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Strategy of Natural Disaster Management of Rob In Tanjung Emas Port Area Based on Value Engineering Analysis and Stakeholder Expectations

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Abstract- Tanjung Emas Port was inaugurated by the government in 1985 and became the main entrance of export and import goods to and from Semarang. So many big companies are building their factories in this area. There is even an industrial estate called Tanjung Emas Processing Zone (TEPZ) which some companies enter in bonded zone. Yet this port faces an ever-present problem, namely rob coming from tidal water and also a continuous decline in soil surface. In order to protect the various port facilities, it is necessary to create a robust flood handling system that is economical, efficient and accurate. The aim of this research is to get the result of handling of inundation based on value engineering analysis and the best stakeholder expectation. Value engineering research approach is directed to the analysis of a function that is a way to get or know the functions that are not needed. The function is presented in the comparison of Cost and Worth. VE analysis in this study was conducted by comparing the handling of rob disasters between polder systems with road elevation. Analytical techniques used include information stage, functional analysis phase, creative phase, evaluation phase, development stage and presentation stage.

***Keywords*:** rob handling, value engineering, stakeholder expectations, Tanjung Emas port

1. Introduction

The Port of Tanjung Emas Semarang is located in Semarang City which is the Capital of Central Java Province. The total harbor area reaches 373.70 km^2. The port which was inaugurated by the government in 1985 became the main entrance of export and import goods to and from Semarang. So it is natural that many large companies build their factories in the region.

In Tanjung Emas area there is also an Industrial Estate called Tanjung Emas Processing Zone (TEPZ) is an industrial area of several companies in bonded zone.

The management of the port in the capital of Central Java province faces an ever-present problem, namely rob. Sea tide flooded the land area in the port. Soil surface continues to fall making the Port of Tanjung Emas increasingly "sinking".

Rob floods can occur without knowing the seasons even in the dry season, and in the event of high tide, the occurrence of rob that closes the pier and even the roads in the port, this results in disruption of the stevedoring process and other port activities. The robust floods caused by the decreasing deletation of soil and seawater also increased in volume and height from year to year.

Various handling has been done to overcome the occurrence of rob floods such as using polder system and road elevation. In order to protect the existing facilities in the port area of Tanjung Emas Semarang against the rob flood that occurs, it is necessary to create a robust flood handling system that is economical, efficient and accurate.

The purpose of this research is to explain the robust flood tackling system that is economical, efficient and accurate. First, to find out the rob flood handling system with polder system and road elevation that has been applied; second, to obtain a description and value engineering comparison analysis of robotic flood handling designs of both systems and third to obtain robust inundation results based on the best value engineering analysis and steakholder estimation.

From these objectives, the hypothesis in this study is: "With the implementation of value engineering of Flood Handling Rob Will Produce Designs That Deliver Economic Value, Efficient and Accurate."

2. Literature Review

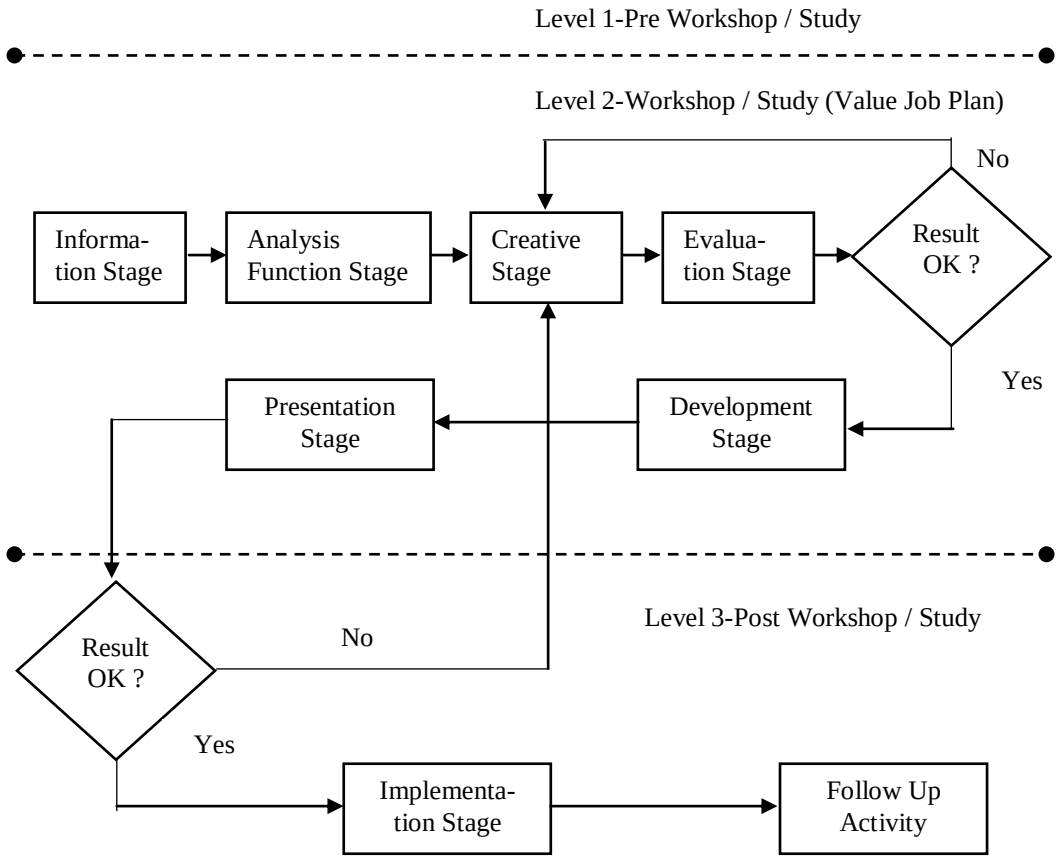
According to Isola (1997), value engineering is a technique in management using a systematic approach to finding the best balance of functions between the cost, reliability and performance of a project. Value Engineering (VE) is the application of a value methodology to a project or service that has been planned or conceptualized to achieve value enhancement. The value methodology is a systematic process used by the discipline to increase the value of a project through the analysis of its functions. (Snodgrass et.al., 1986 in SAVE standard, 2007).

These VE elements are used to assist in VE analysis. This element consists of (Ustoyo, 2007):

1) Selection of project components for VE study.
2) Financing for value
3) Cost modeling
4) Functional approach
5) Functional Analysis System Technique (FAST)
6) Work plan of VE
7) Creativity
8) Determination and financing of VE program
9) Human dynamics, and
10) Setting relationships between owners, designers, and VE consultants.

Each of the elements mentioned above should be used in a VE study for a project.

The standard methodology for passing VE assessment according to SAVE 2007 is divided into 3 levels, i.e.(see fig.1):



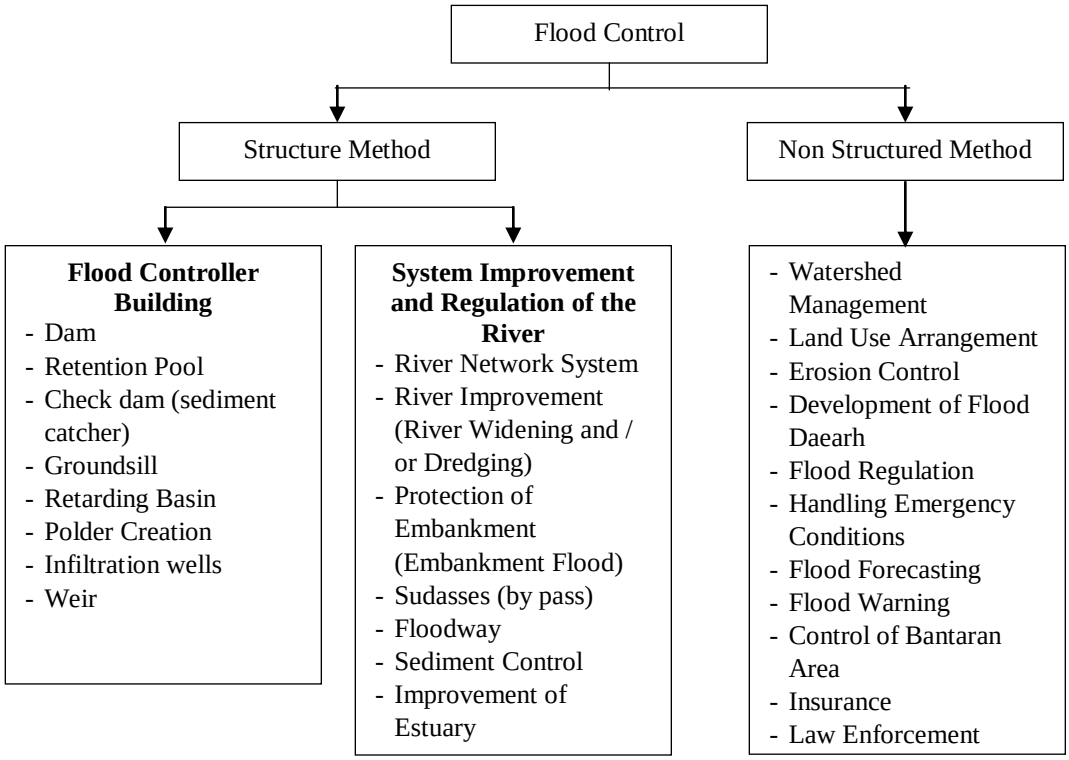
Source: (Kodoatie & Sjarief, 2006)

Fig. 1. Flow Diagram of Value Study Process

The port is a place consisting of land and surrounding waters with certain boundaries as a place of government activity and economic activity which is used as a place for a boat to lean, anchored, up and down passengers and / or loading and unloading of goods equipped with shipping safety facilities and port supporting activities as well as a place of intra and inter-wheel transport movement (PP No. 69 of 2001).

Flooding is a condition where water is not contained in the drainage channel (time) or inhibition of water flow in the drainage channel (Suripin, 2004).

How to handle flood control can be done in structure and non-structures. This method should be reviewed in a single streaming system. In more detail these two methods are shown in Fig. 2.



Source: (Kodoatie & Sjarief, 2006)

Fig. 2. Flood Control Structural & Non-Structural Methods

Steps taken to handle the flood disaster especially in Semarang including Tanjung Emas Port area is in two ways, first handling rob flood with polder system. This handling system includes rob drainage water facilities and infrastructure such as drainage channels, retention ponds, water pumps that form a rob flood control system. Second, the handling of rob floods with road elevation in the form of rigid pavement. Road elevation is done to facilitate the circulation in and out of the flow of goods and passengers to the port. The road is made with concrete construction so it is more resistant to puddles.

3. Research Methodes

This research is a research with value engineering analysis (VE) by comparing the handling of rob disaster between polder system with road elevation. After doing the analysis is expected to know the method of handling the rob flood that will produce a design that provides economic value, efficient and accurate. In addition, research using VE can also be used as a consideration of the government to improve the performance, quality, and life cycle cost between two alternative handling of rob.

The approach used in VE research is directed to the analysis of a function that is a way of getting or knowing unnecessary functions. The function is presented in the comparison of Cost and Worth.

The location of this research is Tanjung Emas Port Semarang area which is hit by flood of rob. This is because the port role is vital to support the economy of Central Java every year experiencing a flood of rob so it is very disturbing port activity. By doing this

research is expected to know handling system to flood of rob which is economic, efficient and accurate.

The data in the study consists of two types:

1) Primary Data, in the form of project technical data, such as working drawings, Budget Plan, Work Plan and Terms.
2) Secondary Data, consisting of a list of unit price or job analysis, material data, materials, and building equipment used, labor data, regulations on handling rob flood that can be used as reference in conducting value engineering analysis.

While the data collection methods used in this study consist of:

1) Documentation
   Documentation is intended to obtain direct data from the research site, including working drawings, Budget Plan (RAB), Work Plan and Conditions (RKS), relevant books, regulations, activity reports, photographs, documentaries, and data relevant to the research.
2) Interview
   In this study used free guided interviews that is a combination of free interviews and guided interviews. In practice, the interviewer brings a guideline that is only an outline of the things to be asked. This research will be interviewed with value engineering expert and rob flood handling.
3) Observation
   Observation is to observe directly to the object of research to see closely the activities undertaken. Observations were made at the collecting information stage.

Data Analysis in this study consists of 6 stages:

1) **Information Stage.** This stage is an early stage in value engineering studies. The activity is as it is at this stage:
   a. Understand the original design concept
   b. Identify problems and constraints
   c. Confirm the most recent project concept.
   d. Visit the location
      In the early stages of this information gathered as much as possible related to the project that became the object of research.
2) **Analysis Function Stage.** Functional analysis stage is an important step, because it is this stage that distinguishes value engineering with other cost-saving methods. At this stage defined the function of the project components that have been defined previously in the information phase.
   Value engineering activities at this stage are:
   a. Determine the function of the work item component.
   b. Identify the problem of rob flood handling using high potential polder and elevation systems for discussion.
   c. Determine the work item component, classify the function into the basic function for the components that work the same as the work item. to develop this function can be used FAST tools.
   d. Determine the cost / worth ratio which is the cost value index compared to the benefit value.

3) **Creative Stage.** This stage is the stage of development of as many as possible alternatives that usually fulfill primary or principal functions. So at this stage need to be developed ideas to reproduce the alternatives to be selected.
   The problem of rob flood handling is discussed at this stage:
   a. Time, altitude, downtrend and rob puddle area
   b. Elevation of harbor area to tidal elevation at sea
   c. What is the elevation of harbor area during heavy rain and seawater
   d. Mechanism of drainage function
   e. Land subsidence
   f. Sea level rise
4) **Evaluation Stage.** At this stage an analysis of ideas and alternatives is made.
   a. First, do a profit and loss analysis on each alternative. At this stage, if any idea is not feasible for further analysis, then the idea / alternative should be eliminated.
   b. Second, perform paired comparison analysis and do decision matrix analysis.
5) **Development Stage.** During the development stage of the value engineering study, any ideas designed are expanded in workable solutions. This development consists of recommended designs, modalities, and life cycle cost comparisons and a description that evaluates the advantages and disadvantages of the proposed recommendations. This best alternative needs to be supported as much as possible technical information.
   Then the selected idea is clearly written so that the owner or other stakeholders can understand the intent of the alternatives and be able to understand the advantages of the selected idea, and also to identify the negative factors of the alternatives.
6) **Presentation Stage.** This stage is the stage of presentation of value engineering studies to the owner and other decision-makers. Value engineering worksheets and results from value engineering analysis are given to owners and stakeholders in decision-making.

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