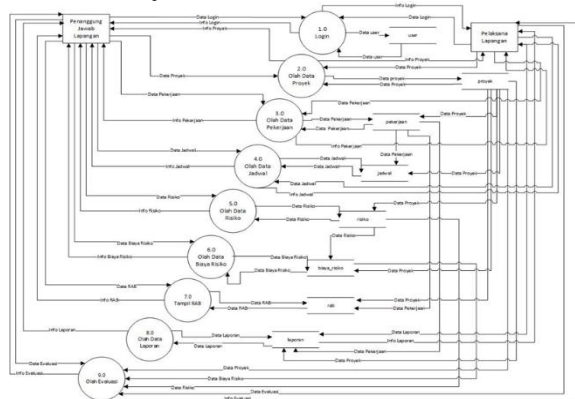


Figure 4 Functional Design System

2.5 display Program

Here is a view of Risk Management Information Systems program Projects CV. CITRABUANA.

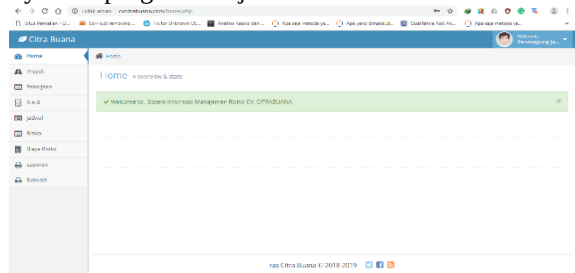


Figure 5 Display Program

2.6 examination

Testing the system aims to find faults and flaws in the software or system being built.

2.6.1 Blackbox testing

Based on the results of black box testing has been done on the Project Risk Management Information System at CV. CITRABUANA, it can be concluded that the application is built has been tested based on the needs that exist, and the process in this application is correct and as expected. The shape of the error display is quite easy to understand. Functionally, this application has generated an expected output.

3 COVER

So the conclusion from a study of the Project Risk Management Information System at CV. CITRABUANA are:

So the conclusions of the study Information Systems Project Risk Management CV. CITRABUANA are:

1. This system can help Responsibility Program in determining the level of risk incurred. Where before this course Responsibility system to handle risk is based only on the first report in without seeing the level and impact caused by these risks. With this system, the Responsibility Program can be easy to deal with risks that are handled first, based on the risk level.
2. This system can help Responsibility Program in determining the costs of emerging risks. Where before the system does not know Responsible Course fees required when the risk arises, so companies do not have an exact figure for how much to charge for emerging risks. With this system, a field that is responsible to determine the cost required when the risk occurs, so that the company can allocate funds to risk the risk that the project will be.

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Table 15 Quantitative Analysis Probability Scale

Risk level	Probability scale
Low	1-30, of projects that happened before
moderate	31-70, of projects that happened before
High	71-100, of projects that happened before

Table 16 Consequences Scale Quantitative Analysis

Probability Scale (%)	Consequences value (USD)
1-30, of projects that happened before	Rp. 50.000 - Rp. 1,000,000 of charges ever issued in the previous project
31-70, of projects that happened before	Rp. 1.001 million - Rp. 3,000,000 of charges ever issued in the previous project
71-100, of projects that happened before	Rp. 3.001 million - Rp. 5,000,000 of charges ever issued in the previous project

Table 18 Output Feedback Risk

N o.	type of Risk	Risk response	Risk level	EMV	Risk strategy
1	External Risks				
1. 1	Unpredictable weather	Adding manpower, overtime	moderate	- 1,750,000	Risk is reduced
1. 2	Material prices suddenly rise	Enter into agreements to building stores in advance	High	- 4,500,000	Risks Reduced
1. 3	Long traffic jam	Setting a good traffic	High		Risks Reduced
1. 4	Car materials can not enter the project site	Do a survey first	moderate		Risks Reduced
2	Risk Tools and Materials				
2. 1	The loss of material on project location	Increase scrutiny on material	moderate	- 1.61 million	Acceptable Risk
2. 2	material delays	To coordinate with the shop building	moderate	- 1,750,000	Risks Reduced

3	Labor Risk				
3. 1	Labor accidents	Provide guidance to workers to always be cautious	High	- 3,500,000	Risks Moved
3. 2	Labor pain	Overtime, additional manpower	Low	- 75,000	Risks Moved

Table 5 Output Analysis of Risk Management

No.	type of Risk	Action	Roles & Responsibilities	budgets	Time	Risk Category	chance	Impact
1	Unpredictable weather	Adding manpower, overtime	Field Executive	Using Money Typical Companies	Often	moderate	moderate	moderate
2	Material prices suddenly rise	Enter into agreements to building stores in advance			Often	High	Very high	Very high
3	Long traffic jam	Setting a good traffic			Very often	High	High	High
4	Car materials can not enter the project site	Conducting a survey beforehand, and told the store building to use smaller vehicles			Not often	moderate	Low	Very high
5	The loss of material on project location	Increased scrutiny on material	Field Executive	Using Money Typical Companies	Not often	moderate	Low	High
6	material delays	To coordinate with the shop building			Not often	moderate	Low	High
7	Labor accidents	Provide guidance to workers to always be cautious	Field Executive	Using Money Typical Companies	Not often	High	High	High
8	Labor pain	Utilizing the existing workforce, with overtime, if they do not kekejar plus workers			Not often	Low	Low	Low

Table 6 Output Risk Identification

No.	type of Risk	Risk Codes	Response	Causes Risk
1	External Risks			
1.1	Unpredictable weather	R1	Adding manpower, overtime	
1.2	Material prices suddenly rise	R2	Doing agreement to store building	Party store building did not confirm the increase in raw material prices
1.3	Long traffic jam	R3	Setting a good traffic	A high vehicle volume and the exit and entry of vehicles to the project site
1.4	Car materials can not enter the project site	R4	Conducting a survey beforehand, and told the store building to use smaller vehicles	The project location does not allow for the entry of a large car carrier raw materials
2	Risk Tools and Materials			
2.1	The loss of material on project location	R5	Increased scrutiny on material	
2.2	material delays	R6	To coordinate with the shop building	Road congestion, stocks of raw materials at the hardware store less
3	Labor Risk			
3.1	Labor accidents	R7	Provide guidance to workers to always be cautious	His carelessness, labor in the works
3.2	Labor pain	R8	Utilizing the existing workforce, with overtime, if they do not kekejar plus workers	