Analysis of the Delay Factors of Construction Projects in North Aceh District

[1]Muhammad Derry Safrizal, [2]Anita Rauzana, [3]Muttaqin Hasan

ABSTRACT-- The performance of a project will not work well if supervision and control are not carried out, then delays will be made in the process of completing a project. Delay in project work has a variety of causes whether it is caused by the negligence of humans or it occurs due to natural factors. Delay in implementation will effect new problems in the project work process, one of the problems is the increasing project implementation costs. The purpose of this study was to analyse the factors that caused the delay in the implementation of the project and to investigate the effects on costs realized in North Aceh. This research method used quantitative and qualitative methods through observation methods by asking questions to the parties that contributed to the Construction Services Development Institute (LPJK). Based on data from LPJK in 2018 the number of contractors domiciled in North Aceh Regency were 83 contractors who qualified K3, M1, M2, B1 and B2. Thus the population is less than 100, therefore the samples/respondents taken in this study were all populations, namely 83 contracting companies domiciled in North Aceh Regency. The variables in this study consist of 2 variables, namely the independent variable / variable X was the causes of Project Delay, and the required variable / Y variable was the Project Cost. The results of this study are based on the analysis of the ordinal logistic regression equation of work design and planning factors, implementation and work relations, material, labour, equipment, field conditions, and beyond the abilities of the contractors that significantly influenced project costs.

Keywords—analysis, delay, factors, construction, projects, aceh district

I. INTRODUCTION

Every construction project has a specific plan, whenever the project has to start, whenever it has to be done and the project being worked on, as well as how to provide its resources, and an implementation plan that is made, because it has been made with the actual reality. The problems that arise will be a challenge that occurs due to delays in the completion of the construction project implementation. The work delays have a variety causes whether they caused by negligence committed by humans until the delays caused by natural factors. The delay in implementation will address various new problems in the project work process, a term that is intended as part of an agreement on the cost of project implementation.

The impact of the delay in project implementation has a great potential toward increasing the cost of project implementation, besides the delay also affects the time overrun, disputes, and termination of employment. These can cause losses to the parties concerned, therefore more attention is needed to the delay in project implementation.

[1] *Civil Engineering Magister, Engineering Faculty, Syiah Kuala University, Banda Aceh, Indonesia.*

[2] *Civil Engineering Department, Syiah Kuala University, Banda Aceh, Indonesia.*

[3] *Civil Engineering Department, Syiah Kuala University, Banda Aceh, Indonesia.*

Furthermore, in this study will analyze the factors that cause delays in the implementation of construction projects and find out their effects on project costs in the Aceh North.

II.   METHODS

2.1 Research Object and Location

The object of research is the target to achieve solutions in problems that occur. The object of this study is to analyze the influence of the factors due to delays in construction projects on costs in the North Aceh region.

2.2 Data Source

The data source is the subject which the data can be obtained. In this study the researcher used two data sources, namely primary data and secondary data. The primary data source is the form of respondents' answers to the questions that have been designed on the questionnaire. While secondary data is the total number of company qualifications sourced from LPJK.

2.3 Determination of Samples

In this study the population taken are contractors or people who are experienced in the field of construction projects, such as experts, project managers, site engineers, field executives and supervisors. So because the population is less than 100, by digesting, as for the samples taken in this study are the populations [1], as many as 83 contracting companies domiciled in North Aceh Regency.

2.4 Validity Test

Validity test is a test used to show the extent to which the measuring instrument used in measuring what is measured. The purpose is to measure whether a questionnaire is valid or not if the questions in the questionnaire are able to reveal what will be measured by its questionnaire. The testing criteria is if r count > r table with $\alpha = 0,05$ then the measuring instrument is declared valid, otherwise if r count < r table then the measuring instrument is invalid [2]. The questions include; A1 = Technical specifications are unclear and lack of firm because they are too general, A2 = Design is unclear, out of sync between one item and another, A3 = Shop drawing is not ready in time, there is no opportunity to learn, A4 = Project data and information less complete, A5 = Design change, A6 = Determination of inaccurate / inaccurate working time duration, A7 = Work order plan that is not well arranged, B1 = Project coordination is quite complicated, B2 = Implementation of the project improvises due to lack of planning, B3 = Complex and specific work processes, which can be simplified, B4 = Supervision function is weak even without supervision, B5 = There is a lot of additional work, B6 = Conversion in implementation schedule, B6 = Failure of the owner to coordinate the work of many contractors / subcontractors, B7 = Incomplete list of work, only given in small increments, B8 = Postponement of work due to financial and legal reasons, B9 = Difficulties in funding work due to financial and legal reasons, B10 = Approval process of wordy work permits, B11 = Deviation of delivery time between material and equipment procurement, C1 = Materials sent are not according to specifications, C2 = Material arrival is late from the schedule because the stock is not ready, C3 = The size of the product material is not appropriate and standard, C4 = Price of material that fluctuates every day,

C5 = Some materials are lost at the project site, C6 = Reduction of material during implementation, C7 = Material standard in specifications not available on the market, C8 = Poor quality control of materials, C9 = Long distance of material sources, C10 = conversion / additions to material specifications used, D1 = Poor / inadequate quality of labour, D2 = Labour shortage, D3 = Lack of workforce experience, D4 = Work is not according to procedures, D5 = Do not master the work in the field, D6 = lack of compactness of the implementation team, D7 = Poor labour discipline, D8 = Replacement of new workers, E1 = Procurement of equipment is not on time, E2 = Equipment that suddenly breaks during the project, E3 = Inadequate equipment, E4 = Equipment shortage in implementation time, E5 = Equipment is often broken, E6 = Lack of equipment capacity, F1 = The difference between field conditions and contract, F2 = Rain continues for days without stopping, F3 = Unusual weather / out of season, F4 = difficult transportation, F5 = Conflicts, F6 = Old unresolved conflicts G1 = Unforeseen occurrences such as fire, flood, earthquake, storm, G2 = Occupational accident, G3 = There are labours strike, G4 = There is riot or chaos, G5 = Conversion in government political / economic situation or policy, and G6 = Land acquisition issues.

2.5 Reliability Test

The reliability test shows the extent of instrument that can provide consistent measurement results if measurements are made repeatedly. The reliability measurement is performed using the alpha ronbach formula [3], while using the equation formula (2.3). The reliability test criterion with the alpha formula is if r count > r table (0.6) then the measuring instrument is reliable, otherwise, if r count <r table (0.6) then the measuring instrument is not reliable [4].

2.6 Data Analysis

Data analysis in this research was carried out quantitatively using Ordinal Logistic Regression or often referred to as PLUM and the data processing was supported by SPSS software. Testing the hypothesis in this study was using ordinal logistic regression because the dependent variable was the ordinal scale.

III.   RESULTS AND DISCUSSION

3.1 Validity Test

Testing the validity of the data in this study was carried out statistically, using the Pearson correlation test. The question is valid if the value of r-count> r-table or p-value is smaller than alpha 5%. The results of the validity test can be seen in the following table

Table 1: The result of validity test

Variable	Item Questions	r-counting	r-table	Addition
Design and Planning Factor (X1)	A1	0,906		Valid
	A2	0,690	0,196	Valid
	A3	0,819		Valid
	A4	0,954		Valid

	A5	0,927		Valid
	A6	0,883		Valid
	A7	0,894		Valid
	B1	0,852		Valid
	B2	0,832		Valid
	B3	0,695		Valid
	B4	0,885		Valid
Implementation	B5	0,863		Valid
and Work	B6	0,878	0,196	Valid
Relations Factor	B7	0,857		Valid
(X2)	B8	0,636		Valid
	B9	0,857		Valid
	B10	0,814		Valid
	B11	0,850		Valid
	B12	0,806		Valid
	C1	0,878		Valid
	C2	0,865		Valid
	C3	0,677		Valid
	C4	0,892		Valid
Material Factor	C5	0,697	0,196	Valid
(X3)	C6	0,622		Valid
	C7	0,539		Valid
	C8	0,908		Valid
	C9	0,893		Valid
	C10	0,536		Valid
	D1	0,809		Valid
	D2	0,882		Valid
	D3	0,910		Valid
Labour Factor	D4	0,939	0,196	Valid
(X4)	D5	0,864		Valid
	D6	0,798		Valid
	D7	0,812		Valid
	D8	0,645		Valid
	E1	0,812		Valid
	E2	0,844		Valid
Equipment	E3	0,780	0,196	Valid
Factor (X5)	E4	0,876		Valid
	E5	0,764		Valid
	E6	0,478		Valid
Field Condition	F1	0,754	0,196	Valid

Factor (X6)	F2	0,860		Valid
	F3	0,826		Valid
	F4	0,791		Valid
	F5	0,755		Valid
	F6	0,457		Valid
	G1	0,792		Valid
	G2	0,696		Valid
Incapability Contractor factor (X7)	G3	0,881	0,196	Valid
	G4	0,834		Valid
	G5	0,728		Valid
	D6	0,855		Valid

Based on the table, it can be concluded that all statements of each variable are valid because they have a positive relationship with the total construct score. This positive relationship occurs because each statement has a significance score below alpha 5% and the r-counting score is bigger than the r-table.

3.2 Reliability Test

Reliability test is a measurement tool to measure a questionnaire which is an indicator of a variable. A questionnaire is reliable if a person's statement is consistent from time to time. Statistical test is performed by looking at the Cronbach alpha score to find out whether it is reliable or not. The criteria used are:

• If cronbach alphas score > 0, 60 then the statement used to measure the variables is reliable.

• If cronbach alpha score < 0, 60 then the statement used to measure the variables is not reliable.

The reliability test results in this study produced a Cronbach alpha score of each variable > 0, 60, so that all variables were declared reliable. Cronbach alpha score for each variable can be seen in the following table.

Table 2: The result of reliability test

Variable	Number of Items	Cronbach Alpha	Critical Score Cronbach Alpha	Addition
Design and Planning Factor (X1)	7	0,938	0,600	Reliable
Implementation and Work Relations Factor (X2)	12	0,954	0,600	Reliable
Material Factor (X3)	10	0,914	0,600	Reliable
Labour Factor (X4)	8	0,931	0,600	Reliable
Equipment Factor (X5)	6	0,838	0,600	Reliable
Field Condition Factor	6	0,838	0,600	Reliable

(X6)

Incapability Contractor factor (X7)	6	0,877	0,600	Reliable

3.3 Ordinal Logistic Regression Analysis

The influence of the factors causing delays in construction projects to the project costs is analyzed using the Ordinal Logistic Regression equation. This analysis has the Output in the form of the most influential factor or not influential factor through the magnitude of Ordinal Logistic Regression coefficient, based on the results of the calculation can be seen as follows.

Table 3: Recapitulation of fitting information model results

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept Only	214.267			
Final	205.169	214.267	27	.000

Based on the table, using the Fitting Information Model explains that a sig value of $0,000 < 0.05$ shows that the independent variables affected the dependent variable, which means that the construction project delay factor significantly influenced the project costs in North Aceh District.

IV. CONCLUSION

Based on the literature review in this study, there are 7 factors of project delays including design and planning factor, implementation and work relationship factor, material factor, labour factor, equipment factor, field conditions factor, and incapability contractor factor. Based on the results carried out using the Information Fitting Model in this study, it indicates that the significance value is 0.00 (<0.05) so the results of this study states that there has an influence of costs on the delay of project implementation in North Aceh District.

REFERENCES

1. Arikunto, S.: Prosedur Penelitian: Suatu pendekatan praktek, Rineka Cipta, 2010
2. Priyatno, D.: Teknik mudah dan cepat melakukan analisis data penelitian dengan SPSS dan tanya jawab ujian pendadaran, Gaya Media, 2010
3. Triton, B. P.: SPSS 13 terapan risets statistik parametric, Andi, 2005
4. Arikunto, S.: Prosedur penelitian suatu pendekatan praktik, Rineka Cipta, 2006