

## Risk Management Plan (RMP); Implementation and challenges towards sustainability and green concept for public projects in Terengganu

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### Abstract

Risk management become be the most significant and integral part of project management. The construction project may fail or succeed, depending on the adopted risk management approach. As risk management is predicting the unpredictable, it is one of the most vital management tools to cope with project risks and uncertainties. In Jabatan Kerja Raya (JKR), risk management is being implemented as part of the project management plan. Despite going through the process, some JKR's project still have problem in the project delivery. Due to this scenario, the objective of this study is to identify the level awareness in implementing the risk management to public authority (JKR). Futhermore, it will also aim to identify and rank the challenges faced by JKR in managing risk management in public projects. Questionnaire survey was carried out in order to obtain a better view of result. Although JKR's organization is provided with standard guideline and most of them aware about it, but it will still face with the construction risks as there is no supervision or weakness in monitoring about implementation of risk management in construction project. Therefore, sufficient knowledge, practice and systematic risk management is essential to reduce the complexity and uncertainties in construction project and finally can promote sustainability toward green concept in finishing project in due time.

*Keywords:* Risk Management, JKR Project,

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### 1.0 Introduction

The construction industry always exposed to predictable and unpredictable risks. Hence risk management is referred as a series of processes which require for the identification, analysis, and reaction towards the project's risk in order to maximize the effects of positive uncertainty and minimize the consequences of negative uncertainty (Lee and Ali, 2012). Risk management has been organized in the developed countries. This is due to the developed countries to applied better risk management for successful projects.

In Malaysia, the level of implementation of the risk management is still low due to some reasons. Risk management is quite a new management concept in the Malaysian construction industry (Mohd Yusuwanet *al.* 2008). However, the authors' further added that the risk management is essential and necessary to achieve the project performance. Furthermore, Lee and Ali (2012) found that the Malaysian construction industry has a bad reputation in managing the risk, and this is happened due to many reasons such as financial factors, time factors, lack of knowledge in managing the risk and etc. In implementing the risk management, the construction industry players should be more proactive.

Therefore, this paper tends to achieve two objectives, namely:

1. To identify the level of awareness in implementing the risk management by public authority (JKR Terengganu).
2. To determine the level of risk management implemented by JKR Terengganu to public projects.

For the purpose of the study, JKR organization is being selected because it is one of the organizations which handle the public project in State of Terengganu. Besides, these projects are selected because they have established and implemented the Risk Management Plan (RMP). Meanwhile, the involvement of other project team members is also essential in managing the risk. Therefore, the selected respondents for the data collection were the Project Manager, Risk Manager and Risk Officer which consists of JKR staff involved with the construction projects. The scope of the study is only limited in the JKR's Terengganu only.

This research focuses on risk management applied by JKR towards public project. The research was complemented by a study of a risk management in construction project at Terengganu as this state had experienced high risk accident such as Stadium Sultan Mizan, Kuala Terengganu. Risk management is crucial to

avoid delay dan default during construction process or when the building is occupied. Therefore, implementing RMP can also indirectly promote sustainability in construction project in regards to time, cost and quality.

## **2.0 Risk Management**

### **2.1 Introduction**

A risk management is to cope with the risks efficiently and also risk management is an important element of project management (Lyons and Skitmore, 2004).The risk management is an actions considered to minimize the conflict happened through the achievement of the project (Skorupka, 2008). According to Thompson and Perry (1979), the risk management is most important at initial stage in a project that is pre contract stage. The reason is there is still several flexibility in designing and planning the project so that we can take into consideration on how serious the risk.

In construction projects, risk is ineluctable and thus, the risk management is crucial management tool in developing construction project due to the realization of its importance as an integral part of project management. The effectual of the risk management can bring greater rewards to project performance by enhancing productivity (Goh and Abdul Rahman, 2013).The risk management is one of the most critical procedures and capability way in coping with project risks and uncertainties.

The right implementation of risk management is essential in order to rescue the project performance from getting the poor reputation of the construction industry. Furthermore, Mark *et al.* (2007) defined that risk management is a systematic process which included identifying, assessing and managing risks in order to raise the chances of a successful project outcome. Risk management can also identify opportunities to enhance value.

According to News Strait Times (2013), Construction Industry Development Board Malaysia (CIDB) expected that the construction industry is able to achieve more than 12 percent of conventional growth for this year. It is driven by a number of other projects under the Economic Transformation Program (ETP), which mostly still ongoing. Hence it is essential to have a risk management in term of preventing any risk happens to the project performance.

### **2.2 Risk Management Process**

In risk management process, there involved a few process which are considered as planning, identification, analysis, response, monitoring and control on a project. According to the Zadeh, (2010), this process of risk management aimed to raise the possibility and effect of positive events, and reduced the possibility and effect of negative incidents to the project. According to Lee and Ali, (2012), the risk management processes include the following:

i. Planning and Context Establishment:

Establishing the context is a critical step within the risk management process and is about determining the environment in which the project will operate. Identification of the context for the risk management processes must include, particularly in the case of large and/or complex projects, identification of risks to the business environment where the project operates. For the risk management processes under JKR, its escalating business risks to Senior Management where it should occur as part of the overall JKR risk management activities, including information and physical security risk management.

ii. Risk identification:

The pinpoint of the risks are set out that the project exposed to. All the comprehensively significant sources and causes of risks should be identified. Risk identification is stressed by researcher as the most important and difficult step in the risk management process (Mills, 2001). After the risk has been identified, it should arrange in a structured format, for instance, using diagrams or table. Risk analysis is regarded as the effect quantification of the identified risks.

iii. Risk analysis :

Risk analysis involved the assessment of risk on its likelihood to occur, impact and seriousness of the risk towards construction activities. There are two methods to estimate the likelihood of risk occurrence and its possible impact, which are quantitative analysis and qualitative analysis. After the analysis is carried out, risk rating is given according to their magnitude of negative impact (Mohd Yusuwan et al., 2008).

iv. Risk treatment :

The step of selecting and identifying preventive measures is to modify the project risks. According to Mohd Yusuwan et al., (2008), from their research, five major elements in risk treatment which are risk reduction, risk retention, risk transfer and risk acceptance. In ensure that the action will bring to the effectiveness and efficientness of operation of the organization the appropriate risk treatment measures must be selected.

v. Monitoring, reviewing and communication :

Essential to ensure the problems are anticipated also planned controls and responses are delivered. Overall, risk management process can be summarized through literature review as in Figure 1.



Figure 1: Process of Risk Management. (Source: Lee and Ali, 2012)

### 2.3 Benefits And Awareness Of Risk Management Process

Risk management is one of the new management concepts in the Malaysian construction industry rather than the others country. In Malaysian construction industry, it will take a long time to be fully accepted by the participants who had involved in the construction site. Majority of the participant in construction are still comfortable and reluctant to change with their traditional culture in doing their job without realizing that this new concept will make their job easier. But, from the early observation we can only see this culture in big companies who are involved in major projects basically have a very good reputation, strong financial standing (Mohd Yusuwan et al., 2008).

### 2.4 Implementation Of Risk Management In Jabatan Kerja Raya (JKR) Malaysia

Risk management refers to the major managerial tool where many organizations concerned with adopted the standardization of risk management as a key process in their work. There are always risks associated with a project. One of the major processes of risk management is managing risk. It is a core discipline that assists managers at all levels as to make correct decisions. Besides it provides a process for assessment of organizing and also controls the risks (Risk Management Facilitation Guidelines JKR Malaysia, (2008).

A planning tool that provides information about what and when events can cause damage in advance strategies to the project outcomes is referred to the implementation of risk management. As a planning tool it identified the possible alternatives a project may take to avoid or minimize damages. Ignoring risks can lead to increased costs and unsuccessful outcomes for projects. And it will contribute to the project's failure. In implementing the risk management JKR had prepared the guidelines in managing the risk in more efficiency. From this guideline, it provides 8 benefits to public's projects when use of risk management practices, there are:

- i. Better certainty and maximize potency to meet the objectives.
- ii. Keep from additional costs and potency for budget overflows due to unanticipated and planned for events.

- iii. Make sure the projects and operations hand over promised functions.
- iv. To attain higher quality by increasing conformance to defined needs.
- v. Accomplished better stakeholder gratification by avoiding damaging events of direct interest to them.
- vi. Identify the necessity to prepare contingency plans where necessary.
- vii. Ability for solve the problems. It can detect early risks and it can reduce the cost in manage the risk when has initial detection.
- viii. Highlight choices and balance

For the JKR itself, this organization must be prepared with the procedures needed to manage the risks. The end result is a section of the Project Management Plan (PMP) or sub-plan to be subsumed under any JKR project plan or day to day operation (Risk Management Facilitation Guidelines Jabatan Kerja Raya (JKR) Malaysia, 2008).

### 3.0 Research Methodology

For this study, the questionnaire survey via email by using radio button distributed to all technical staff at JKR Terengganu, amounting 120 staff. However only 30 per cent as it has several lacking which is the difficulty of the respondent to access the email sent. A radio button is the small circle beside an option which the respondents can choose in a dialog box and click the answer in the circle to make selection.

Due to the inefficiency of radio button’s survey, the researcher make the other alternative that is by using google document where by using this survey, about 50 per cent of the survey is distributed because of its ability to share the document with others. It also makes the researcher can get the feedback or respond from the respondent faster and as it also can save time. By using this instrument, almost of the respondents give the feedback as it is easier to answer the survey. Finally, total respondents are 80% equivalent to 96 staff.

### 4.0 Analysis and Discussion

#### 4.1 Level of Agreement towards awareness of risk management among JKR’s organization.

Based on Table 1 below illustrates for the level of agreement towards awareness of risk management in JKR’s organization. There are five statements which are awareness towards risk management, knowledge regarding its implementation, practice, systematic risk management tool is applied and also standard guideline on risk management is provided to show that most of the respondents agreed regarding the implementation of risk management. The finding of this level of agreement towards awareness of risk management, mean index is between 3.50 to 4.00. Its show that level of agreement towards awareness among JKR staff on risk management is slightly aware and good about implementation of risk management.

Table 1: Level of Agreement based on working experience towards awareness of risk management among JKR’s organization.

Level of Agreement on awareness of risk management	Awareness towards risk management	Knowledge with regards in implement risk management	Practice in implement of risk management	Systematic risk management tool is applied	Standard guideline of risk management is provided
Mean Index	4.03	4.05	3.87	3.93	4.00
Frequency (n=40)					

Table 2 illustrates the extent to which the respondents had involvement in risk management. The table shows 67.5% of respondents were involved directly or indirectly in managing risks in construction projects. However, about 35.5% of respondents does not directly or indirectly involved in managing risks during construction phase.

Table 2: Involvement of respondents in managing risk management

Directly or Indirectly involved in managing risks	Frequency	Percentages (%) Frequency (n=40)
Yes	27	67.5
No	13	35.5
TOTAL	40	100.00

Table 3 (Understanding of respondents towards risk management) shows that the largest proportion (50.0%) of the respondents heard about risk management only occasionally although respondent are from JKR’s organization staff itself. However, only 20.0 percent have heard and always practice the risk management. While 30.0 percent never heard about it at all. It can be concluded that although JKR has provided the guideline but most of them never aware and understand about risk management.

Table 3: Understanding of respondents towards risk management

<b>Directly or Indirectly have been heard about risk management</b>	<b>Frequency</b>	<b>Percentages (%) Frequency (n=40)</b>
Never Heard about it	12	30.0
Heard Occasionally	20	50.0
Heard and always practice on risk management	8	20.0
<b>TOTAL</b>	<b>40</b>	<b>100.00</b>

In the Table 4(Important of risk management) shows that most of the respondent state that risk management is very important which give the responds about 92.5%. However, there is slightly giving the responds that the risk management is not important to the organization.

Table 4: Important of risk management to an organization

<b>Important risk management to an organization</b>	<b>Frequency</b>	<b>Percentages (%) Frequency (n=40)</b>
<b>Yes</b>	<b>37</b>	<b>92.5</b>
No	3	7.5
<b>TOTAL</b>	<b>40</b>	<b>100.00</b>

Table 5 (Taking note of risk at work) shows that 25.0% of the respondents never take note of risk at work and it shows that they are not aware about the risk in their project. 37.5 per cent of the respondents are aware which by take note of risk only. Furthermore, the same result by the respondent by taking note of risk at work during all process of risk management which means they are very concerned about risk in their project that can make the project will slow. For the comparison, Mohd Yusuwani et al., (2008) found that on behalf of the clients as the respondents, about 50% of the respondents take note of risk associated with their work but do not plan to mitigate the risk. Hence, it can conclude that JKR’s organization staff during the works, they are aware about risk and during construction process which they are take note of risk.

Table 5: Taking note of risk at work

<b>Taking note of risk at the work</b>	<b>Frequency</b>	<b>Percentages (%) Frequency (n=40)</b>
Never take note	10	25.0
Take note only	15	37.5
Take note of during all process risk management	15	37.5
<b>TOTAL</b>	<b>40</b>	<b>100.00</b>

Table 6(Provision of training provided by an Organization) below illustrates about the provision of training to the staff in JKR’s organization on risk management. 32.5 per cent of the respondents claimed that the organization provided very minimum training on risk management. However, there is 30.0% of the respondents said that their organization does not provide such training at all. Such JKR’s organization which particular about awareness on risk management, account for 37.5 per cent claiming that their employer provide regular formal training programme. Furthermore, the least of provision of training on risk management can be caused by the lack of supervision on risk management especially for JKR’s district.

Table 6: Provision of training provided by an Organization

<b>Provision of an organization provide training on risk management</b>	<b>Frequency</b>	<b>Percentages (%) Frequency (n=40)</b>
None	12	30.0
Minimum training is provided	13	32.5

Regular formal training programme	15	37.5
TOTAL	40	100.00

**4.2 Results.**

Table 7 illustrates the percentage of the respondent towards implementation of risk management in JKR’s organization. 82.5% of the respondents confirmed that their organization has identifiable and effective risk management frameworks are provided by an organization.

In JKR’s organization itself, there is 95.0% of the respondents confirmed that their organization has does not have their own risk management department. It is because JKR organization only provided the special team to manage the risk during construction project. JKR’s organization also only provided risk management frameworks as their guideline to handle when faced with construction risks. Thus, the response of the respondents on this issue is highly consistent.

For those who insisted that their organization have specific processes of identifying risk, 85.0 per cent identify it as risk identification process, 85.0 per cent as risk analysis and 77.5 per cent as risk or response control. For monitoring, reviewing and communication process, there is about 85.0 per cent who are confirmed with this during process of risk management. For an organizations applied risk management, about 62.5 per cent of the respondents claimed that risk management process is applied to all projects. In addition, according to the Risk Management Facilitation Guidelines Jabatan Kerja Raya (2008), this framework of risk management process may be applied to all projects and not compulsory need to apply to all the projects. Furthermore, 92.5 per cent of the respondents give the responds that the risk management process is used for infrastructure projects as these project involved high risk during construction. Hence, the risk management is very important for the large scale project. For the others project, only 45.0 per cent of the respondents is agreed that their organization applied the risk management to the others project.

According to the Goh and Abdul Rahman (2013), the authors claimed based on the finding where it show that risk management process or approach commonly include the common features such as risk identification, risk analysis and risk response as risk management process, although a variety of different risk management models and frameworks have been proposed by a range of institutions, associations and professionals. As conclude that, systematic risk management is essential as the improvement towards the implementation of risk management.

Table 7: Implementation of risk management in JKR’s organization

Statement	Percentage Frequency (n=40)		
	Yes	No	Not Sure
1. Identifiable and effective risk management frameworks are provided by an organization	82.5	0	17.5
2. An organization has own risk management department	0	95.0	5.0
3. Specific risk management processes used which are;			
i) Planning and Context Establishment	87.5	0	12.5
ii) Risk Identification	85.0	7.5	7.5
iii) Risk Analysis	85.0	7.5	7.5
iv) Risk Treatment/Response	77.5	5.0	17.5
v) Monitoring, reviewing and communication	85.0	0	15.0
4. An organizations applied risk management on projects:			
i) All projects	62.5	0	37.5
ii) Infrastructure projects	92.5	7.5	0
iii) Other projects	45.0	2.5	52.5
5. Stage at which organizational risk undertaking begins:			
i) Inception Stage	45.0	10.0	45.0
ii) Design Stage	67.5	0	32.5
iii) Procurement Stage	60.0	10.0	30.0
iv) Construction Stage	75.0	15.0	10.0
v) Other Stages	57.5	0	42.5

## 5.0 Conclusion

From the analysis and findings, it can be conclude that majority of the staff in JKR's organization who manage the construction project are aware about implementation of risk management although there is more construction risk are happen due to unpredictable events. Knowledge, practice, systematic risk management tools and also standard guideline are very important factor which should to be emphasized in to manage the construction projects that may have a greater impact on the productivity, performance, quality and the budget of the project.

Therefore, in order to ensure the successful of the project, there should be a proper and systematic risk management strategy in place in order to manage the risk in the most efficient way. Based on the findings of the questionnaires there are a number of staff in JKR's organization who know about risk management and who have attended training and some of them have even practice risk management in their organizations. The respondents also agreed that risk management is suitable to be implemented in a construction project with certain characteristics for example project

Though, JKR organization has not adopted an organizational approach to risk management, but it is important as the establishment of project risk management positions itself within an appropriate framework to ensure future compatibility. Furthermore, most of the respondents state that their organization has an identifiable and effective risk management framework is provided by an organization although there is no department of risk management are provided in their organization.

It can be concluded that, meanwhile JKR Terengganu has provided the frameworks or guidelines for implementation of risk management, which means that level of risk management implemented in JKR Terengganu is good condition but with little lack of supervision and RMP was experienced a little disorganized in implementation. Therefore, further research on enforcement of RMP towards sustainability dan green concept can be done to identity and unpack the critical issue especially in regards to time, cost and quality. Risk can be minimize/eliminated with strong foundation on RMP enforcement.

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