

# Risk Management Efforts in Pavement Block Paving Program with Risk Analysis on Construction Projects

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# Risk Management Efforts in Pavement Block Paving Program with Risk Analysis on Construction Projects

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## Abstract

*Government has implemented a concept of sustainable regional development, namely pavingisasi highway program. Where paving is not only used for certain areas, but is used for paving roads. The program has won the award SDI (Sustainable Development Initiative) in the series of APEC events (ACIA pacific Economic copration) held in Nusa Dua - Bali Indonesia October 2013. However, there are several companies engaged in construction services get complaints from people who complained about the state of the road with the paving method can not bertahan according to age plan, when the contractor has carried out the construction process in accordance with the contract documents owned. Therefore, this study aimed to identify risk factors, analyzing and knowing renspon risk in the use of paving blocks in highway pavement. From the analysis it is known that the highest risk is causing a decline in the age of effective planning is less accurate, method of implementation is less precise, supervision and control are less accurate, and Stakeholder uncooperative in which the appropriate response to such risks is avoidance.*

**Keywords:** block paving, pavement highway, risk management.

## 1. Introduction

Public roads are one of the critical infrastructures in supporting the continuity of life, but due to several factors problems, the road becomes damaged, and it becomes a problem in life. Road construction on each road network should be considered because that is one of the basic infrastructures which has a central role in improving the accessibility of the area and population mobility. Development Block Paving as the alternative use of pavement is very beneficial for developing countries, to support the development of infrastructure such as shopping complexes, offices, tourism, places

of worship, residential areas in order to connect between points in the region. Rigid pavement, especially paving block used in special places that require more strength to support the weight of the Secondary Force as in the area of the bend, bus stops, parking lots, slopes, ports, as well as to use the pavement on a specific area such as roads in the area housing, ports, walkways / alleys, sidewalks, roads tourist region, yard work, home, and a shopping complex [1].

Since 2009 Bojonegoro Regional Government has implemented a concept of sustainable regional development, rural road paving program. Where paving is not only used in certain areas, but is used for paving roads. The program has won the award SDI (Sustainable Development Initiative) in the series of APEC events (ACIA pacific Economic cooperation) held in Nusa Dua - Bali Indonesia October 2013. Given blok paving construction in general, the use of paving blocks for a solid road transport certainly has a lot the risk to both the transportation and the construction itself. Therefore, this paper aims to identify risk factors, risk analysis and study the response of the risks in the use of paving blocks in highway pavement.

Paving block is a building material consisting of a mixture of cement, sand, water, so its characteristics nearing mortar [1]. Paving block pavement so that the material has several advantages such as:

1. Easy in its implementation, so as to provide employment opportunities to the wider community.
2. Easy Maintenance
3. If there is damage, the repairs do not require much additional material for paving blocks is a material that can be reused even though it has experienced demolition.

4. Resistant to static loads, dynamic and high shock
5. Flexible enough to overcome the differential settlement
6. Has good durability.

Analyzing the risk is important in a business or enterprise. Risk analysis is used to determine the beginning and the possible loss of profits there. Based on it, risk management needs to be studied. Risk management has an important role in decision-making and can affect the performance of the Project [2]

In PMBOK [3], noted that the project includes the risk management process of the implementation of risk management planning, identification, analysis, response planning and control and monitoring of a project. LPSDP (Leading Practice Sustainable Development Program for the Mining Industry) [4], states that "risk management is a core element that can support development"..

## 2. Method

Research data acquisition is done by collecting data obtained from secondary data from documents that can be used as reference in this study. And primary data obtained by distributing questionnaires to stakeholders, contractors and government agencies

This study used a descriptive analysis and risk management analysis that includes risk identification, risk analysis and risk response.

### A. Risk Identification

This serves to identify any risk that may occur, one of them by tracing the sources of risk to the occurrence of unexpected events.

Techniques for identification can be done in various ways, one of which is by structuring a wide range of variables risks, either from the data of previous projects or from the results of brainstorming together with the project team, then the data is included in the categories of risk according to the characteristics of each variable [5]. It also can be done by observing the source - the source of risk, and then the risk can be identified, so that any risk that might occur in a project can be known [6].

### B. Risk evaluation and measurement

The existence of a risk evaluation, the risk characteristics can be better understood, and the systematic evaluation results make a risk can be measured. This can be done by various techniques according to the level of risk, one of which uses the techniques of probability forecasts for risk, or can also use a matrix. It should be considered in the measurement of risk is to use two classifications, the frequency or occurrence probability of the risk and the seriousness of the loss or risk impact.

### C. Risk management

This stage is intended as a complement after evaluation and risk measurement [6]. Risk management must be taken to avoid huge losses, the risk management techniques include:

#### a. Avoidance

Risk avoidance includes changes to the project management plan to reduce the threat - the threat posed by risk - the risk that bad, to alienate the original purpose of the project risk impact.

#### b. Transfer

When a person or an entity transferring or transferring risks to other parties, they will shift financial responsibility for a risk to another party to pay for these services, for example, is insurance.

#### c. Mitigate

Risk mitigation is to reduce the probability and / or impact of risks that could be detrimental to the acceptable limits.

#### d. Acceptance

Risk acceptance is a technique that is done if a potential risk can not be identified and showed a positive thing.

In choosing among the various techniques that can be used in risk management is to consider the frequency / probability, as illustrated in Figure 1.

In Figure 1 explained that, if the results of the evaluation and risk measurement known probability value is 5 and the value of the impact is 5, then the rumor factor is in the red area / avoidance, and so on. The scale used in this study ARE1 to 5, as can be seen in Table 1 and Table 2 below:

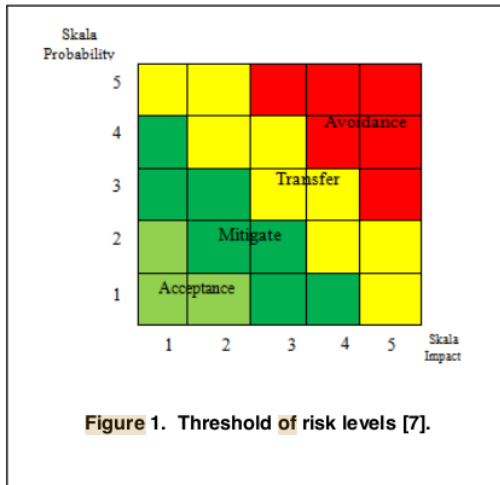


Table 1. Probability Scale.

Probability		
Term	score	Events Criteria
Very small (VS)	1	Tend not to occur (<20%)
Small (S)	2	Small possibility to occur (21-40%)
Medium (M)	3	Occurs and not occur, have the same probability (41-60%)
Big (B)	4	Most probably to occur (61-80%)
Very Big (VB)	5	Very probably occur / frequently (80-100%)

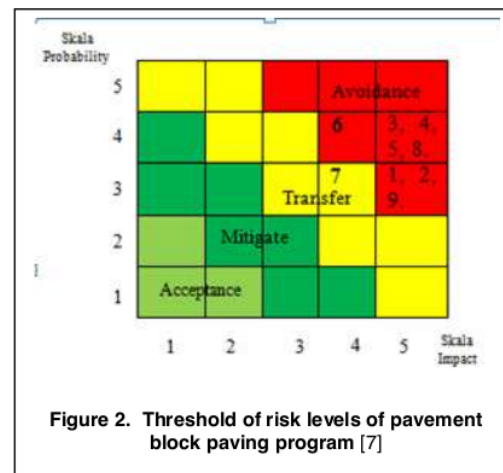
Table 2. Impact Scale.

Impact		
Term	score	Impact Criteria
VeryLight (VL)	1	No effect
Light (L)	2	little effect
Medium (M)	3	fairly effect
Weight (W)	4	effect and adverse motorists
Very Weight (W)	5	effect and adverse motorists and citizen

### 3. Result and Discussion

The projects can be identified 9 types / risk factors that may occur. Results of the project risk identification can be seen in Table 3.

In Table 3 presented the identification results then analyzed to determine the level of risk that exists. From the analysis of the data in Table 3 can be known risk response planning are illustrated in Figure 2 below:



From Figure 2, it is known that risk factors exist in the red area is a risk to the numbers 1,2,3,4,5,6, 8 and 9, it means that risks must be responded by The **avoidance**. While the risk of the number 7 is in the yellow area can be respond by the **transfer**.

**Table 3. Risks that cause loss of quality (design life), which occurs in road paving projects.**

No	Type of Risk	P	I	P x I	Rank
1	Material yang tidak sesuai spek ( paving yang masih muda, paving oplosan)	3	5	15	3
2	Extreme weather ( unpredictable rainy and dry)	3	5	15	3
3	The planning consultant less accurate in planning (planning pavement road surface, tend to not pay attention to the details in the other layer (there are locations that have the native land and are still in need of pavement layers below prior to paving, do not test the value of CBR, the image does not correspond to field conditions , planning methods of implementation and a lot of things that should be planned in detail but escaped attention (only adjusted to the nominal budget)	4	5	20	1
4	Less accurate methods of project implementation (project carried out in accordance with the reference design project .it automatically if the projection is less accurate then the method of implementation is also becoming less appropriate, as well as pavement project need compaction process but not planned compaction)	4	5	20	1
5	Less accurate in monitoring and controlling	4	5	20	1
6	Low labor productivity	4	4	16	2
7	Low productivity equipment	3	4	12	4
8	Uncooperative Stakeholders (contractors who cheat to get the most benefit and not paying attention to quality, consultants, planners and supervisors consultants are incompetent, people still like to consider the project in the region is their property, including material)	4	5	20	1
9	Less competent project management	3	5	15	3

(Source; The results of data processing, 2014)

#### 4. Conclusion

From the results of this analysis, it can be concluded that the risk factors are grouped sequentially based ranking of highest risk are as follows:

1. Planning are less accurate, less precise method of implementation, supervision and

control are less accurate, and Stakeholder uncooperative.

2. The low labor productivity
3. Material that is not within specifications, extreme weather, and Management of the project are less competent.
4. The low productivity of the equipment

Where the rank 1,2 and 3 are in the area avoidance while ranking fourth in the transfer area.

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