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Uncertain Events that Resulting a Risk of an Increase in Construction Costs

(Case Studies on Some of The Contractors in Indonesia)

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***Abstract*— The construction phase of the project implementation stage where the contractor has won the tender and has been prepared for the construction process, is an activity that contains the uncertain events which interact and may originate from internal and external environment of the project. Contractor as responsible and resource managers, must take into account the uncertain events that may lead to the risk of increased costs of the project compared to the initial cost estimate as a consequence of the unforeseen costs that arise during the course of construction. This study aims to identify uncertain events during the execution of the project, then the distribution of the uncertain events to appropriate parties to obtain the uncertain events that are the responsibility of the contractor. Primary data were obtained from several contractors in Indonesia through interviews and questionnaires, while secondary data obtained from the documentation for the implementation of the project. The results of the data analysis suggest that there are 32 uncertain events that raise a risk at the cost of the project. This information into recommendations to the project implementers to anticipate the uncertainty before implementing future projects.**

***Keywords*— uncertain events, risk, project construction, information, upcoming projects**

I. Introduction

Each project will produce a product, while in the project itself there are many uncertainties caused by the limited knowledge of what will happen in the future implementation. If the resulting product is a good product, then it is an opportunity for contractors. While adverse seen as a risk. In the implementation of the construction or development of the construction project, uncertain events that can lead to risk occurred during the execution of the project, can be derived from the external environment and the internal environment of the project, as well as from stakeholders who play a role in it.
Risk due to the uncertain events are events that can be controlled and the events that can not be controlled. The events are not mutually exclusive but mutually interact with each other and affect the initial cost estimate.

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For it in the cost estimate, the contractor must be able to predict and identify any uncertain events that may occur and there may be interaction between the uncertain events that may affect the implementation of systems that raise a risk to the cost of the project or project objectives.

II. Construction Project, Uncertain Events and Risk

A. Construction Project Phase

The construction project is one of the types of projects that have the potential for relatively high risk due to uncertain events, ie events are not sure that it contains, compared to projects that are not construction fields such as manufacturing.Project construction activities are temporary, in the sense of age is limited by the completion of a task, start time and end up with a clearly defined, complex, unique and dynamic at any location and not necessarily a repetitive activity, the type and intensity of change throughout the project. Having a specific goal with a number of cost, schedule and quality criteria goals in the process to reach a predetermined goal, which is embodied in the final product or end work. Vulnerability to changes in construction projects in the field of global economics can propagate in all fields, especially in the construction industry, resulting in uncertain events faced by the company in Indonesia is very large contractor. Uncertain events originating from the external environment will affect the internal environment of the project and the contractor. The construction phase is a process to realize the plan into a physical form. This stage is the stage most commonly take up a lot of financing, labor and time, as well as the various parties involved as well as substantial resources, compared to other stages.

B. Uncertain Events

Uncertain events originating from the external environment and internal environment affects the system implementation projects that have been planned by the contractors and the parties directly involved. Due to the uncertain events that affect project implementation system, will have an impact on the project objectives to be achieved is the right time, cost and quality of work (triple constraint)

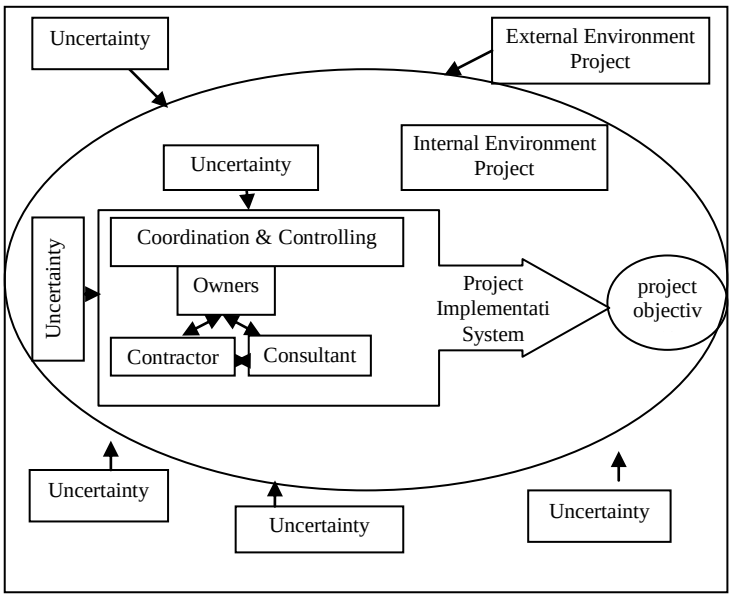


Figure 1. Uncertain Events that affect the implementation of the system of construction

C. Construction Project Risks

The risk caused by uncertain events are always present in every construction project and is something that can not be ignored, but must be taken into account properly, if want to achieve the project objectives.

Several researchers have conducted studies on the risk of construction projects such as Al Bahar (1990), Seung and Diekman (2001), Mak and Picken (2000) Azwar (2003). Flanagan (1993) conducted a systematic and in-depth discussion of the risks in construction projects, sources, impacts and consequences that will occur, the parties must be responsible as well as alternatives in mitigating risk. Besides, it is also recommended several methods in analyzing risks.

III. Research Methods

Primary data were collected after the identification of the uncertain events that pose a risk based on the study of literature. In addition, discussions are also conducted, with some project manager or site engineer in the research, to improve the quality of data obtained. The results of the identification of the real conditions are accumulated with the identification based on the literature. Further mapping was conducted aiming to obtain a thorough picture of the uncertain events that may occur during the execution of the project that raises the risk and have the potential to impact on the cost of implementing that need to be taken into account in the estimation of project costs . Mapping results are classified into major categories based on the source, the characteristics or nature of any uncertainty, interrelationships naturally and logically, making it easier strategies to respond. The results of the identification and classification to the drafting of a questionnaire format that includes questions which compiled a structured and systematic.

This research surveys conducted in Jakarta and Bandung where respondents selected is contracting companies and subcontractors / specialists, both private and state-owned companies, which are involved in the implementation of construction projects. Selection of contractor firms and subcontractors is based on the consideration to be able to represent the population of the construction industry in Indonesia.

The structure of the questionnaire is shown in Figure 2 below:

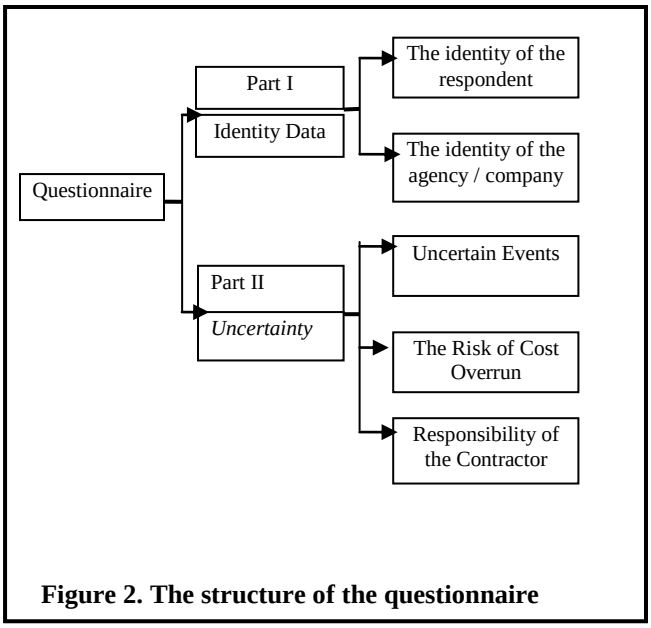


Figure 2. The structure of the questionnaire

IV. Uncertain events in construction projects that raise a risk to the project cost and the responsibility of the contractor

One of the determining factors in order to achieve successful implementation of the project is the stipulation agreement on the details of the roles and responsibilities of all parties involved and approved by all the culprit. Responsibility to uncertain events and the resulting risks to be allocated to the appropriate parties.

In response to the risk, contractors often use intuition based on experience and judgment. Al-Bahar (1990) states that by means of intuition, the contractor can not quantify uncertainty and analyze the risks involved in a project systematically. Even if the contractor can assess a risk in this

way, the potential impacts associated with these risks can not be evaluated.

In the research, forms of risk management that is often used by the contractor according to the results of the questionnaire are to: insurance, escalation contingency cost, dual currency ,contracts, guarantees and others. While the methods used to respond to those risks are : Risk Avoidance, Risk Reduction, Risk Retention, Risk Sharing, Risk Transfer and clauses in FIDIC..

Uncertain events in construction projects that raise a risk to the project cost and the responsibility of the contractor are shown in Table 1 below :

Table 1. Uncertain events in construction projects that raise a risk to the project cost and the responsibility of the contractor

Code	Uncertain Events
UE 1.	Indications corruption, collusion, nepotism
UE 2.	Changes in environmental conditions around the project
UE 3.	Increased air pollution around the site
UE 4.	Disruption of traffic around the site
UE 5.	Noise
UE 6.	Construction Waste
UE 7.	Claims by the neighborhood community of the project
UE 8.	Destruction by surrounding communities
UE 9.	Error of Cost Estimation
UE 10.	Lost (theft) in the project environment
UE 11.	Creating additional facilities and temporary road / special pass to access the land to the project site
UE 12.	The method used is less precise
UE 13.	Lack of mastery of the technology implementation
UE 14.	Failed coordination among labor, causing inaccuracy, instability, disfluencies entire field operations and methods of construction
UE 15.	The failure of the main contractor in the execution of supervision of the subcontractor's work
UE 16.	Implementation of changes to the subcontractor's work is not in accordance with the wishes of the owner as the main contractor instruction error
UE 17.	Delay of the subcontractor's work due the influence of the previous work delays
UE 18.	Delay in procurement of materials and equipment
UE 19.	Execution time is not appropriate scheduling

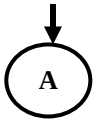
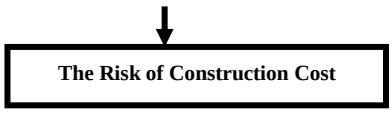


Table 1. …..*continuation*

Code	Uncertain Events
UE 20.	Data and events during the execution of the project was not documented
UE 21.	Safety and health are not guaranteed allocated project
UE 22.	Safety and environmental protection projects are less well
UE 23.	Demonstrations, strikes or labor unrest by contractors
UE 24.	Disputes between the main contractor workforce with labor subcontractors
UE 25.	Provision of material and workers non-standard by contractors / subcontractors
UE 26.	The work the contractor or subcontractor is not accepted by the owner
UE 27.	Errors of work done at night



V. Recommendation

This study is focused on the implementation phase of the project, given that the dominant opinion comes from contractors. The research data were based on the subjective assessment of potential problems if different from the real situation so that the collection of secondary data can be used to support the values given subjectively.

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