

Analysis of Project Delays on the Work of Abrasion Handling of Panjang Island of Jepara

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Abstract - Ideally, in the construction project, all components of the contract are clearly described to the contractor regarding the agreement, technical specifications, plan drawings, general and special terms, quantity list, implementation plan and schedule to limit the project completion time. However, the cases experienced in the construction are a discrepancy between the plan and the implementation schedule that has been made with the realization in the field, resulting in delays in project completion. The purpose of this study (1) Analyzing the variable factors of labor, work tools, materials, finance, managerial, planning and scheduling of project delays on the work of Panjang Island abrasion handling. (2) Analyze the most dominant variable about project delay of Panjang Island abrasion project. This research method is descriptive quantitative. The research location is in DPUPR of Jepara regency with total sample is 40 respondents. The data analysis is multiple linear regression using SPSS V.21. The results showed that (1) labor, working tools, material, finance, managerial, planning and scheduling variables contributed to the delay in Panjang Island abrasion project. This can be seen from the value of F arithmetic of 136.288 while for the value of F table is 2.34. In addition, the significance value is 0.000. (2) The most dominant variables on the delay of Panjang Island abrasion project are financial, planning and scheduling.

Keywords: Construction Project, Employment, Project Delay

1. Introduction

Ideally, in the implementation of a construction project, all components of the construction contract are clearly described to the service user regarding the agreement, technical specifications, drawing of agreement plans, general terms and special terms and quantity lists. In addition, a construction project generally has a plan and schedule to limit the timing of completion of the project work. However, the cases experienced in the construction are a discrepancy between the plan and the implementation schedule that has been made with the realization in the field resulting in delays in project completion.

Project time delay is an event that occurs on every project. The delay in the project will result in a decline in time so that it will reduce the advantages that have been targeted by the contractor who handles the project. Time delays can also be caused by poorly implemented project management as well as human resource mistakes in it.

The delay will cause harm to the parties, especially owners and contractors, as it is generally accompanied by conflicts, time and cost demands, as well as deviations from the quality of project completion (Saleh, 2005). For contractors, delays can lead to the project costing of the project due to the increased time spent on the project. Besides, it can also lead to decreased contractor credibility for the time to come. As for the owner, the delay in the use or operation of construction project results and often has the potential to cause disputes and claims between the owner and the contractor (Soeharto,1997). According to Proboyo (1999), delays in project implementation have adverse consequences for both owners and contractors because the impact of delays is conflict and debate about what and who causes, as well as time demands, and added costs.

According to Andi (2003), the potential factors to influence the timing of construction implementation consist of seven categories, including labor, materials,

equipment, site characteristics, managerial, financial, other factors include the intensity of rainfall, economic conditions, and workplace accidents.

Assaf (1995) explains that the causes of delays can be seen in terms of materials, labor, equipment, costs, design changes, relationships with relevant agencies, scheduling and controlling, slow monitoring and testing procedures used in projects, environments, contracts, and the absence of professional manager consultants. Meanwhile, according to Proboyo (1999), project delays often occur due to planning changes during the implementation process, poor managerial and contractor organization, poorly planned and integrated work plans, incomplete drawings and specifications, or contractor failure in implementing work. Based on the phenomenon and inconsistency of the results of previous researchers, the authors are interested to conduct a study entitled "Analysis of Project Delay in the Work of Panjang Island Abrasion Handling".

2. Method

This study is a case study, which is about the variables that affect project delays in the work of long-term abrasion handling. The case study is a study that aims to investigate in depth on a particular subject to give a complete picture of a particular subject (Indriantoro and Supomo, 2000). Scope of research relates to a life cycle or includes a particular section that is focused on certain factors or elements and events.

The method used is descriptive method, which is a method designed to collect various information about the current situation. Sigit (2001) defines that descriptive research method as an activity that includes data collection in order to answer questions concerning the current state of the course from the subject of a study.

Population is all values both calculated and measured, quantitative and qualitative, rather than certain characteristics of a complete and clear set of objects (Husaini Usman, 2006). The target population of this research is PPTK, PPKom, Supervisory Consultant, Contractor and Community with total seal is 40 people. Sampling method is Quota Sampling. this sampling method is more concerned with the purpose of research in determining sampling research. The study sample is predetermined population unit. Quota Sampling is used to determine the population unit that will be used as research sample. The population unit being the sample of the study was then given a questionnaire. (Burhan Bungin, 2014: 125). So it can be concluded that the number of samples used in this study were 40 respondents

3. Results And Discussion

Based on the test results in the picture above shows that the dots (which describe the real data) appear to spread around the diagonal line and follow the direction of the diagonal line. Multicollinearity test aims to test whether the regression model of correlation between independent variables (independent). a good model should not occur correlation between independent variables. Detection of the presence or absence of multicollinearity by analyzing the correlation material of independent variables, and by looking at the tolerance value and the value of variance inflation factor (VIF). It can be seen in the attachment.

Table 1. Multicollinearity Table Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-4.292	.812		-5.284	.000		
Labor	.078	.036	.104	2.151	.039	.506	1.975
Working tools	.067	.025	.096	2.718	.010	.949	1.054
Material	.043	.021	.078	2.041	.049	.800	1.250
Finance	.162	.029	.254	5.509	.000	.554	1.806
Managerial	.095	.040	.145	2.392	.023	.319	3.135
Planning, Scheduling	.375	.040	.572	9.315	.000	.311	3.213

a. Dependent Variable: keterlambatan_proyek
Source: Primary Data, 2017

Based on the result of multicollinearity test, it is known that labor variable has Tolerance value 0.506 and VIF 1.975, for work tool variable has Tolerance value 0.949 and VIF 1.054, for material variable has Tolerance value of 0.800 and VIF 1.250, for financial variable has value Tolerance of 0.554 and VIF 1.806, for managerial variable has Tolerance values of 0.319 and VIF 3.135, and for planning and scheduling variables have Tolerance values of 0.311 and VIF 3.213. This shows that there are no independent variables have a tolerance value less than 10 percent and there are no independent variables have a VIF value more than 10. So it can be concluded that there is no multicollinearity between independent variables in the regression model.

Based on the scatterplot chart shows that there is a pattern that is not clear, and there is a point spread above and below the number 0 on the Y axis. So it can be concluded that Heteroskedasticity did not occur in the regression model.

4. Data Analyze

The coefficient determination test of R^2 is used to find out how well the sample uses the data. R^2 measures the amount of reduction in the dependent variable obtained from the user of the independent variable. R^2 has a value between 0 and 1, with a high R^2 ranging from 0.7 to 1.

Table 2. Coefficient of Determination
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.980 ^a	.961	.954	.282	1.747

a. Predictors: (Constant), planning scheduling, work tools, material, financial, labor, managerial

b. Dependent Variable: project delay

Source : Primary Data, 2017

R^2 used is adjusted R square value which is R^2 that has been adjusted. Adjusted R square is an indicator to determine the effect of adding time to an independent variable into the equation. The test results coefficient of determination can be seen in the attachment.

From the output looks the correlation value is 0.980 with the coefficient of determination 0.954. Thus, 95.4% variations in the variables change in project delay are explained by labor variables, work tools variables, material variables, finance variables,

managerial variables and planning and scheduling variables. While 4.6% is influenced by other factors that we do not care.

Multiple regression analysis in this study aims to determine the magnitude of the effect of independent variables of labor (X1), work tools (X2), Material (X3), financial (X4), managerial (X5), planning and scheduling (X6), and dependent variable is the project delay in the work of Panjang Island abrasion handling (Y).

Table 3. Table of Results of Multiple Linear Regression Analysis
Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-4.292	.812		-5.284	.000
Labor	.078	.036	.104	2.151	.039
Working tools	.067	.025	.096	2.718	.010
1 Material	.043	.021	.078	2.041	.049
Finance	.162	.029	.254	5.509	.000
Managerial	.095	.040	.145	2.392	.023
Planning, Scheduling	.375	.040	.572	9.315	.000

a. Dependent Variable: Project delay

Source : Primary Data, 2017

Multiple linear regression analysis is done to find out how far independent variable has dependent variable influence. With these variables can be arranged in the following equation:

$$Y = -4.292 + 0,078x_1 + 0,067x_2 + 0,043x_3 + 0,162x_4 + 0,095x_5 + 0,375x_6 + e$$

The multiple linear regression equation can be explained as follows:

1. Constants of -4.292 can be defined as labor (X1), work tools (X2), Materials (X3), finance (X4), managerial (X5), planning and scheduling (X6), and dependent variable is project delays in work of Panjang Island abrasion handling (Y) value is -4.292
2. The regression coefficient of the labor variable (X1) is 0.078, it means that any change of labor variable (X1) is one unit, it will result in the change of project delay on work of Panjang Island abrasion handling of 0.078 unit
3. The regression coefficient of work tool variable (X2) is 0,067 means that every change of work tool variable (X2) for one unit will cause the change of project delay on work of Panjang Island abrasion handling for 0,067 unit
4. Material Variable Regression Coefficient (X3) of 0.043 means that any change of material variable (X3) of one unit will result in a change of project delay on work of Panjang Island abrasion handling of 0.043 units.
5. The coefficient of regression of the financial variable (X4) of 0.162 means that any change of financial variable (X4) for one unit will result in the change of project delay on work of Panjang Island abrasion handling of 0.162 units
6. Managerial managerial regression coefficient (X5) of 0.095 means that any managerial variables change (X5) of one unit will result in a change in project delay on work of Panjang Island abrasion handling of 0.095 units.
7. The regression coefficient of planning and scheduling variables (X6) of 0.375 means that each change of planning and scheduling variables (X6) for one unit will result in a change in project delay on work of Panjang Island abrasion handling of 0.375 units.

Partial test (t test) aims to test or confirm the hypothesis individually. This partial test contained in the results of statistical calculations is shown by t arithmetic. In more detail the results of t arithmetic can be seen in the attachment. The results of the calculations performed by using the help of SPSS version 21 can be described as follows:

Table 4. Table t Test Results
Coefficients^a

Model	t	Sig.
(Constant)	-5.284	.000
Labor	2.151	.039
Working tools	2.718	.010
1 Material	2.041	.049
Finance	5.509	.000
Managerial	2.392	.023
Planning, Scheduling	9.315	.000

a. Dependent Variable: Project delay

Source : Primary Data, 2017

Based on the results of the statistical test t in Table 4.9, it can be explained the effect of labor (X1), work tools (X2), Materials (X3), finance (X4), managerial (X5), planning and scheduling (X6), and dependent variable project delay on work of Panjang Island abrasion handling (Y).

Basically, F statistical tests show whether all independent or independent variables included in the model have a mutual influence on the dependent variable. Terms used are:

Table 5. Table of F Test Results
ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	64.978	6	10.830	136.288	.000 ^b
Residual	2.622	33	.079		
Total	67.600	39			

a. Dependent Variable: project_delay

b. Predictors: (Constant), planning_scheduling, work_tool, material, finance, labor, managerial

Source: Primary Data, 2017

Based on ANOVA test result or F test in Table 4.16. Show that the value of F arithmetic equal to 136.288 while for the value of F table is 2.34 (df 1 = 3 and df 2 = 40-3-1 = 36). and the significance value is 0.000 which is smaller than the level of significance (0.05). Thus the value of F arithmetic > F table (136.288 > 2.34) and the significance value is smaller than the level of significance (0,000 < 0.05). the second hypothesis is accepted, which means labor (X1), work tools (X2), Materials (X3), finance (X4), managerial (X5), planning and scheduling (X6), and dependent variables are project delays on the work of Panjang Island abrasion handling (Y).

5. Discussion

A. Effect of Labor Factors Influence on project delays in work of Panjang Island abrasion handling

The result of statistic test on labor factor to the delay of the project on the work of Panjang Island abrasion handling shows the value of t arithmetic 2.151 with the value of t table 1.683 and the value of p value (Sig.) 0.039 which is below 0.05 (significance level). this means the value of t arithmetic more than t table ($2.151 > 1.683$) then t arithmetic in the rejected area (H_0), which means nil hypothesis (H_0) rejected and alternative hypothesis (H_a) accepted. So the first hypothesis H_a accepted, that there is a significant positive influence between the factors of labor to the project delay on the work of Panjang Island abrasion handling.

This is in accordance with research conducted by Messah, et al (2013) on the study of the causes of the delay in the implementation of building construction projects in Kupang city, that the factor of labor is considered by the contractor as the most influential factor and often occurs in the construction implementation. this is because at the time the project is implemented to coincide with the rainy season. Labor is one of the decisive factors in a successful construction project. A construction work if not supported by good labor in terms of quality and productivity will not provide the desired project quality performance. The effectiveness and productivity of labor depends on the ability possessed by the existing workforce. because the ability to show potential people to perform a particular task or job (Gibson, 1984).

B. Effect of Work Tool Factors Influence on project delays on work of Panjang Island abrasion handling

The result of statistical test of work tool factor toward the delay of project on the work of Long Island abrasion handling shows t value 2,718 with value of t table 1,683 and value of p value (Sig.) 0,010 which is under 0,05 (level of significance). this means the value of t arithmetic more than t table ($2.718 > 1.683$) then t arithmetic in the rejected area (H_0), which means nil hypothesis (H_0) rejected and alternative hypothesis (H_a) accepted. So the first hypothesis H_a accepted, that there is a significant positive influence between the work tool factor on the delay of the project on the work of Panjang Island abrasion handling.

This is in accordance with research conducted by Handayani, et al (2013) on Factor Causes Analysis of Delay in Implementation, explained that the work tool influence on Project Delay. The existence of damage of work tool with a factor weight of 0.875 and communality of 76.5%. Tools used to assist human beings in doing the construction work of a building structure. Heavy equipment is an important factor in the project, especially construction projects as well as mining and other activities on a large scale. According to Syahbana and Laksono (2011) the purpose of the use of heavy equipment is to facilitate humans in doing their work, so that the expected results can be achieved more easily with a relatively short time. Heavy equipment can also be categorized into several classifications such as the classification of heavy equipment and classification of heavy equipment operational.

C. Effect of Material Factors Influence on project delays on work of Panjang Island abrasion handling

The result of statistic test of material factor on the delay of project on the work of Panjang Island abrasion handling shows that value of t arithmetic 2,041 with value of t table 1,683 and value p value (Sig.) 0,049 which is under 0,05 (level of significance). this means that value of t arithmetic more than of t table ($2.041 > 1.683$). then t arithmetic in

area rejected (H_0), which means nil hypothesis (H_0) rejected and alternative hypothesis (H_a) accepted. So the first hypothesis H_a accepted, that there is a significant positive influence between the material factors on the project delay on the work of Panjang Island abrasion handling.

This is in accordance with the research conducted by Handayani, et al (2013) on the Analysis of Factors Causing the Delay of the Implementation of the Work of the Project Building, explained that the material affect the Project Implementation Delay Project. The existence of material damage with a factor weight of 0.811 and communality of 65.8%. Theoretically, Construction material is the most costly and time consuming component, therefore the right materialist is the most important element. The selection of suitable materials in time and cost and available labor can improve the quality of the project while reducing construction costs.

D. Effect of Financial Factors Influence on project delays on work of Panjang Island abrasion handling

The result of statistic test of financial factor to the delay of the project on the work of Panjang Island abrasion handling shows that the value of t arithmetic 5.509 with the value of t table 1.683 and the value of p value (Sig.) 0.000 below 0.05 (significance level). This means that the value of t arithmetic more than t table ($5.509 > 1.683$). then t arithmetic in area rejected (H_0), which means nil hypothesis (H_0) rejected and alternative hypothesis (H_a) accepted. So the first hypothesis H_a accepted, that there is a significant positive influence between financial factors on the project delay on the work of Panjang Island abrasion handling.

This is in accordance with research conducted by Handayani, et al (2013) on Analysis about Factor Causes of Project, explained that the financial effect on Project Delay. the absence of incentive money for the contractor, if the settlement time is faster than schedule with the factor weight of 0.793 and the communality of 62.9%. A well-managed project can be completed on time, according to plan and budget. It is generally, the case that cost is one of the main factors in determining the success of the project and no one is willing to take responsibility for the excess cost.

Project cost management includes three basic processes: (1). Cost estimates make your best judgment of the cost of resources needed to complete a project. (2). Cost Budgeting sets estimates for individual work items, and builds the basis for measuring performance. (3). Cost control controls changes of project budgets. By managing their processes, inputs and outputs, it can develop an effective system to ensure that resource costs remain within an approved budget.

E. Effect of Managerial Factors Influence on project delays on work of Panjang Island abrasion handling

The result of statistical test of managerial factor on project delay in the work of Panjang Island abrasion handling shows that value of t arithmetic 2,392 with value of t table 1,683 and value of p value (Sig.) 0,023 which is below 0,05 (level of significance) this mean that t value more that t table ($2.392 > 1.683$) then t arithmetic in area rejected (H_0), which means nil hypothesis (H_0) rejected and alternative hypothesis (H_a) accepted. So the first hypothesis H_a accepted, that there is a significant positive influence between managerial factors on project delays in the work of Panjang island abrasion handling.

This is consistent with the research conducted by Handayani, et al (2013) on Analysis of Factor Causes of Project Delay, explained that managerial factor effect on Project Delay, due to managerial is communication between the representative owner and contractor with a factor weight of 0.789 and communality of 62.2%. In theory,

Construction management includes the physical quality of construction, cost and time. material management and manpower management will be more emphasized, because planning management plays a role of only 20% and the rest of the implementation management includes cost control and project timing. Construction management has several functions, among others: (1) As a Quality Control to maintain the fit between planning and implementation (2) Anticipate the change of uncertain field conditions and overcome the constraints of limited time of implementation (3) Monitor achievement and progress of the project that has been achieved, it is done with daily, weekly and monthly (daily) (3) Evaluation results can be made a decision-making action on the problems that occur in the field. Managerial function of management is a good information system to analyze the performance of the field and the purpose of Construction Management is to manage the management functions or manage the implementation of development in such a way that obtained optimal results in accordance with the requirements (spesification) for the purposes of achieving this goal, also need to consider also about the quality of buildings, cost used and execution time. In the framework of achieving this result always attempted the implementation of quality control, cost control and time control.

F. Effect of Planning and Scheduling Factors Influence on project delays on work of Panjang Island abrasion handling

The result of statistical test of Planning and Scheduling factor to the delay of project on work of Panjang Island abrasion handling shows that value of t arithmetic 9.315 with value of t table 1,683 and value p value (Sig.) 0.000 below 0,05 (significance level). This calculate is more than t table ($9.315 > 1.683$) then t arithmetic in the rejected area (H_0), which means nil hypothesis (H_0) rejected and alternative hypothesis (H_a) accepted. So the first hypothesis H_a accepted, that there is a significant positive influence between Planning and Scheduling factors to the project delay in the work of Panjang Island abrasion handling.

This is in accordance with the research conducted by Handayani, et al (2013) on Factor Causes Analysis of the Implementation of the Project's Construction Work, explained that the managerial effect on the delay in the implementation of project delay, the delay factor due to planning and scheduling is the determination of the duration of work time is not thorough with a factor weight of 0.878 and communnality of 77.2%.

6. Conclusion

After the researchers conducted the analysis in the previous chapters then the researchers can give some conclusions as follows:

1. The variables, include labor, work tools, materials, finance, managerial and planning and scheduling, contribute to the delay on work of Panjang Island abrasion handling. This can be seen from the value of F arithmetic of 136.288 while for the F table value of 2.34 (df 1 = 3 and df 2 = 40-3-1 = 36). Also obtained the significance value of 0.000 is smaller than the significance level of 0.05.
2. The most influential / dominant variable on project delays on work of Panjang Island abrasion handling is finance as well as planning and scheduling.

7. Suggestions

Based on the conclusions of the research results, it can be given suggestions as follows:

1. This research is expected to be utilized and developed by various parties such as Public Works and Spatial Planning Department of Jepara Regency to be able to overcome the obstacle that happened and become the trigger of delay for construction

development in Jepara regency and also to construction service provider in order to anticipate human resource problem and nature resource problem which is a construction constraint.

2. To get a balanced research results, it is necessary to get input from other parties such as the owner and the consultant.

References

- Ahmed, S.M., Azhar S., Kappagtula P. and Gollapudil D. (2003). Delays in construction: a brief study of the Florida construction industry. Proceedings of the 39th Annual ASC Conference, Clemson University, Clemson, SC, pp. 257-66.
- Ahyari, Agus. 1987. *Pengendalian system Produksi. Buku 1 dan 2. BPEF: Yogyakarta.*
- Alaghbari W.A.M., Razali M.A.K., Salim, A. and Ernawati (2005). Factors affecting construction speed of industrialized building systems in Malaysia. Universiti Putra Malaysia: Master's thesis.
- Alifen, R. S., Setiawan, R. S., Sunarto, A. 2000. Analisa "What If" Sebagai Metode Antisipasi Keterlambatan Durasi Proyek, *Dimensi Teknik Sipil*, Vol. 2 No. 1, Maret.
- Andi, Susandi, Wijaya H. 2003. *On Representing Factors Influencing Time Performance Of Shop-House Constructions In Surabaya.* Dimensi Teknik Sipil : Jakarta.
- Andriani, M dan Wirjamadi, B. 2013. Peranan Gizi dalam siklus kehidupan, Jakarta : Kencana Prenada Media Group.
- Arditi D. and Patel BK. (1989), Impact Analysis Of Owner-Directed Acceleration, *Journal of Construction Engineering and Management ASCE* Vol 115, no.1, pp.144-157.
- Assaf et al. (1995). Causes of delay in large building construction project.
- Austen A.D., dan R.H. Neale, 1994, *Manajemen Proyek Konstruksi Pedoman, Prosedur, PPM dan PT* Pustaka Binaman Pressindo, Jakarta.
- Burhan Bungin, 2014, *Metodologi Penelitian Kuantitatif.* Jakarta: Kencana Prenamedia Group.
- Cahyono, B. 2007. *Kedelai, Teknik Budidaya dan Analisis Usaha Tani.* C.V Aneka Ilmu Semarang.
- Callahan, M.T. 1992 *Construction Project Scheduling*, MC Graw-Hill New York.
- Dessler, G, 1996. *Manajemen Sumber Daya Manusia. Human Resource Management* 7 th ed, Edisi Bahasa Indonesia, Jilid 2. Jakarta ; PT Prenhallindo
- Dipohusodo, I. (1996). "Manajemen Proyek dan Konstruksi". Jilid 1, Kannisius, Yogyakarta.
- Donal S. Barie, 1984, *Dealy Couesed by Owner on His Agent.*
- Ghozali, Imam 2013. *Aplikasi Analisis Multivariate dengan Program SPSS.* Semarang: Badan Penerbit Universitas Diponegoro.
- Gibson, Ivancevich. 1984. *Organisasi dan Manajemen Perilaku Struktur Proses.* Jakarta: Penerbit Erlangga.
- Hasoloan Benget Sianipar. 2012. Analisis Faktor-Faktor Penyebab Keterlambatan Penyelesaian Proyek Konstruksi Pengaruhnya Terhadap Biaya. Skripsi. Universitas Sebelas Maret Surakarta.
- Indiantoro, Nur. 2000. An Empirical Study of Locus of Control and Cultural Dimensions as Moderating Variable of The Effect of Participate Budgeting on Job Performance and Job Satisfaction. *Jurnal Ekonomi dan Bisnis Indonesia* Vol. XV, Januari : 97-114.

- IndraPanduPrasetyo. 2012. Analisis Keterlambatan Dan Kualitas Hasil Pekerjaan Pada Proyek Konstruksi. Skripsi. Universitas Indonesia.
- Indriantoro, Nur dan Bambang Supomo. 2011, “*Metodologi Penelitian Bisnis Untuk Akuntansi Dan Manajemen*”. Edisi Pertama, BPFEE, Yogyakarta.
- Jan Tamamengka, Analisis Tenaga kerja Terhadap Produktivitas pada Konstruksi (Studi Kasus : Rehabilitas Dan Perluasan Rumah Dinas Rektor Unsrat), Sekripsi Studi S1 Teknik Sipil, Fakultas Teknik Universitas Sam Ratlangi Manado 2016.
- Kaming, Peter F., Olomolaiye, Paul O., Holt Gary D., Harris, Frank C., 1997. ”Factor Influencing Construction Time and Cost Overruns on HighRise Projects in Indonesia”, Taylor and Francis Journal of Construction Management and Economics, Vol 15: 83 – 94.
- Kraiem, Z. K. dan Diekman, J. E., 1987, Concurrent Delays in Construction Projects, Journal of Construction Engineering and Management, ASCE, vol . 113, no. 4, hal.591-602.
- Kusjadmikahadi, R. Amperawan. 1999. Studi Keterlambatan Kontraktor Dalam melaksanakan Proyek Konstruksi di Daerah Istimewa Yogyakarta. Yogyakarta: UGM.
- Levis and Atherley.(1996). Delay construction. Langford: Cahner Books Internasional.
- Proboyo, Budiman. 1999. Keterlambatan Waktu Pelaksanaan Proyek Klasifikasi dan Peringkat dari Penyebab-penyebabnya. Program Pascasarjana Studi Manajemen Konstruksi Universitas Kristen Petra Surabaya. Surabaya.
- Robbins, S.P. 1996. *Perilaku Organisasi*. Jakarta: Perihallindo
- aleh, Nursyam. 2005. Faktor-Faktor Yang Menyebabkan Klaim dan Penyelesaiannya Pada Industri Konstruksi. Faculty of Civil Engineering University Teknologi Malaysia.
- Scott, S. 1997. *Delay Claims in U.K. Contracts*. J. Constr. Eng. Mgmt. Vol. 123. No. 3. 238-244.
- Singgih Santoso, 2000, *Uji Validitas dan Reabilitas Data*, Jakarta: Alfabeta
- Soehardi Sigit, 2001, *Pengantar Metodologi Penelitian*, Cetakan Kedua, Jakarta ; BPFEE UST.
- Soeharto, Imam. 1992. Manajemen Proyek Industri. Erlangga : Jakarta.
- Soeharto, Iman. 1997. Manajemen Proyek dari Konseptual sampai Operasional. Erlangga. Jakarta.
- Studi Keterlambatan Kontraktor Dalam melaksanakan Proyek Konstruksi di Daerah Istimewa Yogyakarta. Yogyakarta: UGM.
- Sufreni dan Yonathan Natanael, 2014. *Belajar Otodidak SPSS Pasti Bisa*, Jakarta: Gramedia.
- Suyatno. 2010. Analisis Faktor Penyebab Keterlambatan Penyelesaian Proyek Gedung (Aplikasi Model Regresi). Tesis. Universitas Diponegoro.
- Usman, Husaini. (2006). Manajemen-teori, *Praktik dan riset pendidikan*. Bumi aksara : Jakarta.