International Journal of Economics, Business and Management Research

Vol. 9, No.10; 2025

ISSN: 2456-7760

The Effect of Labor, Materials, and Payments on the Progress of PT.Totalindo Eka Persada Tbk CWR-02 Project in Pekanbaru, Riau

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doi.org/10.51505/IJEBMR.2025.91021 URL: https://doi.org/10.51505/IJEBMR.2025.91021

Received: Oct 09, 2025 Accepted: Oct 13, 2025 Online Published: Oct 18, 2025

Abstract

Work progress is the percentage of work completed relative to the total value of the work item. Given the various factors involved in project development to achieve work targets, it is necessary to conduct in-depth evaluation and analysis based on scientific analysis of available resources, including labor, materials, and payments, so that the project can be completed on time. This study analyzes work progress to determine the effect of the number of workers, the amount of materials, and the amount of payments on work progress. The research method used is multiple linear analysis with three (3) independent variables. The data used is primary data that has been processed using the SPSS Statistics 25 data processing application by simplifying the variables as appropriate. The results of the study show that 1). the number of workers partially has a positive and significant effect on work progress, 2). the amount of materials partially has a positive and insignificant effect on work progress, 3). the amount of payment has a positive and insignificant effect on work progress, and 4). the number of workers, the amount of materials, and the amount of payment simultaneously have a positive effect on work progress.

Keywords: Construction Project, Work Progress, Labor, Materials, Payment

1. Introduction

1.1. Introduce the Problem

PT. Totalindo Eka Persada, Tbk is currently in the process of constructing the Physical Infrastructure of the University of Riau Project Package CWR-02, which is being carried out at the University of Riau Campus, Bina Widya Campus KM. 12.5, Simpang Baru, Tampan District, Pekanbaru City, Riau. The project is currently in its 94th week, as shown in the image below. In Figure 1.1 below, you can see the progress of the 94th week from March 30 to April 4, 2024, at the time of the termination of the contract with PT. Totalindo Eka Persada Tbk, where the realization progress was 81.5676% and the remaining progress was 18.43%. for the Information

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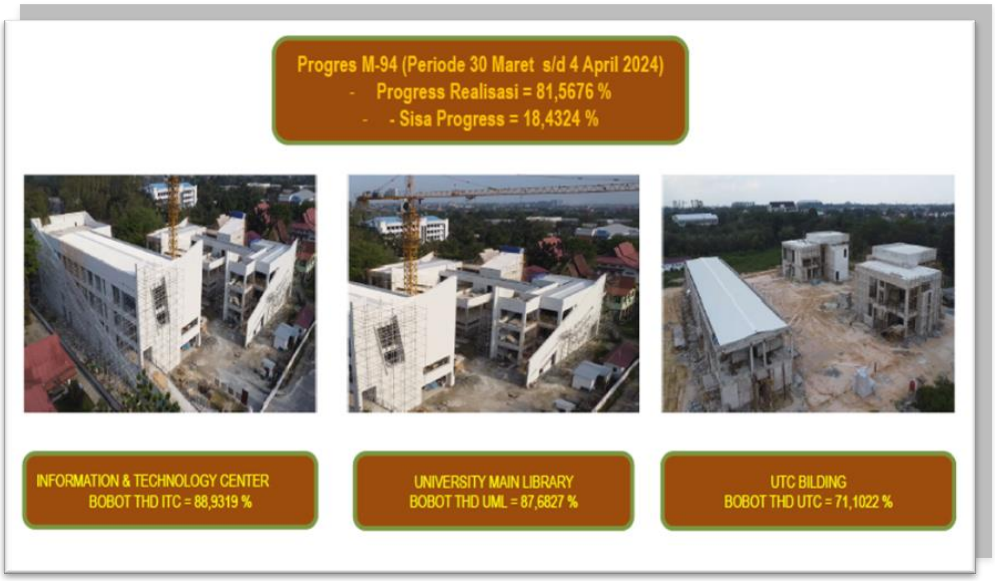
& Technology Center building with a THD ITC weight of 88.9319%, the University Main Library building with a THD UML weight of 87.6827%, and the UTC Building with a THD UTC weight of 71.1022%.

Figure 1.1 Week-94 Work Progress (Period March 30, 2024 to April 4, 2024) of PT. Totalindo Eka Persada Tbk CWR-02 Project Pekanbaru, Riau.



Source: PT. Totalindo Eka Persada, Tbk, 2025

1.2 Explore Importance of the Problem

Given the various factors involved in project development to achieve work targets, it is necessary to conduct in-depth evaluation and analysis based on scientific analysis of available resources, including labor, materials, and payments, so that the project can be completed on time.

1.3 Describe Relevant Scholarship

Work progress is the percentage of work completed relative to the total value of the work item. Work progress illustrates the amount of work that shows the relative importance of a work item compared to other work items in the project (Aprilia 2020).

Project management is the activity of planning, organizing, directing, and controlling the resources of a company's organization to achieve specific goals within a specific time frame using specific resources. Planning and managing resources and time are interrelated parts of construction project management. In addition to quality, project achievement can also be evaluated based on time. The resources spent and the time spent to complete tasks must be measured regularly. (Santoso, 2003)

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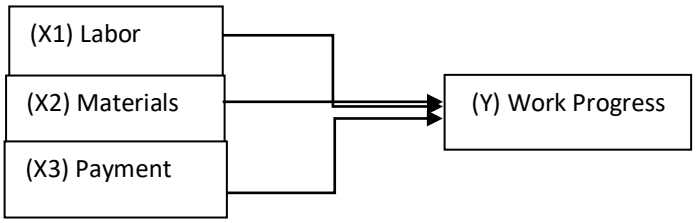
The progress of construction projects is very important and affects the Company's reputation. Timely work progress is influenced by several factors, both internal and external to the company. Internal factors include labor, materials, and the skills possessed by workers in the field, while external factors include timely payments and the amount received from employers as a basis for achieving the planned progress. (Sandjaya, 2024)

1.4 State Hypotheses and Their Correspondence to Research Design

Figure 2.1 Conceptual Framework



Hypothesis:

Based on the conceptual framework above, the hypothesis can be formulated as follows:

1. The amount of labor, the amount of materials, and the amount of payments are suspected to have a partially significant effect on work progress.
2. The number of workers, the amount of materials, and the amount of payments are suspected to simultaneously have a significant effect on work progress.

2. Method

In accordance with standard academic practice and for the sake of clarity and replicability, this section is divided into labeled subsections. Each subsection describes essential methodological components of the study, including participant characteristics, sampling procedures, sample size and precision, measurement approaches, research design, and any proposed interventions. Although this study did not involve experimental manipulations in the traditional sense, proposed mitigation strategies are also described in relation to the analysis

2.1 Identify Subsections

In alignment with conventional scientific reporting practices, the Method section in this study is organized into clearly labeled subsections to facilitate clarity, replicability, and ease of navigation for the reader. This structured approach is particularly important in applied research, where various aspects of the methodological process—ranging from participant characteristics to data analysis procedures—need to be transparently documented

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2.2 Participant (Subject) Characteristics

Participants in this study were not individual respondents, but rather personnel and project workers involved in active construction sites managed by PT Totalindo Eka Persada Tbk. These included supervisors, field workers, and HR staff whose records, behaviors, and work conditions formed the basis of the analysis. Eligibility was determined by involvement in ongoing construction projects during the study period and availability of documented risk events. As this study did not involve direct human experimentation or surveys, informed consent was not applicable. However, ethical standards were upheld

2.3 Sampling Procedures

The data used is primary data sourced from PT. Totalindo Eka Persada, Tbk, which was processed using the SPSS Statistics 25 data processing application by simplifying the variables, adjusting them to the data received, and simplifying them with the following information:

- Work progress in nominal percentage with decimal fractions with four digits after the decimal point, multiplied by 100.
- Labor force in units of people/units
- The amount of material in cubic meters (m3) is used as is.
- The amount of payment in Rupiah is simplified into millions of rupiah so that it is divided by one million.

2.4 Analyzed data and analysis methods

Multiple Linear Analysis Method with three (3) independent variables to examine the effect of labor, materials, and payments on the work progress achieved by PT. Totalindo Eka Persada, Tbk. Case study: CWR-02 Project, Pekanbaru, Riau.

The explanation of the variables used is as follows:

- Work Progress (Y) is the level of achievement or progress of project work in a certain period that can be done with the available resources.
- Labor (X1) is the number of workers, including company staff and field workers, who carry out construction project work, including foremen (contractors), subcontractors, and workers from suppliers.
- Material Quantity (X2) is all raw materials used in the project work such as cement, sand, steel, wood, bricks, and other supporting equipment calculated by volume (m3).
- Payment Amount (X3) is the payment made by the contractor for the purchase of materials, worker wages, subcontractor payments, and operations.

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3. Results

3.1 Statistics and Data Analysis

3.1.1 R-Square Test

Model Summary[b]					
R	R Square	Adjusted R Square	Standard Error of the Estimate	Change Statistics	
				R Square Change	F Change
.846[a]	.715	.706	24.79642	.715	73,670

Source: Processed data from IBM Statistics 25

- R-squared (Coefficient of Determination): This number indicates how much of the variation in the dependent variable can be explained by all the independent variables in the model.
- R Value: This is the correlation coefficient between the dependent variable and the independent variables.

3.1.2 ANOVA Test

ANOVA[a]					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	135890.171	3	45,296.724	73,670	.000[b]
Residual	54,107.907	88	614,863		
Total	189,998.077	91			

Source: Processed data from IBM Statistics 25

- If F-calculated is greater than F-table (or the significance value (Sig.) is less than 0.05), then Null Hypothesis is rejected, which means there is a significant effect.
- If F-calculated < F-table (or significance value (Sig.) > 0.05), then H0 is accepted, which means there is no significant effect.

3.1.3 Coefficients Test

Coefficients[a]				
Model	Unstandardized Coefficients		Standardized Coefficients	Sig.
	B	Std. Error	Beta	
(Constant)	31.915	6.125		.000
Labor force	.818	.285	.640	.005
Materials	.001	.001	.210	.346
Payment	.001	.004	.014	.812

Source: Processed data from IBM Statistics 25

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- If the Sig. value is < 0.05, then the independent variable has a significant partial effect on the dependent variable.
- If the Sig. value is ≥ 0.05, then the independent variable does not have a significant partial effect.

3.2 Analysis results

3.2.1 R-Square Test results

The R-Square coefficient value = 0.715 means that 71.5% of the dependent variable can be explained by all dependent variables or 71.5% of Work Progress is influenced by the Number of Workers (X1), the amount of materials (X2), and the amount of payments (X3), while the remaining (100% - 71.5%) = 28.5% is influenced by other variables outside the dependent variables.

3.2.2 ANOVA Test results

The significant value obtained is = 0.000, meaning that the Sig. value is < 0.05, so H0 is rejected. This means that there is a simultaneous effect of (X1) Number of Workers, (X2) Amount of Materials, and (X3) Amount of Payments on (Y) Work Progress.

3.2.3 Coefficients Test results

1. The Coefficients value (X1) Number of Workers is positive (0.818) and Sig. = 0.005, meaning that the Sig. value is relevant (in accordance with the substance) and has a significant effect on (Y) Work Progress.
2. The Coefficient value (X2) for the Amount of Materials is positive (0.001) and Sig. = 0.346, so the Sig. value is ≥ 0.05, meaning that the Amount of Materials (in accordance with the substance) is not significant for (Y) Work Progress.
3. Coefficient Values (X3) Payment Amount has a Positive Value (0.001) and Sig. = 0.000, meaning that the Sig. value refers to the Payment Amount (in accordance with the substance) and is not significant to (Y) Work Progress.

4. Discussion

4.1 Regression Model results

The resulting multiple linear regression model is as follows:

Y = 31.915 + 0.818.X1 + 0.001.X2 + 0.001.X3

Note:

- (Y) = Work Progress (%)
- (X1) = Number of Workers (people)
- (X2) = Amount of Materials (m3)
- (X3) = Total Payments (million rupiah)
- α_0 = Beta Coefficient
- α_1 = Coefficients of each independent variable (X1, X2, X3)

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4.1.1 Analysis Regression Model Results:

1. For an increase of one unit in the Number of Workers, there is an impact of an increase of 81 in the work progress of PT. Totalindo Eka Persada Tbk Project CWR-02, Pekanbaru Riau.
2. For every one unit increase in the Amount of Materials, there is an increase of 0.1 in the work progress of PT. Totalindo Eka Persada Tbk Project CWR-02, Pekanbaru Riau
3. For every one-unit increase in the amount of payment, there is an increase of 0.01 in the work progress of PT. Totalindo Eka Persada Tbk Project CWR-02, Pekanbaru Riau

4.2 Conclusion

This study confirms that the number of workers has a statistically significant influence on construction progress, while material and payment amounts, though positively associated, are not significant predictors. These findings underscore the importance of optimizing workforce allocation in large-scale construction projects. Stakeholders should prioritize labor management strategies to enhance timely project completion.

4.2.1 Recommendations

The company PT. Totalindo Eka Persada, Tbk is advised to prioritize increasing labor resources over materials and payments to optimize project progress.

Acknowledgements

The author would like to express sincere gratitude to the management and project team of PT Totalindo Eka Persada Tbk for providing access to project data and field observation sites, which were crucial to the success of this study.

Special thanks are extended to colleagues who provided constructive feedback during the conceptualization and drafting stages of the manuscript. The authors also acknowledge the assistance of Alicon publicaation in formatting the tables and figures for publication.

The authors declare that there were no conflicts of interest in the conduct of this research, and no special authorship agreements apply. All listed authors contributed meaningfully and equally to the development of the study, analysis, and writing of the manuscript.

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Attachment

Work Progress, Number of Workers, Amount of Materials, and Payment Amount
PT. Totalindo Eka Persada, Tbk CWR-02 UNRI Project
Period Week 1 to Week 92 (June 2022 - April 2025)

No	Week Period	Moon Period	Work progress multiplied by 100	Number of Workers (People)	Amount of Material (m3)	Payment Amount (Million Rupiah)
			(Y)	(X1)	(X2)	(X3)
1	Week 1	June 2022	0.02	8	343	159.61
2	Week 2	June 2022	0.05	8	343	623.16
3	Week 3	June 2022	2.92	12	348	482.39
4	Week 4	June 2022	2.25	12	348	660.9
5	Week 5	July 2022	2.76	12	348	701.47
6	Week 6	July 2022	2.93	12	348	340.5
7	Week 7	July 2022	4.83	13	399	1150
8	Week 8	July 2022	5.3	15	401	300
9	Week 9	August 2022	5.29	15	401	567.5
10	Week 10	August 2022	5.21	15	401	4328
11	Week 11	August 2022	6.29	16	450	110.45
12	Week 12	August 2022	7.38	17	485	765.4
13	Week 13	September 2022	7.31	17	485	658.4
14	Week 14	September 2022	7.01	17	485	760
15	Week 15	September 2022	7.14	17	485	896.34
16	Week 16	September 2022	8.16	19	549	847.92
17	Week 17	October 2022	8.06	19	549	811.52
18	Week 18	October 2022	8.15	19	549	214.54
19	Week 19	October 2022	50.29	23	596	286.16
20	Week 20	October 2022	54.36	23	596	567.52
21	Week 21	November 2022	81.97	25	9056	276.15
22	Week 22	November 2022	89.22	25	9056	1231.15
23	Week 23	November 2022	84.09	25	9056	245.6
24	Week 24	November 2022	84.57	30	10234	767.23
25	Week 25	December 2022	83.58	30	10234	450.52
26	Week 26	December 2022	87.26	30	10234	224.21
27	Week 27	December 2022	89.64	30	10234	731.13
28	Week 28	December 2022	82.86	30	10234	556.4
29	Week 29	January 2023	80.26	30	10234	287.9
30	Week 30	January 2023	99.75	43	10234	845.5

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31	Week 31	January 2023	92.82	43	12076	765.4
32	Week 32	January 2023	93.69	43	12076	356.43
33	Week 33	February 2023	91.08	43	12076	358.04
34	Week 34	February 2023	98.42	43	12076	1078.5
35	Week 35	February 2023	93.43	43	12076	73.74
36	Week 36	February 2023	93.34	46	12533	650.03
37	Week 37	March 2023	97.29	46	12533	1250.6
38	Week 38	March 2023	92.86	46	12533	525.45
39	Week 39	March 2023	98.17	46	12533	1188.4
40	Week 40	March 2023	96.22	46	12533	664.79
41	Week 41	April 2023	94.23	46	12533	1812.68
42	Week 42	April 2023	98.27	46	12533	205
43	Week 43	April 2023	98.01	46	12533	1000.41
44	Week 44	April 2023	98.22	46	12533	552.76
45	Week 45	May 2023	99.64	46	12533	1013.22
46	Week 46	May 2023	95.43	46	12533	505.9
47	Week 47	May 2023	98.76	46	12533	399.15
48	Week 48	May 2023	98.54	46	12533	1202.97
49	Week 49	June 2023	109.67	53	13935	1652.61
50	Week 50	June 2023	109.55	53	13935	1637.57
51	Week 51	June 2023	104.33	53	13935	880.41
52	Week 52	June 2023	100.26	53	13935	1059.25
53	Week 53	July 2023	108.73	53	13935	1847.61
54	Week 54	July 2023	105.46	53	13935	1847.61
55	Week 55	July 2023	102.25	53	13935	844.51
56	Week 56	July 2023	109.87	53	13935	1388
57	Week 57	August 2023	100.33	53	13935	885.62
58	Week 58	August 2023	100.01	53	13935	1184.54
59	Week 59	August 2023	104.11	53	13935	1105.56
60	60th week	August 2023	102.33	59	14063	1012.25
61	Week 61	September 2023	100.29	59	14063	1540.18
62	Week 62	September 2023	106.26	59	14063	2559.41
63	Week 63	September 2023	102.11	59	14063	2150
64	Week 64	September 2023	100.02	59	14063	2450
65	Week 65	October 2023	105.62	59	14063	694.95
66	Week 66	October 2023	100.12	59	14063	1175
67	Week 67	October 2023	105.34	59	14063	1500
68	Week 68	October 2023	100.02	59	14063	500
69	Week 69	November 2023	102.61	59	14063	450
70	70th week	November 2023	108.02	59	14063	300

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71	Week 71	November 2023	119.88	66	15060	1165
72	Week 72	November 2023	118.72	66	15060	245
73	Week 73	December 2023	111.86	66	15060	605.72
74	Week 74	December 2023	112.45	66	15060	115
75	Week 75	December 2023	125.45	85	38056	300
76	Week 76	December 2023	121.87	80	38056	190.65
77	Week 77	January 2024	128.35	80	38056	350
78	Week 78	January 2024	120.91	85	38056	1170
79	Week 79	January 2024	128.47	85	38056	157
80	80th week	January 2024	123.71	87	38056	300
81	Week 81	February 2024	127.15	87	38056	290
82	Week 82	February 2024	153.74	123	45672	1413.25
83	Week 83	February 2024	152.41	123	45672	193
84	Week 84	February 2024	154.31	123	45672	258.74
85	Week 85	March 2024	150.57	127	45672	750
86	Week 86	March 2024	142.12	127	45672	537
87	Week 87	March 2024	149.17	140	45672	1220
88	Week 88	March 2024	149.17	140	45672	1152.5
89	Week 89	April 2024	151.86	140	45672	1600
90	90th week	April 2024	151.1	144	45672	774.5
91	Week 91	April 2024	151.25	144	45672	1530
92	Week 92	April 2024	150.86	144	50985	1450

Source: PT Totalindo Eka Persada, Tbk 2025