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ANALYSIS OF THE EFFECT OF FABRICATION AND INSTALLATION WORK ON COST OVERRUNS IN STEAM TURBINE GENERATOR PROJECTS AND COAL BOILERS IN PALEMBANG

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ABSTRACT

Delays (time overruns, SPI < 1) and exceeding budget costs (cost overruns, CPI < 1) on EPC (Engineering, Procurement, Construction) Projects are a global phenomenon due to the very diverse and unique nature of construction projects so that many companies experience losses during construction execution work activities. A very critical job in the execution of EPC projects is fabrication and installation activities which are part of construction activities because there are very many variables that have an impact on cost overruns if the fabrication and installation work is not monitored and controlled properly. In this study, an analysis of the effect of fabrication and installation work on cost overruns was carried out on the Steam Turbine Generator and Coal Boiler Project in Palembang. The analysis was performed using SPSS Ver software. 25 by processing questionnaire data from the answers of 42 respondents. With good control and early anticipation of construction activities so that it can help project managers in managing projects more effectively and efficiently so that the SPI (Schedule Performance Index) and CPI (Cost Performance Index) are more than one and the achievement of other requirements in accordance with project specifications and contracts.

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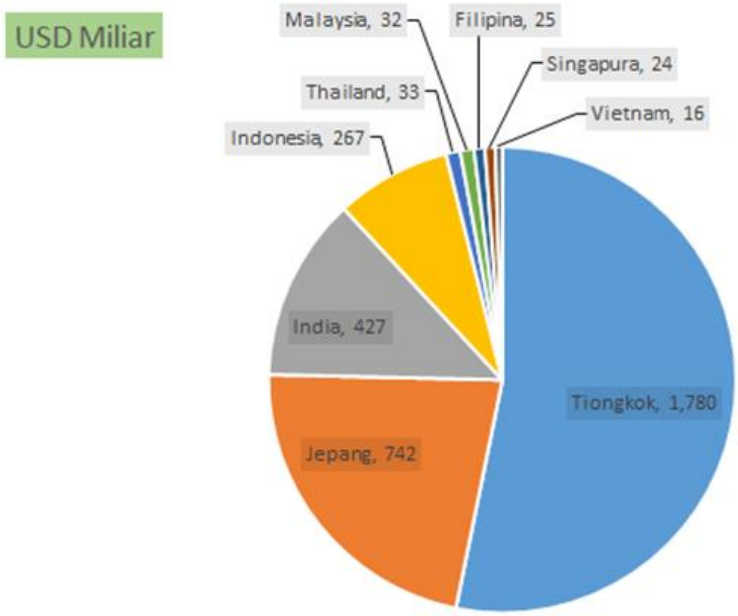
1. INTRODUCTION

Delays in the construction industry are a global phenomenon due to the very diverse nature of construction projects [1]. According to the research report [2],[8], it states that construction costs are excessive in excess of the budget (overruns the budget). This is one of the main issues that must be addressed by construction management during the execution of construction work. According to [2] that cost overrun is a critical issue. Including EPC (Engineering, Procurement, Construction) projects, quite a lot of EPC projects passed through the schedule (delayed) that had been planned and agreed upon jointly between the owner and the contractor in the contract so that many contractors could not and even resigned to complete EPC projects because the cost of completing the project had exceeded the plan or there was a cost overruns. The EPC project is a work with the scope to complete Engineering, Procurement and Construction activities. [4],[5] This EPC project can be said to be completed if testing and commissioning of the facility that has been built so as to achieve the performance or performance that has been agreed with the owner and in accordance with the contract. Engineering work includes the design of all facilities so that the documents produced by the engineering team can be used by the procurement team for the purchase of materials and equipment . In addition, the results of the design by the engineering team can be used by the construction team for fabrication and installation /installation [16]. The market value of construction services in Indonesia is very large and even the value is the largest among ASEAN countries. The Indonesian market reaches more than 60% as figure 1. and the Indonesian construction market is also included in the top four construction market shares in Asia [6] [19].



Source: Asia Construction Outlook, [6]

Figure 1. Asian Construction Market

One of the national contracting companies engaged in EPC is PT Rekayasa Industri (REKIND)[7], which has been working on quite a lot of national and international projects since its establishment by the Government of the Republic of Indonesia on August 12, 1981. The business in the FIELD OF EPC is very dependent on the success of the EPC projects carried out. If these EPC projects in a company experience delays [7] [15] or cost overruns, this will interfere with the company's performance in terms of finance and the continuity of the company. The problem, whether the performance factor of the fabrication work affects the excess cost (cost overrun, CPI < 1), What is the performance factor of the installation work affects the excess cost (cost overrun, CPI < 1). What factors of fabrication work and installation work affect the excess cost (cost overrun) on the performance of fabrication and installation work in construction activities. The purpose of the study is to determine the influence of fabrication and installation work with quantitative research methods. Research Methods are literature review, quantitative and engineering research.

2. RESEARCH METHOD

2.1 Research design

The implementation of the EPC project starts from the engineering stage by preparing all the designs and specifications of the goods then proceeds to the procurement phase for the purchase of goods (Purchase Order) until it is sent to the project site and storage[19]. In addition, procurement also selects subcontractors for service work (Subcontracting).Land preparation activities and temporary offices at the project site, pile and foundation activities, fabrication and installation of equipment and materials will be carried out by the construction team. Fabrication and installation work on EPC project construction activities has always been the main topic that causes the overall cost overrun of the project so that the CPI is below 1 while from research-research it can be seen that it is very large which affects the delay in fabrication and installation work activities and has an impact on construction performance. Work errors in the early stages, namely engineering design, will greatly affect the fabrication and installation work so that it will cause rework and so from the procurement side with delays in the delivery of permanent materials /equipment to the project site. For this reason, it is necessary to conduct research on the performance of fabrication and installation work on the construction activities of the STG & Coal Boiler project, what are the factors that affect the performance of fabrication and installation work. So that it has an impact on excess costs (cost overrun, CPI < 1) and what are the main factors causing excess costs (cost overrun) on the performance of fabrication and installation work in construction activities and whether strategies must be designed to overcome excess costs (cost overrun) in the implementation of fabrication and installation work on construction activities in the REKIND EPC project. The flow of the thinking framework or research design in this study is shown by the diagram figure 2. And for the prospect [17] depends on the manufacturing project of the Company's management.

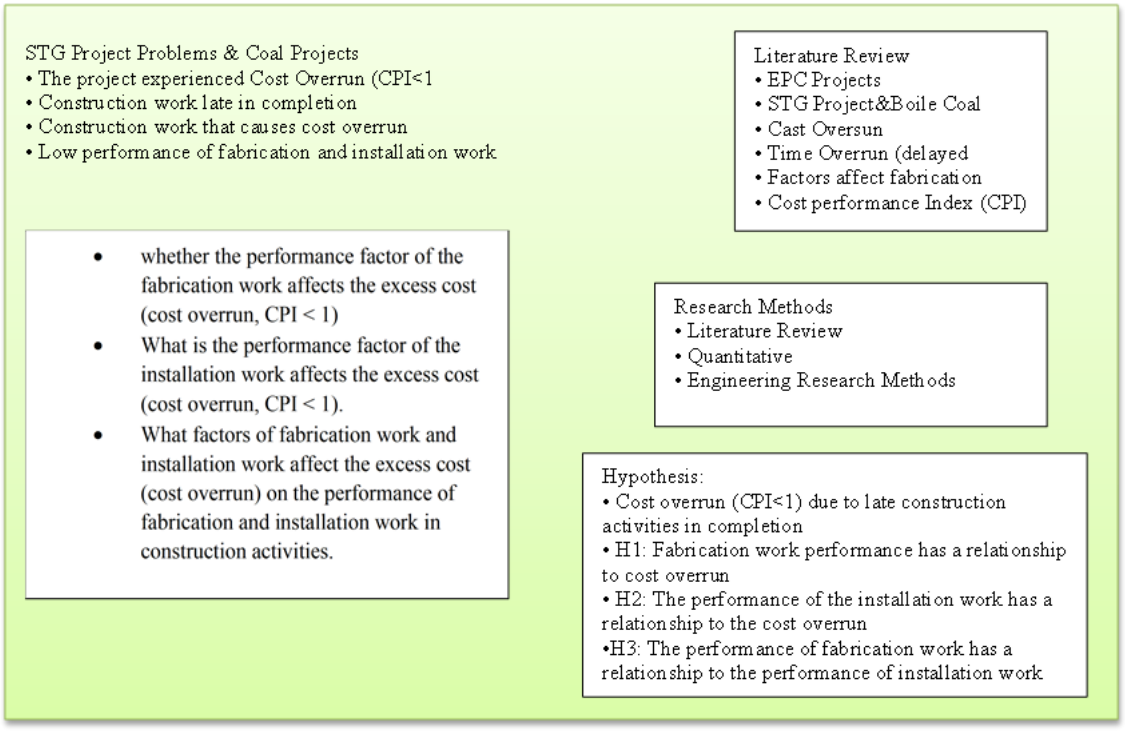


Figure 2. Research Design

2.2 Research variables

In the implementation of the questionnaire, a pilot survey was first carried out to 5 (five) experts whose purpose was to validate the factors affecting the performance of fabrication and installation work and the causes of cost overrun that were most affected by the EPC project, ensuring that these factors were easy to understand the statements presented. Experts can provide comments and input on these variables / factors, at this stage there is an addition of 2 factors for the free variables (Fabrication) X1 and (Installation) X2 and editorial improvements to the statements on the factor for variable Y (Cost Overrun).

2.3 Population and samples

This research takes a case study of the STG & Coal Boiler project which has a cost overrun or CPI < 1, the EPC project [18] has completed the implementation of construction work, mechanical completion, commissioning, performance test and plant acceptance or handover to the client. According to Roscoe [9], the sample size feasible in the study was between 30 and 500. In this study, the number of samples taken from the population as respondents as shown in Table 1.

Table 1. Number of respondents

No.	Jabatan	Jumlah	Presentase
1	Senior Vice President (SVP)	2	4%
2	Vice President (VP)	4	8%
3	Prohect Manager (PM)	15	30%
4	Project Control Manager (PCM)	12	24%
5	Engineering Manager (EM)	1	2%
6	Construction Manager (CM)	7	14%
7	Senior Engineer	9	18%
	Total	50	100%

Source: Processed Data

The STG & Coal Boiler project is a one-unit Steam Turbine Generator (GTG) installation work with a capacity of 23 MW and two units of coal boilers with a capacity of 240 tons per hour for the Sriwidjaja Palembang Fertilizer (PSP) plant, the project value almost reaches 2 trillion. The project includes Engineering, Procurement, Construction and Commissioning work [11] [12]. The project location is in Palembang, South Sumatra Province, the factory is beside the Musi river, besides the width and in the Musi river this is never dry all year round is a positive factor used as a means of shipping heavy equipment for PSP purposes through large ships. Project Management [10] STG & Coal Boiler has a Lump Sum Fixed Price contract scheme with the scope of work starting from the Engineering, Procurement, Construction phases all

carried out by REKIND. REKIND won this project through an open tender because it already has experience in power plant projects, refinery & petrochemical and oil & gas. REKIND was chosen because the proposed price is competitive and lower than other bidders. In addition to the Engineering, Construction phase, REKIND [13] also carried out the Commissioning phase up to the Performance Test and Warranty Period stages for 12 months.

2.4 Data analysis techniques

Double correlation analysis is used to determine the relationship between independent variables (X1, X2,.....Xn) to the independent variable (Y) simultaneously, This coefficient shows how much relationship occurs between the independent (free) variable simultaneously and the dependent variable (bound). The value of R ranges from 0 to 1, the value of getting closer to 1 means that the relationship that occurs is getting stronger, on the contrary, the value is closer to zero, the relationship that occurs is getting weaker.

2.5 Data analysis methods

The data analysis method uses SPPS 25 [14] to prove the hypothesis, there is an influence or absence of variables X1 on Y and X2 on Y. likewise Ho: There is no significant influence simultaneously (together between fabrication and installation on cost overruns. Ha: There is a significant influence simultaneously (together) between fabrication and installation on cost overruns.

3. RESEARCH RESULTS AND DISCUSSION

3.1 Data analysis results

3.1.1 Measuring validity

The validity test was carried out using the Pearson Product Moment correlation method by looking at the Pearson correlation value between each indicator. If the instrument used to obtain the data is valid, it means that the instrument can be used to measure what should be measured. For variables that have a rhitung value (rxy) of SPSS greater than rtabel (0.304) it is declared valid and if rxy is smaller than 0.304 it is declared invalid, it will not be used in further analysis that is to be issued. In this analysis, fabrication and installation variables that are declared invalid with a correlation value of less than 0.304 are contained in the variables as shown in Table 2. below.

Table 2. Variables declared invalid (r < 0.304)

Variable	sub-indicators	Factor		r Value
Fabrication (X1)	X1.1. Design	X1.1.1	Late completion of shop drawing and material samples	0,313
	X1.3. Quality	X1.1.3	Errors in design and undergoing changes	0,333
	X1.4. Manpower	X1.3.2	Overtime work excessively	0,328
Installation Everrun(X2)	X2.1. Project site conditions	X2.1.1	Poor communication	0,413
	X2.4 Communication and coordination	X2.1.2	Lack of communication	0,376
		X2.4.3	Broken relationships	0,357
		X2.4.4	Lack of technology	0,368

Source: Processed Data

then a validity test was again carried out to ensure that the rhitung > rtabel, obtained 1 invalid variable (X2.2.3) with a rhitung value of 0.289 (smaller than rtabel = 0.304). Furthermore, those variables that have been tested for validity and are all valid (rhitung > 0.304), can be continued for reliability tests. As for Y (Cost Overruns) has a variable whose value of r is greater than 0.304 and is declared valid.

3.1.2 Reliability test

After 2 validity tests are carried out, invalid variables are discarded and only valid variables are continued to test the reliability of each indicator.

The reliability test is measured based on the reliability coefficient (r11) and is used to determine the level of reliability of a test using the Internal Consistency method with Alpha Cronbach. The criterion for a research instrument to be said to be reliable using this technique is when the reliability coefficient (r11) > 0.6. Based on the results of the analysis with the SPSS Software Version. 25 Against the existing data, a reliability coefficient of 0.776 > 0.6 for the fabrication work variables (X1) and installation (X2) which showed that the research instruments used in this study were reliable, shown in Table 3. below.

Table 3. Cronbach's Alpha Value for Calculations
Reliability of Fabrication Work (X1) and Installation (X2)

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	42	100.0
	Excluded[a]	0	.0
	Total	42	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.971	51

Source: Processed Data

3.1.3 Data analysis

Double correlation analysis is used to determine the relationship between independent variables (X1, X2,... Xn) to the independent variable (Y) simultaneously, This coefficient shows how much relationship occurs between the independent (free) variable simultaneously and the dependent variable (bound). The value of R ranges from 0 to 1 see table 4., the value of getting closer to 1 means that the relationship that occurs is stronger, on the contrary the value is closer to zero, the relationship that occurs is weaker.

Table 4. R value in Model Summary

					Change Statistic				
Model	R	R Square	Adjusted R Square	Std. Error of The Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	0.996	0.993	0.699	11.314	0.993	3.381	40	1	0.410

Source: Processed Data

In the output of the Model Summary from the results of multiple linear regression analysis, an R value of 0.996 was obtained. Because the double correlation value is between 0.80 – 1.000, there is a very strong relationship between fabrication and installation to cost overruns. As a result of this analysis, some are excluded variables as presented in Table 5.

Table 5. Excluded variables

Variable	sub-indicators		Factor
Fabrication (X1)	X1.3.Work Area	X1.5.5	Lack of safety management
Installation Everrun(X2)	X2.2 contractor subs	X2.2.1	Late mobilization to the project
	X2.3. Financial	X2.1.2	Cash flow difficulty
	X2.4	X2.4.3	Lack of communication
	Communication and coordination	X2.4.4	the relationship is rejected

Source: Processed Data

3.1.4 Determination analysis (R2)

Determination analysis is used to determine the percentage of contribution of the influence of independent variables (X1, X2, ...Xn) simultaneously against the dependent variable (Y). This coefficient shows how much the percentage of variation of independent variables used in the model is able to explain the variations in dependent variables. R2 is equal to 0, hence there is not the slightest percentage of the contribution of the influence that the independent variable gives to the dependent variable. Conversely R2 is equal to 1, then the percentage of contribution of influence that the independent variable gives to the dependent variable is perfect. The results of the termination analysis can be seen in Table 4. (Output Model Summary), obtained the number R2 (R Square) of 0.993 or 99.30%. This shows that the percentage contribution of the influence of independent variables (fabrication and installation) on dependent variables (cost overruns) is 99.30%. While the remaining 0.7% is influenced or explained by other variables that are

not included in this research model, including piling, foundation, building, electrical and instrument work.

3.1.5 Regression coefficient test together (F Test)

This test is used to find out if the variable is independent (X1, X2, ... Xn) together have a significant effect on the dependent variable (Y). The results of the Fhitung test can be seen in Table 6. which is the output of multiple linear regression analysis using SPSS Ver software. 25.

Table 6. Calculated F. value on ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	17437.643	40	432.741	3.381	0.410[b]
Residual	128.000	1	128.000		
Total	17437.643	41			

Source: Processed Data

Hypothesis: Ho: There is no significant simultaneous effect (together between fabrication and installation on cost overruns. Ha: There is a significant influence simultaneously (together) between fabrication and installation on cost overruns. If, Fhitung < Ftabel, then Ho is accepted but if Fhitung > Ftabel, then H0 is rejected. From Table 5. obtained the calculated F value of 3.381as the Ftable value can be searched using the table F (sig = 0.05) which is 3.238. So Fnumber > Ftabel (3,381 > 3,238) so that Ho is rejected, then there is a significant influence simultaneously (together) between fabrication and installation on cost overruns.

3.1.6 Partial regression coefficient Test (t test)

This test is used to find out if in an independent variable regression model (X1, X2,.....Xn) partially has a significant effect on the dependent variable (Y). The results of the t test can be seen in the coefficients output from the results of multiple linear regression analysis.

a. Variable Regression Coefficient Testing X1.1.1.

Hypothesis: Ho: Partially there is no effect of X1.1.1 on cost overruns. Ha: Partially there is an effect of X1.1.1 on cost overruns. If, count < ttabel then Ho accepted If, count > ttabel then H0 is rejected. From the output coefficients obtained a calculated value of 0.178 while the ttable value can be searched using the table t (0.05) which is 1.685. So counting < ttabel (0.178 < 1.685) so that Ho is accepted, then there is no effect of X1.1.1 on cost overruns (Y) due to the absence of delays in completing shop drawings and material samples.,685.

b. Variable Regression Coefficient Testing X1.1.2

Hypothesis: Ho: There is partial no effect of X1.1.2 on cost overruns. Ha: Partially there is an effect of X1.1.2 on cost overruns. From the output coefficients obtained a calculated value of 0.541, so the calculation of the < ttabel (0.541 < 1.685) so that Ho was accepted, then there was no influence of X1.1.2 on cost overruns (Y) because communication and coordination had been carried out well with the fabrication team.

c. Variable Regression Coefficient Testing X1.1.3

Hypothesis: Ho: There is partial no effect of X1.1.3 on cost overruns. Ha: Partially there is an effect of X1.1.3 on cost overruns. From the output coefficients obtained a calculated value of 0.186, so the calculation of the < ttabel (0.186 < 1.682) so that Ho was accepted, then there was no effect of X1.1.3 on cost overruns (Y) due to the absence of design errors and changes.

d. Variable Regression Coefficient Testing X1.1.4

Hypothesis: Ho: Partially there is no effect of X1.1.4 on cost overruns. Ha: Partially there is an effect of X1.1.4 on cost overruns. From the output coefficients obtained a calculated value of 1,610, so the calculation of < ttabel (1,610 < 1,682) so that Ho was accepted, then there was no effect of X1.1.4 on cost overruns (Y) due to the absence of delay in design approval from the client from the analysis of testing the coefficient of these variables (t test), the variables whose test results are Ho rejected or partially have an effect on the cost overruns are contained in Table 7.

Table 7. The calculated value of the > ttabel (1.682)

Variable	sub-indicators		Factor	Nilai t	Ket.
Fabrication (X1)	X1.3 Quality	X1.3.2	Low-job Quality	2,129	Ho ditolak
	X2.2 Subcontractor	X2.2.5	Inexperienced construction personnel	1,769	Ho di tolak
		X2.2.7	Late payment	2,634	Ho di tolak
Installation Overrun(X2)	X2.3 Finansial	X2.3.2	Its increasing costs	2,617	Ho di tolak
	X2.5		Forming welding	1,918	Ho di tolak

Source: Processed Data

3.1.7 Correlation analysis

This correlation analysis was carried out to determine the relationship that has a strong correlation to the cost overruns (Y) variable. Using the Pearson correlation method (product moment correlation), it was

obtained that the fabrication and installation-free variables that have a strong correlation to cost overruns are variables that have a correlation value of r > 0.304. These variables are found in Table 8.

Table 8. Free variables that have a strong correlation to cost overruns

Variabel	Indicator Subs	Factor		Nilai r
Fabrication (X1)	X1.1 Design	X1.1.1	Late shop	0,313
	X1.3. Quality	X1.3.2	Low-job Quality	0,328
	X1.4. Manpower	X1.4.1	Overwork	0,309
Installation	X2.1 Project site conditions	X2.1.3	Extreme weather conditions	0,530
Everrun(X2)	X2.4. Communication and coordination	X.2.4.3.	Lack of coordination	0,323
	X2.5. Teknologi	X2.5.1	Lack of information technology	0,68

Source: Processed Data

3.1.8 Analysis of multiple regression results

In the Coefficients table of the SPSS Ver software. 25 can be analyzed the contribution of each free variable X to the cost overruns (Y), Free variables that have a strong contribution (more than 60%) directly affect the cost overruns found in Table 9.

Table 9. Free variables that have a strong contribution (more than 60%) against cost overruns

Variable	Indicator Subs	Factor	
Fabrication (X1)	X1.1 Design	X1.1.4	Late design approval
	X1.2. Pengerjaan	X1.2.1	Late completion of delivery
	X1.4. Manpower	X1.4.1	Over work
		X1.4.4	Skilled workforce
Installation	X3.1	X3.1	Extreme weather conditions
overruns(X2)		X2.2	Inexperienced construction personnel
		X2.3	Ineffective coordination
		X2.4	Monitoring control

Source: Processed Data

Delays in fabrication and installation work in construction activities greatly affect the cost overruns in the STG Boiler project, it can be seen that the contribution of strong factors exceeds 60%.

3.1.9 Validation of experts and project teams

The results of the analysis from the description above obtained that the factors that affect the performance of fabrication and installation work so that it has an impact on excess costs (cost overruns) in the STG Boiler project are as shown in Tables 10, 11 and 12 below.

Table 10. Factors that affect the performance of fabrication work so that it has an impact on excess costs (cost overruns, CPI < 1)

Variabel	Indicator Subs	Factor	
Fabrication (X1)	X1.1 Design	X1.1.1	Late shop
	X1.3. Quality	X1.1.3	Lack of coordination
	X1.4. Manpower	X1.3.2	Low-job Quality
Installation	X2.1 Project site conditions	X2.1.3	Over work
Everrun(X2)	X2.4 Communication and coordination	X1.4.3	Lack of coordination
	X2.5. work Area	X1.5.6	No space

Source: Processed Data

Table 11. Factors affecting the performance of installation work so as to have an impact on excess costs (cost overruns, CPI < 1)

Variabel	Indicator Subs	Factor	
Installation	X2.1 Project site conditions	X2.1.2	Surface contruction
Everrun(X2)	X2.2 Contractor sub	X1.3.2	Inexperienced personnel
	X2.3 Financial	X2.3.2	Cost high
	X2.4 Communication and coordination	X.2.4.3.	Lack of communication
	X2.5. Technology	X2.5.1	Lack of information technology

Source: Processed Data

Table 12. The main factors causing excess costs to the performance of fabrication and installation work on construct activities

Variabel	Indicator Subs	No		Factor
Fabrication (X1)	X1.1 Design	1	X1.1.1	Lack of Design
	X1.3. Quality	2	X1.3.2	Low-job Quality
	X1.4. Manpower	3	X1.4.1	Inexperienced personnel
Installation Everrun (X2)	X2.1 Project site conditions	4	X2.1.3	Surface control
	X2.4 Communication and coordination	5	X.2.4.3	Lack of coordination
	X2.5. Technologi	6	X2.5.1	Lack of information technology

Source: Processed Data

Then the analysis of the above factors is then validated by the same expert as the expert who performed the previous validation and coupled with the personnel involved in the STG Boiler project.

3.2 Discussion

Based on the analysis carried out starting from the distribution of the first questionnaire to the expert for validation of questions/statements then submitting the questionnaire to 50 respondents with the return of 42 questionnaires. The respondent's answer was then processed using SPSS Ver software. 25 to obtain factors that affect the performance of fabrication and installation work so as to have an impact on excess costs (cost overruns, CPI < 1) as well as the main factors causing excess costs to the performance of fabrication and installation work in construction activities. From the analysis performed on free variables (X) and bound variables (Y) using multiple correlation analysis (R) on SPSS Ver. 25, an R value of 0.966 was obtained and this is a very strong relationship (0.80 – 1,000) between fabrication and installation to cost overruns.

Meanwhile, the percentage of contribution of the influence of independent variables (fabrication and installation) on independent variables (cost overruns) was 99.30% from the determination analysis and the remaining 0.7% was influenced by influenced or explained by other variables that were not included in this research model, including piling, foundation, building, electrical and instrument work. Testing to determine independent variables together has a significant effect on dependent variables carried out with F tests so that F-counting > Ftabels (3.381 > 3.238) is obtained, then there is a significant influence simultaneously (together) between fabrication and installation on cost overruns.

To determine the independent variable partially affects the dependent variable, then a t test was carried out (counting > t table), correlation analaisis (r > 0.304) and multiple regression analysis by taking free variables that have a strong contribution (more than 60%) which directly affects the cost overruns. Meanwhile, the main factors causing excess costs to the performance of fabrication and installation work in construction activities are project site conditions (unforeseen underground surface conditions, extreme weather conditions and unforeseen natural events), Subcontractors (late payments to subcontractors), financials (increased costs as a result of sanctions from clients) and Technology (lack of information and communication technology).

Additional information from experts and the project team, another factor that causes an excess of costs to the performance of fabrication and installation work is the limited area to build a temporary worskshop in the project area so that the construction of the workshop is carried out outside the project area which requires additional costs for transportation from the workshop to the project site. And the condition of the project location that is not supportive at the time of installation so that it interferes with access during the work and besides that there are other contractors involved to do different scopes of work but interfere with access to work, it often happens that access cannot be bypassed due to work by other contractors. The two factors mentioned above have been included in the questionnaire questions/statements during expert validation, but when the validation test for factors X.1.5.6 and X2.1.5 has a value of r < 0.304.From the project objective is that there is no delay in completing it (on schedule, SPI > 1) and does not exceed the project budget (on budget, CPI > 1), For this reason, a strategy is needed that must be designed to overcome excess costs (cost overruns) in the implementation of fabrication and installation work on construction activities in the REKIND EPC project as follows: Construction of a fabrication shop around the project area and if outside the project area, this has been considered the cost when at the beginning of the proposal (tender). The project completion schedule must be strictly monitored and controlled properly in accordance with the planning (schedule) so that there are no additional costs, especially indirect costs.

Cash flow management must be considered in more detail because this will have an impact on the payment of subcontractors and vendors so that there is a delay in payment. It is necessary to select the competence of project personnel, especially key personnel and level managers such as Project Manager, Project Control Manager, Project Procurement Manager, Engineering Manager, Construction Manager and AFM. The design uses smart 3D to avoid mistakes and reduce discrepancies at the time of construction. The selection of subcontractors that are in accordance with the project criteria and have similar and at least almost

the same project experience so that it does not interfere in the installation stage because this will affect the speed up of completion (schedule).

Fabrication and installation of steel structures are made into one package so that the subcontractors who carry out the installation understand the members to be installed. Identify success-determining factors that improve cost performance. Risk management by identifying risk variables and assessing risks. Information and communication technology planning, especially for material databases, welding joint databases, subcontractor payments,

4. CONCLUSION

After data analysis through the stages of the previous research process, results were obtained in the form of:

a. There are factors that affect the performance of fabrication work so that it has an impact on excess costs (cost overrun, CPI < 1), namely: Design, Workmanship (Production) and Work Area.
b. There are dominant factors affecting the performance of installation work so that it has an impact on cost overrun, CPI < 1) namely: Project Location Conditions, Subcontracting, Finance and Technology.
c. There are two factors that have the largest weight / first rank which is the main factor causing overruns to the performance of fabrication and installation work in construction activities, namely: Project Site Conditions, Subcontractors, . Finance and Technology

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