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CAUSE ANALYSIS OF CONTRACT AMENDMENT IN THE X DRY DAM CONSTRUCTION PROJECT IN INDONESIA

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ABSTRACT

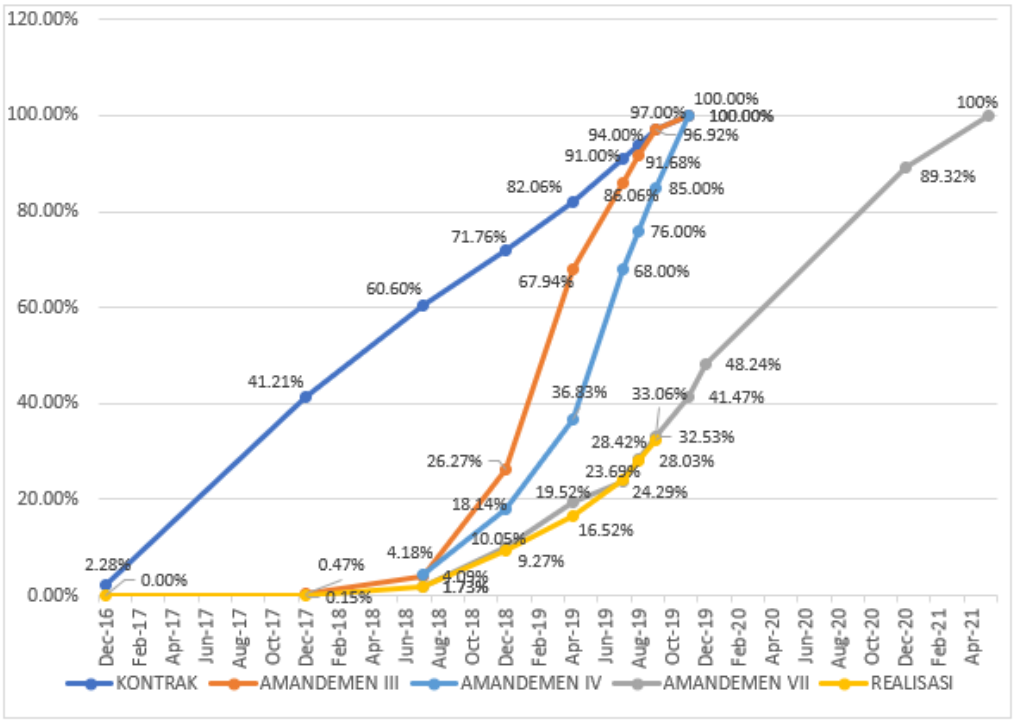
The government is build two dams in an effort to pursue flood capacity in Jakarta, one of which is the X Dry Dam project. There were obstacles during the construction of this project, which resulted in several changes in the form of contract amendments. The purpose of this study is to determine the most influence factors that causes of contract amendments and give suggestions for that factors, so the next contract amendment can be minimized and the project can run according to the costs and time that has been set. In this study the authors use quantitative research methods by distributing questionnaires to respondents who are staff at contractor. Secondary data used is S curve. This research uses 4 stages of questionnaire by using the reliability test using SPSS version 25 software and data analysis of importance index (II). From the results of this study are the X Dry Dam Project has 5 factors that most influence the occurrence of contract amendments that are land acquisition (53.33%), severe weather conditions (52.19%), society refusal of the project (48.84%), lacking of design process planning (42.12%), and schedule /estimated time by the owner is too fast (40.28%).

Keywords: Dam Project, Contract Amendment, Multi Years Contract, Importance Index.

INTRODUCTION

X Dry Dam Project in Indonesia has a function to pursuing flood control capacity in Jakarta considering that one of the causes of flooding in the capital is caused by the overflowing of the Ciliwung and Cisukabirus Rivers. This dam has a volume of 6.45 million m3. However, during the construction there were various obstacles causing changes in the contents of the contract through several amendments and caused a mismatch in the implementation schedule for the X Dry Dam from the schedule planned in the contract. As a result of the obstacle, the owner has once proposed an extension in the Multi Years Contract which was originally 4 fiscal years (Fiscal Year 2016 to Fiscal Year 2019) to 6 fiscal years (Fiscal Year 2016 to Fiscal Year 2021). Until the October 2019 the project has been amended eight times and it is possible that the amendment will re-emerge during the period of the dam construction project.

Figure 1. S Curve of X Dry Dam Project



Source: Project Document, 2019

After reviewing the project s curve, there have been several changes to the implementation schedule so that amendments III, IV, and extension of implementation time occurred in amendment VII. The amendment to this extension of time was also renewed in amendment VIII due to work pending. Likewise with the amendments IV and VII, there was a Change Order, namely changes in the scope of work and reduction and addition of work volume. Several times the change in the power of the budget user and the change in the legal representation of the parties also entered into other amendment numbers.

Previous research has been conducted on the factors that cause delays and Contract Change Orders (CCO) on several dam projects and government projects, but research has not been found on the X Dry Dam Construction Project. Therefore, it is necessary to identify the causes of contract amendments in this project and produce solutions or recommendations to overcome the causes and reduce the negative impact in achieving the project objectives.

Literature Review

According to the [2], change of work (change order) is a written request signed by the architect, contractor, and owner made after the contract is issued, which has the power to change the scope of work or make adjustments to the contract value and the completion time of the work.

According to the [3], Amendments are official changes made to the contents of an agreement. Such changes can take the form of addition, subtraction, omission and renewal of the contents of the contract and agreed by both parties. Whereas the Addendum is defined as an addition made to an agreement. The addition is in the form of additional documents which usually contain a description or terms, obligations, or additional information to help the implementation of the work. Addendum is usually done because there are things that are not

yet regulated in the main agreement. Based on the actual provisions of the CCO (Contract Change Order), Addendum and Amendment to the Contract are the same terms, only the Addendum and the Amendment of the Contract are the follow-up products of the CCO (Contract Change Order).

Based from the reasons in [4] , in the case there are differences between field conditions at the time of implementation, with pictures and / or technical specifications specified in the Contract Document, Owner and Provider of Goods / Services can make changes to the contract which includes:

a. increase or decrease the volume of work stated in the Contract;
b. increase and / or reduce the type of work;
c. change the technical specifications of the work in accordance with the needs of the field;
d. change the implementation schedule.

Based on the above provisions it is clear that contract amendments can be made with amendments and addendums to the contract.

RESEARCH METODOLOGY

To achieve the objectives of this research, the study was divided into several stages. starting with a literature review, research methodology, data collection and analysis, discussion of results, conclusions and a series of recommendations.

1. Reliability Test
   The reliability test aims to determine the level of reliability of the data generated by an instrument to ensure the consistency of research instruments in the same concept. Reliability analysis that is commonly used is Cronbach Alpha (C-alpha) analysis. This study conducted a reliability test using the Statistical Package for Social Sciences software program (SPSS 25.0 for Windows).

2. Frequency Index (FI) % $= \sum_{i=1}^{5} \left[a \,.\, \left(\frac{n}{N}\right) \right] .\ \frac{100}{5}$

   Where :
   (a) Constant of weighting given to each response
   (1= Rarely, 2= Unlikely, 3= Possible, 4= Likely, and 5= Almost Certain).
   (n) The frequency of responses.
   (N) Total number of responses

3. Severity Index (SI) % $= \sum_{i=1}^{5} \left[a \,.\, \left(\frac{n}{N}\right) \right] .\ \frac{100}{5}$

   Where :
   (a) Constant weighting given to each response
   (1= Negligible, 2 = Low, 3 = Medium , 4 = High, and 5 = Critical).
   (n) The severity of responses.
   (N) Total number of responses

4. Importance Index (II) % = $\left(\frac{\text{FI} \,.\, \text{SI}}{100} \right)$

   Where :

(FI) = The calculated of Frequency Index
(SI) = The calculated of Severity Index

Table 1. Rating Interval Scale

No.	Scale	Description
1	Index 0% - 19.99%	No Affect
2	Index 20% - 39.99%	Minor Affect
3	Index 40% - 59.99%	Moderate Affect
4	Index 60% - 79.99%	Affectable
5	Index 80% - 100%	Major Affect

Source: Sugiyono, 2017

RESULTS AND DISCUSSIONS

Data Analysis

Table 2. Reliability Test

No	Responden Scale	*Cronbach Alpha*
1	*Frekuency*	0.939
2	*Severity*	0.955

Source: SPSS version 25 output, 2019

Table 3. Frequency, severity, importance index, and overall ranking

VARIABLE	CAUSE FACTORS OF AMENDMENT CONTRACT	FI%	SI%	II%	RANK
Technical Aspect					
XI	Soil Investigation	50.00	56.00	28.00	13
X2	schedule /estimated time by the owner is too fast	58.67	68.67	40.28	5
X3	Scheduling from the contractor	48.67	58.67	28.55	12
X4	Change of plans and scope of work by the owner	57.33	65.33	37.46	6
X5	Approval of the work permit is too long	45.33	50.67	22.97	20
X6	There is work that needs to be dismantled / repaired	39.33	48.67	19.14	24

VARIABLE	CAUSE FACTORS OF AMENDMENT CONTRACT	FI%	SI%	II%	RANK
X7	lacking of design process planning	61.33	68.67	42.12	4
X8	The Feasibility Study does not cover all aspects	48.67	58.67	28.55	12
X9	Work plan and technical drawings are incomplete	54.67	60.67	33.16	9
X10	Shortage of soil sample drilling point	48.67	60.00	29.20	11
Excecution Aspect					
X11	Unskilled labour	42.00	55.33	23.24	19
X12	Site supervision	43.33	51.33	22.24	21
X13	Changes in material specifications	46.00	54.00	24.84	18
X14	Changes in the equipment specifications	39.33	44.00	17.31	26
X15	Equipment operator availability	37.33	45.33	16.92	27
X16	Changes in design / detail by the owner at the time of execution	55.33	66.67	36.89	7
X17	Demand changes in the work already completed	46.00	63.33	29.13	11
X18	Time for shop drawing approval process	47.33	56.00	26.51	16
X19	Design accuracy	54.67	60.67	33.16	9
X20	Appropriate budget plan and technical drawings	45.33	56.00	25.39	17
Management and Financial Aspects					
X21	Late payment by owner	32.67	45.33	14.81	28
X22	Material price escalation	50.67	53.33	27.02	14
X23	The work stage data adjusts the excecution time so that it is difficult to adjust the fulfillment of resources	48.67	60.00	29.20	11
X24	Poor of management	39.33	54.00	21.24	22
X25	*Contract Change Order* (CCO) frequency	54.00	58.67	31.68	10
X26	The owner's delay in giving permission, approval and decisions	46.00	54.00	24.84	18
X27	Poor communication between parts of the organization in each contractor	47.33	56.67	26.82	15

Source: Author, 2019

VARIABLE	CAUSE FACTORS OF AMENDMENT CONTRACT	FI%	SI%	II%	RANK
Social and Environment Aspect					
X28	Work accident in the site	29.33	39.33	11.54	30
X29	Severe weather condition	68.67	76.00	52.19	2
X30	Society refusal of the project	66.00	74.00	48.84	3
X31	Uncertainty in completion of land administration to the payment process	59.33	67.33	39.95	6
X32	Land acquisition	66.67	80.00	53.33	1
Political Aspect					
X33	Occupational safety in the site	38.00	46.67	17.73	25
X34	Support and policy from the local government	51.33	52.67	27.04	14
X35	Completion of land status is late	59.33	62.00	36.79	8
X36	Delay in getting permission / approval from the authorized government	43.33	46.67	20.22	23
X37	Political situation	32.67	40.00	13.07	29

Results

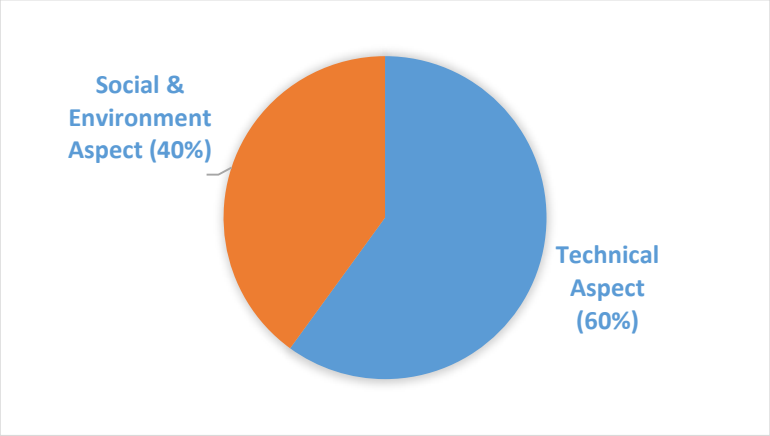
Based on the results of the analysis of the discussion of this study, a conclusion can be drawn regarding the factors that affect the causes of contract amendments in the X Dry Dam Construction Project in Bogor are as follows:

Table 4. a High Importance Index Value Cause the Contract Amendment

Rank	Score %	Variable	Factor	Category
1	53.33	X32	Land Acquisition	Social and Environment Aspects
2	52.19	X29	Severe Weather Condition	
3	48.84	X30	Society Refusal of The Project	
4	42.12	X7	Lacking of design process planning	Technical Aspects
5	40.28	X2	Schedule / estimated time by the owner is too fast	

Source: Author, 2019

Figure 2.Pie Chart of Aspect Cause the Contract Amendment



Source: Author, 2019

CONCLUSIONS

Based on the analysis of the research that has been done, it can be concluded that some of the variables that caused the contract amendment are as follows:

1) **Variable X32 (Land Acquisition)** is the variable with the second highest FI percentage of 66.67% which means "Affectable" and the first highest SI of 80% which means the impact is "major affectable" the amendment of the contract. Land acquisition is the highest factor because until the end of 2019 the progress of land acquisition for the X Dry Dam only reached 58.41 Ha (85.99%) of the total area that should have been 78.35 Ha. So that the lack of land that is not yet free due to the payment process area of 19.94 Ha (14.01%). Suggested recommended actions are that the owner should ensure that the land is ready 1-2 years before the construction execution by creating a special team to negotiate, re-schedule, and make adjustments to work methods and resources following schedule changes
2) **Variable X29 (Severe Weather Conditions)** is a variable with the highest percentage of FI percentage of 68.67% which means "affectable" and the second highest SI of 76% which means the "major affect" the amendment of the contract. The weather conditions are caused by the project location in an area with high rainfall so that rain often causes flooding, increased river flow, up to very slippery road access so that the temporary road to the field is cut off and takes a maximum of 2-3 weeks at during the repair process. Suggested action recommended is that all stakeholders should plan to overcome unexpected conditions by conducting an early warning system of disaster mitigation to minimize the impact of disasters, speeding up the process of repairing temporary road damage.
3) **Variable X30 (Society Refusal of the project)** is a variable with a FI percentage of 66% which means "affectable" and SI of 74% which means the "major affect" the amendment of the contract. The society refusal of the project was not caused by the community's ignorance of the project. First, refusal due to administrative processes and payment of compensation for their land has not yet been completed. Second, the existence of waqf and burial ground so that it takes time to conduct in-depth discussion and socialization between the project owner and the community. Suggested action recommended is to socialize to the community, if the land administration process is difficult. Requires pressure from higher on each instance that manages the land status process.
4) **Variable X7 (lacking on design process planning)** is a variable with a FI percentage of 61.33% which means "affectable" and SI of 68.67% which means "affectable" the amendment of the contract. The design process is not mature in the planning resulting

in the dismantling of work items that have been done, this certainly results in loss of time and cost. This variable also causes design changes to occur so that it takes time to discuss and review new designs. Suggested recommended actions are FGD (Forum Group Discuss) with experienced experts when planning or when changes occur.

5) **Variable X2 (Schedule / estimated time by the owner is too fast)** is a variable with a FI percentage of 59.33% which means "moderately affect" and SI of 67.33% which means "affectable" the amendment of the contract. This variable is caused by the availability of time given by the owner too quickly and seems too rushed so it is not in accordance with the readiness of the field conditions so that the contractor has difficulty adjusting work items with the availability of resources and time. The recommended action is that the owner and the contractor conduct a discussion to review the re-schedule, and the estimation details should be as detailed as possible so that when a setback occurs the item causes it and then revises the schedule again.

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