

PERFORMANCE BASED CONTRACT RISK RELATIONSHIP ANALYSIS IN BOJONEGORO-PADANGAN ROAD PROJECT

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ABSTRACT

Performance Based Contract imposed by the government as contract to maintain the quality and efficiency of the budget form, for the implementation of road infrastructure in Indonesia. Performance Based Contract was a kind of a new contract with stage Design-Procurement-Build-Operation-Maintain. Interpretive Structural Modeling was used to investigate the relationship risk variables at each stage of the Performance Based Contract so it can be modeled with graphical models and sentences models of each element and sub Performance Based Contract elements. Variables that will be modeled by Interpretive Structural Modeling starts with, data retrieval with questionnaires and interviews. The results of the use of Interpretive Structural Modeling is variable disturbance of the environment as a key variable, and put the project budget as variables that influence at all stages of the Performance Based Contract.

Keywords: *Interpretive Structural Modeling; road infrastructure; Performance Based Contract; Risk.*

A. INTRODUCTION

Infrastructure development is the purpose of the construction, rehabilitation and maintenance of roads linking one area to another to support the activities undertaken by the community. Along with the development of human needs, both in urban road system, in a region, and between the city and the province developed rapidly in terms of the number of roads, length, and construction technology. The existence and usefulness of a road can be used throughout the shelf life has been planned if they are designed with attention to various aspects. One important aspect of the construction of the highway that determine lifespan of the road until the occurrence of damage.

Performance Based Contract (PBC) is a form of new contracts recently introduced in Indonesia by the Ministry of Public Works. Performance based contract, which means assessment carried out on the basis of the resulting performance, not just a job that has been completed as in the form of a conventional contract. So in addition to be tested (commissioning) after the work is completed will also be assessed performance (Yasin, 2014)

Identification of risk conducted from stage design, procurement, construction and maintenance of which consists of several indicators of risk. The level of risk to the system of performance-based contracts, the highest level in the design stage and

then at the stage of construction, maintenance and final stages of procurement (Yuwana, 2013)

B. LITERATURE STUDY

• Construction contract

Definition of contracts in General according to (Yasin, 2014) is an agreement that is made on the basis of willingness shared between two parties (parties I and II), a legal value. While the construction contract is an agreement to build a building with certain requirements, which are made by the parties I as the owner of the building, with the II as the commissioning of buildings. Therefore, a letter of agreement is declared invalid if based on such things as follows:

1. The freedom of the will (no forced)
2. Skills do (to carry out what was exchanged)
3. The existence of a particular object (building)
4. halal Causa (not prohibited by applicable law)

Construction contract is the "end product" of marketing and management activities and the early activity of production management. A construction contract is a meeting between marketing activities with the activities of the production

• Performance Based Contract

(Yasin, 2014) define the Performance Based Contract (PBC) is a type of contract with a goals and indicators that basing payment on the fulfillment of the minimum performance indicators. Critical elements of effective PBC is the statement

of work is well defined and clearly in writing to achieve performance standards

- Road

Government Regulation number 34 Year 2006 describes the road is the road transport infrastructure covering all parts of the road, including complementary buildings and equipment intended for the traffic, which is at ground level, above ground, below ground level and/or water, as well as on the surface of the water, except railroad, road, and street trucks.

- Risk

The risk is the variation in things that may occur naturally in a situation (Asiyanto, 2009). Risk is a threat to life, property or financial gain due to the danger of that happening. In general the risk associated with the likelihood (probability) of occurrence of an event beyond the expected (Soeharto, 2001)

- Interpretive Structural Modelling

Interpretive Structural Modeling is the process of interactive learning where a set of different risk elements directly related and structured into comprehensive systematic Model. The model is formed, describes the structure of a complex problem or system problems, or field of study, in a pattern designed implies graphics as well as words (Warfield, 1979).

C. METHODOLOGY

This research is an exploratory study to understand and acquire knowledge about the relationship the risks or threats that occur during the implementation and allocator risk of contracting, as well as study the response of the contractors who have carried out the project. From this relationship will be examined to explain the relationship of risk in the use of Performance Based Contract Interpretive Structural Modeling.

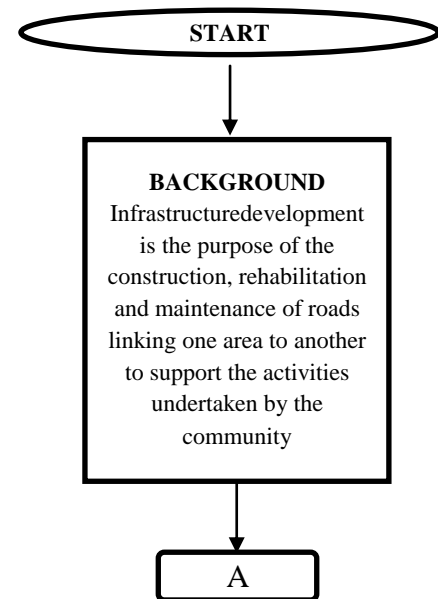
A. Data Collection

Primary data were collected by the researchers by means of:

1. Interview
2. Questionnaire

B. Respondents

Respondents in this study is the contractor PT. Pembangunan perumahan (Persero) Tbk– PT Basuki Rahmanta Putra KSO implemented Performance Based Contract in road construction projects Bojonegoro – Padangan, East Java.



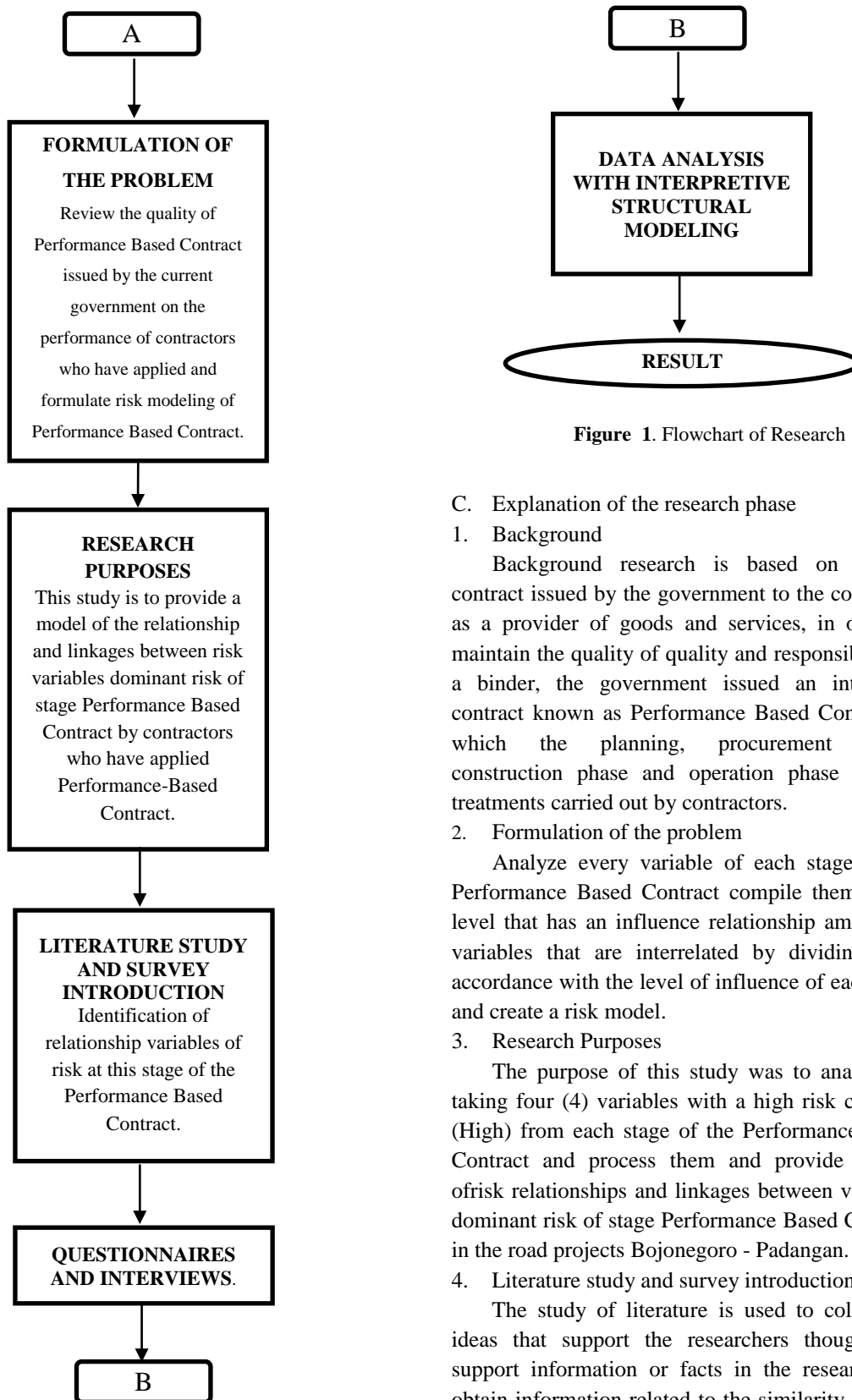


Figure 1. Flowchart of Research

C. Explanation of the research phase

1. Background

Background research is based on a new contract issued by the government to the contractor as a provider of goods and services, in order to maintain the quality of quality and responsibility as a binder, the government issued an integrated contract known as Performance Based Contract in which the planning, procurement phase, construction phase and operation phase and all treatments carried out by contractors.

2. Formulation of the problem

Analyze every variable of each stage of the Performance Based Contract compile them into a level that has an influence relationship among the variables that are interrelated by dividing it in accordance with the level of influence of each level and create a risk model.

3. Research Purposes

The purpose of this study was to analyze by taking four (4) variables with a high risk category (High) from each stage of the Performance Based Contract and process them and provide models of risk relationships and linkages between variables dominant risk of stage Performance Based Contract in the road projects Bojonegoro - Padangan.

4. Literature study and survey introduction

The study of literature is used to collect the ideas that support the researchers thought that support information or facts in the research and obtain information related to the similarity or links with study, for preliminary survey was conducted to determine and obtain data on relevant risks and supports major survey on the implementation of

Performance Based Contract in road projects
 Bojonegoro – Padangan

5. Questionnaires and Interviews

To obtain primary data obtained by questionnaires and interviews to the contractor.

6. Data analysis with Interpretive structural modeling

The four (4) high-risk variables were then treated with Interpretive Structural Modeling method which will result which explains the strong relationship with the analysis that divides the Mic-Mac cluster based Power Drive and Dependence then from the relationship partitioned to sort by level of risk level of variables that made the model the risk of stage Performance Based Contract.

7. Results

The results of Interpretive Structural Modeling is a model with linkages dominant risk variables that correlate with the relationship as seen from the level of the risk level, so as to be given an explanation of the risks at this stage of the Performance Based Contract of road projects Bojonegoro - Padangan.

D. RESULTS AND DISCUSSION

Assessment of risk analysis that has been done is knowing the Risk Event will then be known to the highest risk of some stages of the PBC

Table 1.Risk Event

No	VARIABLES OF RISK	P		I		RISK EVENT
		Total	Avg	Total	Avg	
PT. PP (CONTRACTOR)						
A	DESIGN AND ENGINEERING					
1	The accuracy the scope of work	20	2.857	23	3.286	9.388
2	Qualification engineer	21	3	18	2.571	7.714
3	Engineering communication with procurement	21	3	17	2.429	7.286
4	Use of technology for working methods	23	3.286	17	2.429	7.980
5	Project budgets	23	3.286	22	3.143	10.327
6	Project implementat	19	2.714	19	2.714	7.367

	ion schedule					
7	Design changes	15	2.143	17	2.429	5.204
8	Incomplete specs	15	2.143	17	2.429	5.204
9	Shop Drawing incomplete	16	2.286	17	2.429	5.551
10	Lack of design accuracy	19	2.714	18	2.571	6.980
11	Less sophisticated design and engineering	15	2.143	13	1.857	3.980
B	PROCUREMENT					
1	Vendor bid prices higher than estimated	24	3.429	26	3.714	12.735
2	Availability of materials and human resources	8	1.143	15	2.143	2.449
3	Delays in the supply of materials and tools	15	2.143	11	1.571	3.367
4	Identification of materials and equipment	15	2.143	11	1.571	3.367
5	Vendor Quality Control	9	1.286	8	1.143	1.469
6	Procurement of control documents	15	2.143	7	1	2.143
7	Manufacturing process	15	2.143	12	1.714	3.673
8	Vendor Performance	11	1.571	7	1	1.571
9	Material warranty	12	1.714	13	1.857	3.184
10	Late approval from the owner	14	2	11	1.571	3.143
11	Disputes from third parties	11	1.571	11	1.571	2.469
12	Less experience in inspection and shipping	14	2	7	1	2.000
C	CONSTRUCTION					
1	Site conditions different from	18	2.571	14	2	5.143

2	Restricting working hours	14	2	11	1.571	3.143
3	Quality control and insurance	10	1.429	11	1.571	2.245
4	The design can not be applied in the field	15	2.143	11	1.571	3.367
5	Additional time due to rework	13	1.857	15	2.143	3.980
6	Design changes	14	2	19	2.714	5.429
7	The supply of materials from third parties does not meet specifications	12	1.714	14	2	3.429
8	Forced mature	12	1.714	15	2.143	3.673
9	Friendship supervisor in making decisions	14	2	15	2.143	4.286
10	The delay of cashflow	19	2.714	19	2.714	7.367
11	Disruption of the environment	21	3	16	2.286	6.857
12	Disputes regarding the definition of specifications and documents	16	2.286	17	2.429	5.551
13	Duration in project implementation	12	1.714	15	2.143	3.673
14	Differences in availability of budgets with work progress	19	2.714	18	2.571	6.980
15	Quality of work does not meet the job	15	2.143	15	2.143	4.592
16	Unpredictable soil conditions	16	2.286	16	2.286	5.224
17	Inadequate specifications	14	2	15	2.143	4.286
18	Recent progress payment terminj	19	2.714	17	2.429	6.592
19	Licensing and	16	2.286	17	2.429	5.551

	regulation					
20	The postponement is entangled in disputes	14	2	14	2	4.000
21	The distinction availability of the budget with the progress of the work	14	2	14	2	4.000
22	Unexpected weather conditions	19	2.714	15	2.143	5.816
23	HSE Problems	17	2.429	17	2.429	5.898
24	Technical issues	18	2.571	13	1.857	4.776
25	The occurrence of differences between work sequences and performance indicators	13	1.857	11	1.571	2.918
D	MAINTENANCE					
1	The quality of construction is ugly	12	1.714	21	3	5.143
2	Unexpectedly severe conditions	16	2.286	17	2.429	5.551
3	The short-term focus that fails to minimize long-term costs	18	2.571	22	3.143	8.082
4	Difficulties in power resources	15	2.143	15	2.143	4.592
5	Occurrence during the warranty period	16	2.286	15	2.143	4.898
6	Traffic damage occurred	11	1.833	10	1.667	3.056
7	Fines due to response Attractive less quickly	11	1.571	10	1.429	2.245
8	Age design does not fit the plan	13	1.857	10	1.429	2.653

Risk Event was obtained by Probability (Total/Avg) x Impact (Total/Avg). Risk variable in the table 1 of each stage will be taken that have the highest risk weighting on the scale by giving the Risk Event (RE). Taking risk with variable scale is intended for selecting the variables into intervals. Next from the scale then ranked. So direkapitulasi as follows:

Table 2. Scale and Indicator

DESIGN AND ENGINEERING		
No	Scale	Ranking
1	11 - 8.8	1
2	8.8 - 6.6	2
3	6.6 - 4.4	3
4	4.4 - 2.2	4
5	2.2 - 0	5
PROCUREMENT		
No	Scale	Ranking
1	13 - 10.4	1
2	10.4 - 7.8	2
3	7.8 - 5.2	3
4	5.2 - 2.6	4
5	2.6 - 0	5

CONSTRUCTION		
No	Scale	Ranking
1	8 - 6.4	1
2	6.4 - 4.8	2
3	4.8 - 3.2	3
4	3.2 - 1.6	4
5	1.6 - 0	5
MAINTENANCE		
No	Scale	Ranking
1	9.00 - 7.20	1
2	7.20 - 5.40	2
3	5.40 - 3.60	3
4	3.60 - 1.80	4
5	1.80 - 0	5

Table 3. Very high risk of each stage

DESIGN AND ENGINEERING	
1	Project budgets (D1)
2	The accuracy the scope of work (D2)
B PROCUREMENT	
1	Vendor bid prices higher than estimated (PG1)
C CONSTRUCTION	
1	The delay of cashflow (K1)
2	The distinction availability of the budget with the progress of the work (K2)
3	Disruption of the environment (K3)
4	Recent progress payment terminj (K4)
D MAINTENANCE	
1	The short-term focus that fails to minimize long-term costs (PM1)

A. Analysis Mic-Mac

Cluster group division is based on the analysis of Mic-Mac (Satapathy, Patel, Biswas, & Mishra, 2013) can provide an explanation of the relationship variables based on the thrust and the variables that affect the way Bojonegoro-Padangan project with the implementation of Performance Based Contract. Pictures along with the following explanation:

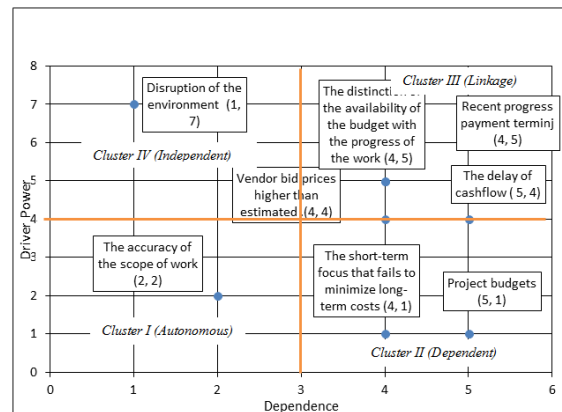


Figure 2. Analysis Mic-Mac

From analysis obtained 4 levels of risk with 8 variables with Cluster division as follows:

- a. *Cluster I (Autonomous):* The accuracy of the scope of work

- b. *Cluster II (Dependent)*: The short-term focus that fails to minimize long-term costs
- c. *Cluster III (Linkage)*: The distinction of the availability of the budget with the progress of the work
- d. *Cluster IV (Independent)*: Disruption of the environment

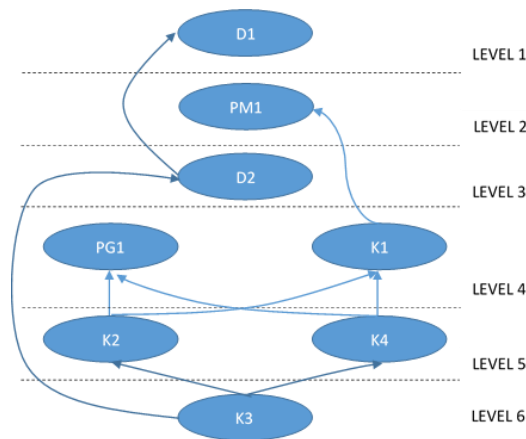


Figure 3. Model Interpretative Structural Modeling

Model Interpretative Structural Modeling explained that the relationship model risk in road project Bojonegoro-Padangan has 6 levels of risk levels. Variable Project budgets(D1) as the most variable of all the achievement variables affect the risk and Disruption of the environment(K3) as causes of events that dominate dependency risk variables. This model also explains the hierarchy between variable levels of risk, risk linkages, classification of relationships per level of risk and partition levels that affect the level of risk in the Performance Based Contract so as to provide a detailed explanation of each risk level

E. CONCLUSION

The results of the use of Interpretive Structural Modeling is variable Disruption of the environment as a key variable, and Project budgets as variables that influence at all stages of the Performance Based Contract. Budget project as the most influential risk with the ability to influence high risk, and has a high exposure to risk variables affect each other in Bojonegoro-Padangan road project. From these results so as to give consideration to the contractor in the use of budgetary policy during the construction period.

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