

## Critical Factors Affecting Quality Performance in Construction Projects

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### **Abstract**

*The purpose of this study was to identify factors that most influence quality performance in construction projects in Banda Aceh, in terms of labor, tools, costs, and materials. The data collected in this study were primary data and secondary data, with the target respondents was contractor companies that involved in the implementation of construction work in the city of Banda Aceh. Based on the results of the questionnaire survey and data processing analysis, it was obtained 8 quality performance factors that are very influential on the construction project, namely changes in scope and work items at the owner's request, factor of lack of material quality, improvement of project plan drawing, poor quality of equipment, factor of lack of work experience, factors of uncertain weather conditions, lack of work discipline, factors of lack of workforce expertise.*

**Keywords:** *quality, performance, project, construction, contracting company*

### 1. INTRODUCTION

An increasing number of contractors, has not been followed by an increase in quality and performance, which can be seen from the quality of work, timeliness of completion of the implementation, and resource utilization efficiency of personnel, capital, and technology in the organization of construction services. In general, high-tech construction work cannot be fully controlled by the construction service business. Quality performance factors in the implementation of construction projects are important things to be studied, which are influenced by several factors such as lack of work experience, lack of material quality, poor project funding planning, and others. The purpose of this study is to identify the factors that most influence the quality performance of construction projects in Banda Aceh, in terms of labor, technicians / tools, costs, and materials. The data collected in this study were primary data and secondary data, the target respondents are contractors in the city of Banda Aceh, with the qualification of B, M, and K (large, medium, and small), amounting to 42 respondents. Primary data is obtained through questionnaires, where the questionnaire is distributed directly to the contracting company. Secondary data used as the basis for compiling questionnaires obtained from literature studies, both scientific journals and books related to this study. Data processing in this study using Microsoft Excel Software.

### 2. MATERIALS AND METHODS

The location in this study was in the city of Banda Aceh, respondents in this study were contractor companies in Banda Aceh, which had the qualifications of K3, M1, M2, B1, and B2. Identification of factors that influence quality performance in construction projects is by conducting literature studies based on the results of previous studies, the quality factors of construction projects based on previous research can be seen in the following Table 1.1:

Table 1.1 Identification of Quality Performance Factors in Construction Projects

Factors	Quality Performance Factors
X1	Error in Estimated Costs
X2	Equipment maintenance costs
X3	High interest rates
X4	Unexpected costs
X5	Materials sent do not meet specifications
X6	Late material deliveries
X7	Inadequate material available
X8	Material price increase
X9	Improper material procurement
X10	Lack of material quality
X11	The lack of labor discipline
X12	Low motivation of the workforce
X13	Lack of labor skills
X14	Lack of workforce
X15	Slow labor providers
X16	Too many projects handled
X17	Lack of coordination
X18	Lack of work experience
X19	Change in scope and work items
X20	Repair plan drawings

X21	Uncertain weather conditions
X22	High equipment prices
X23	The equipment is not in accordance with the required technical specifications
X24	Poor equipment quality
X25	Equipment is damaged
X26	Equipment is lacking

*Method of collecting Data*

Data collection methods are carried out by distributing questionnaires to respondents. The data collected are primary data and secondary data. Primary data in this study are data obtained from interviews and filling out questionnaires to respondents. Primary data is obtained through the process of distributing questionnaires to 42 contracting companies in Banda Aceh directly, and the answers are based on respondents' subjective opinions. Secondary data in this study is a list of the names of contractor companies registered as members of the Indonesian National Contractors Association.

*Number of Samples*

Determining the sample size of a population can use a variety of techniques, one of which is by using the Slovin technique with permissible analysis error tolerance is 10% (Umar, 2008). The Slovin formula is as follows:

$$n = N / (1 + (N \times e^2))$$

Where ;

*n* = number of samples

*N* = population

*e* = error margin

Target respondents are contractor companies that involved in the execution of construction work in the city of Banda Aceh, which are qualified B, M, and K (large, medium, and small), the number of population is 72 contracting companies, using the Slovin formula obtained 42 respondents for the distribution questionnaires.

*Likert scale*

Sugiyono (2010), Likert scale is used to measure attitudes, opinions and perceptions of a person or group of people about social phenomena. To get an answer, an instrument is made that is linked to a form of statement or attitude support that is expressed by a specific word or indicator. Riduwan (2003), states that Likert scale is used to measure attitudes, opinions, or groups about social events or symptoms. For analysis purposes, the answers can be given scores, as follows:

1.	<i>Very high influence</i>	=5
2.	<i>High influence</i>	=4
3.	<i>Medium influence</i>	=3
4.	<i>Low influence</i>	=2
5.	<i>Very low influence</i>	=1

*Validity Test*

According Sugiyono (2012), the validity of the degree of correspondence between a conceptual limit given by relief operations have been developed. Validity relating to the conformity between a construct or indicators used to measure it. Validity is measuring what you want to measure.

*Reliability Test.*

According to Morissan (2012), reliability is an indicator of the level of reliability or trust. A measurement is called reliable or has reliability if it consistently provides the same answer. Reliability testing was carried out using the Cronbach Alpha method, measured based on the Cronbach Alpha scale from 0 to 1. The test using this coefficient must be greater than or equal to 0.6, which is the value considered to be able to reliably test whether the questionnaire was used (Triton, 2006 )

*Descriptive Analysis*

Sugiyono (2013) states that descriptive analysis is a statistic that is used to describe or describe collected data. The presentation method is in the form of tables, graphs, or diagrams. Descriptive analysis can be in the form of data, average, number of data values, lowest data values, and high data values. Soepono (1997) states that descriptive statistics are used to provide the most frequently presented data (mode) of each parameter discussed and presented in the form of tables. Descriptive statistics are also used to organize and summarize data obtained from the results of data collection in the field.

**3. RESULTS AND DISCUSSION**

The results of the spread of the questionnaire were obtained after data collection, data processing using descriptive analysis. The results obtained from data processing are respondents' answers about the analysis of factors that affect quality performance in construction projects in Banda Aceh. The number of questionnaires distributed to 42 respondents.

Validity Test Results

Validity test is used to measure whether the questionnaire is valid or not. Validity testing is done by calculating the correlation between each indicator score of each factor with the total score of the factor. Validity test was performed on each factor with the Pearson product analysis moment comparing the rxy value with the r-table value. If the rxy value is greater than the r-table value, then the factor is considered valid. The r-table value obtained from the product moment table is 0.393. The results of the calculation of the validity test values for the questionnaire can be seen in the following table:

Table 1.2 Validity Test Results

Factors	r value	Description
X1	0,456	Valid
X2	0,532	Valid
X3	0,491	Valid
X4	0,570	Valid
X5	0,567	Valid
X6	0,496	Valid
X7	0,505	Valid
X8	0,545	Valid
X9	0,447	Valid
X10	0,543	Valid
X11	0,401	Valid
X12	0,564	Valid
X13	0,656	Valid
X14	0,594	Valid
X15	0,562	Valid
X16	0,603	Valid
X17	0,534	Valid
X18	0,621	Valid
X19	0,578	Valid

X20	0,591	Valid
X21	0,629	Valid
X22	0,431	Valid
X23	0,541	Valid
X24	0,525	Valid
X25	0,403	Valid
X26	0,444	Valid

Based on the results of the calculation of the validity of the questionnaire, each instrument has a value greater than 0.3 means that the questionnaire is valid and meets the minimum coefficient required.  
*Reliability Test Results*

This analysis is used to predict the correlation between scales made with all existing scales, based on the cornbach alpha coefficient. This analysis can provide the possibility to measure the same object with a coefficient of  $\geq 0,6$ . The value of the cornbach alpha coefficient for each category can be seen in the following table.

Table 1.3 Reliability Test Results

No. of Items	Cronbach Alpha	Description
26	0,897	Reliable

Based on the results of the reliability analysis for all factors, a reliability coefficient was obtained at 0.897. The questionnaire is feasible, because it has fulfilled the minimum Cronbach Alpha coefficient required, which is a minimum of 0.6.

*Descriptive Analysis*

Descriptive analysis is used to determine the factors that most influence the quality performance of a construction project. Descriptive analysis uses the value of the mode to obtain the data that most often appears, so that the answers that are the most chosen by the respondents can be obtained. The results of the mode score can be seen in Table 1.4 below.

Table 1.4 Results of Descriptive Statistics

Factor	Score					Mode	Influence Level
	5	4	3	2	1		
X1	3	16	14	8	1	4	High influence
X2	4	17	14	6	1	4	High influence
X3	5	13	19	5	0	3	Medium influence
X4	7	16	13	4	2	4	High influence
X5	6	17	16	2	1	4	High influence
X6	7	18	16	1	0	4	High influence
X7	7	18	14	3	0	4	High influence
X8	4	23	14	1	0	4	High influence
X9	6	18	17	1	0	4	High influence
X10	22	11	7	1	1	5	Very high influence

X11	17	16	6	2	1	5	<i>Very high influence</i>
X12	7	16	14	5	0	4	<i>High influence</i>
X13	15	12	14	1	0	5	<i>Very high influence</i>
X14	3	20	17	2	0	4	<i>High influence</i>
X15	3	15	17	6	1	3	<i>Medium influence</i>
X16	8	14	16	4	0	3	<i>Medium influence</i>
X17	5	22	12	3	0	4	<i>High influence</i>
X18	19	9	10	4	0	5	<i>Very high influence</i>
X19	24	7	8	3	0	5	<i>Very high influence</i>
X20	21	13	2	6	0	5	<i>Very high influence</i>
X21	18	15	2	7	0	5	<i>Very high influence</i>
X22	2	18	11	10	1	4	<i>High influence</i>
X23	5	18	14	5	0	4	<i>High influence</i>
X24	20	11	11	0	0	5	<i>Very high influence</i>
X25	6	14	15	7	0	3	<i>Medium influence</i>
X26	2	9	18	13	0	3	<i>Medium influence</i>

Table 1.4 is the result of the mode value of the factors that influence quality performance in construction projects. From the results of data processing on quality performance, there are 26 factors that have a mode value, with categories that have been determined based on a Likert scale. The results of the recapitulation of the quality performance factors can be seen in Table 1.5 below.

Table 1.5 Recapitulation of Descriptive Statistics

Kategori	Jumlah
Very high influence	8
High influence	13
Medium influence	5
Low influence	0
Very low influence	0

Based on the results of Table 1.5, there are 8 quality performance factors that are very high influence on the construction project in the city of Banda Aceh, namely:

- a) Change in scope and work item, is very high influence quality performance factor in construction projects. With the change in work items will suddenly have an impact on project time performance, errors in the presentation of design and planning specifications by the owner and consultant planner can affect the quality at the implementation stage, it is better to provide design and planning that is clear enough and can be understood by the owner so that it can avoid changes in the project implementation process (Susila, 2012).
- b) Lack of material quality, is the most influential quality performance factor in construction project. The lack of quality of the material will determine the contractor or project owner in determining the material supplier to choose, because the element of quality is very decisive result of the work performed. Thus, the project implementer must examine the material before it is purchased, or be taken to the project location, so that the quality of the resulting construction can be guaranteed, and the repute of the implementing party and the project owner can be maintained (Mulyono, 2007).
- c) Repair plan drawing, is the most influential quality performance factor in construction projects. In this case, if the design and specifications are wrong or not clearly given to the implementing party, it can cause the project quality to be poor. Therefore the owner and planning consultant should provide design and specification planning that is clear enough and can be understood by the implementing party, so as to avoid errors in the project implementation process (Susila, 2012).
- d) Poor equipment quality is the most influential quality performance factor in construction projects. Poor equipment can cause quality performance to be hampered, because at the time of implementation, these equipment cannot be functioned optimally by workers. Thus the executor can check the equipment before being taken to the project location, and maintain the equipment properly after being used by placing it in the place provided by the project implementer (Mulyono, 2007).
- e) Lack of work experience, is the most influential quality performance factor in construction projects. Lack of work experience can cause unfavorable work, and delayed work, thus requiring improvement to achieve the expected quality. Thus the company must hold seminars or special training for workers, so that workers get a lot of experience, knowledge, and work experience (Mulyono, 2007).
- f) Uncertain weather conditions, is the most influential quality performance factor in construction projects. Erratic weather such as the rainy season that has not ended will risk the implementation of construction projects. Bad weather will cause delays in some construction project activities, such as delays in casting, paving, and others. The results of this study are similar to the research conducted by Suyatno 2010, which states that one of the factors that affect quality is the weather factor.
- g) The lack of labor discipline is the most influential quality performance factor in construction projects. Lack of labor discipline in complying with the regulations set by the contractor, such as smoking, eating and drinking carelessly while working, not using safety, this will cause delays because it adds work to clean up trash and the remaining cigarette butts before working on casting, and not using safety equipment completely and correctly will result in high accidents. To improve worker discipline is to pay more attention to legal sanctions, by always warning workers who violate the rules of the company (Elisa, 2013).
- h) Lack of labor skills, is the most influential quality performance factor in construction projects. Lack of expertise, lack of formal and non-formal education in construction work, such as errors in the installation of formwork, or labor that is not in accordance with their expertise, therefore, the company or workers should take part in skills training (Ahzan, 2014).

#### 4. CONCLUSION

Based on the research objectives, and after the research was carried out, the conclusion of the research results was achieved: Based on the results of the questionnaire survey, and data processing analysis, it was found that the eight quality performance factors that affected the construction project were factors of change in scope and work items ( 57%), Lack of material quality (52%), Repair plan drawings (50%), Poor equipment quality (48%), Lack of work experience (45%), Uncertain weather conditions (43%), The lack of labor discipline (40%), and Lack of labor skills (36%).

Based on the experience of the author in carrying out this research, there are several things that the author would like to suggest for the development of future research towards a better direction, namely: More in-depth research can be done by adding other quality performance factors from various references,

increasing the number of respondents, because the more respondents, the closer to the true value of the research data, and the need to conduct further research for each of the different regions, so that the value of the differences in each region can be seen.

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