

Integrating Performance Intensity into Project Time Management: A Predictive Model for Duration Estimation in Construction Projects

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Abstract

Time related issues are frequently encountered in construction projects, often affecting project completion. To address this, effective scheduling and continuous evaluation are essential. This study focuses on assessing the time performance of a building construction project using the Performance Intensity (PI) method. Building projects are prone to delays, which can impact costs, quality, and stakeholder satisfaction. The study aims to estimate the time needed to complete the project and compare the analytical results with the actual project duration. A quantitative descriptive approach was applied, beginning with literature reviews and field studies by collecting secondary data, such as planned and actual schedules and weekly progress reports. The data were processed into duration days, work performance, and time consumption, then analyzed using five key indicators: PPI, API, CPI, CCS, and CCP. The findings reveal significant time performance deviations, particularly in several periods. In period 17, the project was predicted to be completed 77 days earlier, on May 13, 2025. By period 31, the forecasted completion date was July 28, 2025, still ahead of the original plan. The planned duration was 302 days, while the PI analysis predicted 301 days, showing a one day improvement. These results indicate that the contractor's acceleration efforts were successful after delays caused by design revisions. This study demonstrates that the PI method provides a measurable, objective approach for evaluating project schedule performance. Its contribution lies in applying this method to a building construction project, a subject not previously explored using PI analysis, offering valuable insights for improving project time management.

Keywords: Performance Intensity, Project Time Performance, Schedule Control, Duration Prediction

1. INTRODUCTION

Effective time management is a fundamental component in the execution of any project, particularly in the context of complex construction endeavors. The ability to manage time efficiently has a direct influence on minimizing resource wastage and reducing the likelihood of project failure (1). In construction projects, timely completion is especially vital, as it affects multiple dimensions including project cost, quality standards, client satisfaction, and the company's overall reputation.

Traditional time performance assessment methods such as the Earned Value Analysis (EVA) and the Critical Path Method (CPM) have been widely adopted in project control. However, the Performance Intensity (PI) method offers a newer alternative that enhances the accuracy of project duration forecasts and provides early detection of potential delays. This method builds upon the bar chart scheduling approach, incorporating refined formulas to evaluate the progress rate of project activities (2). The PI approach enables more precise monitoring of project timelines both at individual period intervals and across the project as a whole while also allowing for real-time estimations of completion dates based on current progress (3).

Performance Intensity serves as a key metric within the momentum management framework and is used to quantify activity performance in relation to time. It is calculated by dividing the total duration-days of activities by the allocated working days (time consumption). Functionally similar to a speed metric, such as "miles per hour," PI indicates how efficiently an activity is being executed. This allows project managers to strategically adjust activity sequences slowing or accelerating certain tasks to optimize overall project outcomes. In contrast to Earned Value Management Systems (EVMS), which relate project performance to financial metrics like labor or total costs, PI emphasizes direct temporal performance. Despite this conceptual difference, both approaches utilize ratio-based calculations in their frameworks.

The term duration days refers to the amount of work effort necessary to shorten an activity by one calendar day, based on its originally scheduled duration. Meanwhile, work performance denotes the total number of duration-

days accomplished during a given period, and time consumption reflects the planned working time during that same interval.

This research focuses on evaluating project time performance in a building construction project by applying the Performance Intensity method. The objective is to offer an alternative framework for project scheduling and time control that can enhance efficiency and reduce the risk of delays.

2. METHOD

The methodology began with a literature review and field study through the collection of secondary data, including planned and actual time schedules as well as weekly progress reports. These data were then processed to derive key variables such as duration-days, work performance, and time consumption. Subsequently, five primary indicators were calculated: Planned Performance Intensity (PPI), Actual Performance Intensity (API), Cumulative Performance Index (CPI), Cumulative Consumption Status (CCS), and Cumulative Completion Performance (CCP). The results of these analyses were utilized to assess the project's time status, forecast the projected completion date, and compare the actual duration with the duration estimated using the Performance Intensity method. This process served as the basis for drawing conclusions and formulating recommendations.

2.1 Planned Performance Intensity (PPI)

Planned Performance Intensity (PPI) refers to the level of productivity measured in units of time, based on the project schedule as initially planned. It indicates the expected rate of work performance according to the original project timeline.

$$PPI = \frac{\text{Planned Work Performance}}{\text{Planned Time Consumption}} \quad (1)$$

(Source: Woolf, 2007 in Sugiyanto, 2021)

2.2 Actual Performance Intensity

Actual Performance Intensity (API) represents the level of productivity measured based on the actual project schedule and real progress observed directly in the field. It reflects the actual rate at which work is being completed relative to the time consumed

$$API = \frac{\text{Actual Work Performance}}{\text{Actual Time Consumption}} \quad (2)$$

(Source: Woolf, 2007 in Sugiyanto, 2021)

2.3 Catch-up Performance Intensity

Catch-up Performance Intensity (CPI) is used to calculate the level of performance that must be achieved in the remaining periods in order to recover delays or meet the predetermined project targets. It indicates the required intensity of work moving forward to stay on schedule.

$$CPI = \frac{\text{Required Work Performance}}{\text{Remaining Time Consumption}} \quad (3)$$

(Source: Woolf, 2007 in Sugiyanto, 2021)

2.4 Cruise Control Setting

Cruise Control Setting (CCS) represents the average value of Planned Performance Intensity (PPI) calculated from the beginning to the end of the project. It serves as a benchmark for maintaining consistent performance throughout the project duration.

$$CCS = \frac{\text{Total Work Performance}}{\text{Total Time Consumption}} \quad (4)$$

(Source: Woolf, 2007 in Sugiyanto, 2021)

2.5 Cruise Control Period

Cruise Control Period (CCP) refers to the average value of Planned Performance Intensity (PPI) calculated from the start of the project up to the current period. It indicates the target performance level that should have been maintained up to the present stage of the project.

$$CCP = \frac{\text{Cumulative Planned Work Performance}}{\text{Cumulative Time Consumption}} \quad (5)$$

(Source: Woolf, 2007 in Sugiyanto, 2021)

2.6 Time Performance Analysis Based on Performance Intensity

a. Project Time Status by Period

Table 1: Project Time Status Evaluation by Period

Comparison of Variables	Project Time Status
API < PPI	Indicates that project performance during the period is slower than originally planned.

Comparison of Variables	Project Time Status
API = PPI	Indicates that project performance is in line with the planned schedule.
API > PPI	Indicates that the project is progressing faster than the planned schedule.

b. Overall Project Time Status

Table 2: Project Schedule Status

Comparison of Variables	Project Time Status
Cumulative API < CCP	The project is progressing more slowly than the planned cumulative achievement up to the current period. The causes of the delay should be identified to implement appropriate acceleration strategies.
Cumulative API = CCP	The project is proceeding according to the planned schedule, with no delays or acceleration in work execution.
Cumulative API > CCP	The project has progressed faster than the planned schedule. This condition may provide benefits in terms of resource optimization and project cost efficiency.

2.7 Project Completion Prediction

The final step in time performance analysis using the Performance Intensity method is to estimate the project's completion time. This prediction involves calculating the estimated number of remaining days required to finish the project and determining the expected completion date. The formula used to estimate the remaining duration is as follows:

$$\text{Estimated Completion Time} = \frac{\text{Total Remaining Duration Day}}{\text{Cumulative Time Consumption}} \quad (6)$$

(Source: Woolf, 2007 in Sugiyanto, 2021)

3. RESULTS AND DISCUSSION

Table 3 outlines the scheduled duration of activities for the building construction project, specifying the start and end dates for each task. The project is set to commence on July 24, 2024, and is planned to be completed by July 30, 2025. The overall scope of work is categorized into key sections: general requirements, site development, building construction, and system installations. Within the general requirements, activities such as setting up temporary facilities, implementing occupational safety management, and arranging work safety insurance are planned to span 274 days. Mobilization and demobilization are scheduled to begin in November 2024.

Site development includes land clearing, earthworks, and the installation of utility infrastructure such as drainage systems, power panels, electrical wiring, and grounding systems. Most of these tasks are scheduled toward the end of the project, beginning in July 2025. In contrast, the structural work on the building starts earlier, on July 24, 2024, with the basement level as the initial focus. Construction then progresses floor by floor up to the roof. The basement structure has the longest work duration 225 days while the upper-level structural tasks range between 35 and 84 days.

Architectural and mechanical works are conducted in parallel with structural activities, beginning in May and continuing through July 2025. The mechanical systems, including vertical transportation, HVAC, plumbing, and fire protection, vary in duration from 14 to 49 days. Electrical installations are planned for July 2025. This phased and coordinated execution strategy ensures smooth progress and optimal integration among disciplines, supporting timely project completion by the planned date of July 30, 2025.

Table 3: Planned Project Duration

	WORK DESCRIPTION	DURATION (DAYS)	START	FINISH
A.	GENERAL REQUIREMENTS			
A.1	TEMPORARY FACILITIES AND CONTROLS	274	7/24/2024	7/30/2025
A.2	OCCUPATIONAL SAFETY MANAGEMENT SYSTEM	274	7/24/2024	7/30/2025
A.3	MOBILIZATION AND DEMOBILIZATION	28	11/14/2024	7/16/2025
A.1	WORK SAFETY INSURANCE	245	11/14/2024	7/30/2025
B.	SITE CONSTRUCTION WORK			
B.1	SITE PREPARATION	29	7/24/2024	21/08/2024
B.2	EARTHWORKS	14	7/3/2025	7/16/2025
B.3	DRAINAGE SYSTEM	14	7/17/2025	7/30/2025
B.5	POWER PANEL INSTALLATION	14	7/17/2025	7/30/2025
B.6	CABLE INSTALLATION	14	7/17/2025	7/30/2025
B.7	GROUNDING SYSTEM INSTALLATION	14	7/17/2025	7/30/2025
C.	BUILDING			
C.1	LABORATORY BUILDING			
I.	STRUCTURAL WORK			
I.A	BASEMENT FLOOR (MAB - 3.05)	225	7/24/2024	5/14/2025
I.B	1 ST FLOOR (MAB -0.05)	77	3/13/2025	6/11/2025
I.C	2 ND FLOOR (MAB +5.95)	84	3/20/2025	6/25/2025
I.D	3 RD FLOOR (MAB +11.95)	70	5/1/2025	7/9/2025
I.E	4 TH FLOOR (MAB +15.85)	70	5/8/2025	7/16/2025
I.F	1 ST FLOOR ROOF TOP (MAB +23.65)	49	5/29/2025	7/16/2025
I.G	2 ND FLOOR ROOF TOP (MAB +28.00)	35	6/19/2025	7/23/2025
II.	ARCHITECTURAL WORK			
II.A.	BASEMENT FLOOR	49	5/8/2025	6/25/2025
II.B.	1 ST FLOOR	42	5/15/2025	6/25/2025
II.C.	2 ND FLOOR	49	5/22/2025	7/9/2025
II.D.	3 RD FLOOR	42	6/5/2025	7/16/2025
II.E.	4 TH FLOOR	35	6/19/2025	7/23/2025
II.F.	ROOF FLOOR	21	7/3/2025	7/23/2025
II.G.	ROOF	14	7/17/2025	7/30/2025
III.	MECHANICAL WORK			
III.A	TRANSPORTATION SYSTEM INSTALLATION	35	6/26/2025	30/07/2025
III.B	HVAC INSTALLATION	42	6/19/2025	30/07/2025
III.C	PLUMBING	49	6/12/2025	30/07/2025
III.D	FIRE PROTECTION SYSTEM	49	6/12/2025	30/07/2025
IV.	ELECTRICAL WORK			
IV.A.	BASEMENT FLOOR	35	6/19/2025	7/23/2025
IV.C.	2 ND FLOOR	35	6/26/2025	7/30/2025
IV.F.	ROOF FLOOR	21	7/10/2025	7/30/2025

Table 4 presents a summary of the project's duration days, illustrating the comparison between the planned and actual weekly work durations across 53 project implementation periods. The data reveals that during the early stages of the project (Weeks 1 to 3), there was a significant discrepancy between the planned and actual

performance. In particular, Week 1 recorded a notable deviation, with an actual value of 328 duration days, far exceeding the planned value of 40. However, this was followed by a prolonged period of inactivity (Weeks 4 to 16), resulting in an increasing gap between the planned and actual performance values. Project activities resumed in Week 17 and continued through to the end of the implementation period, with varying values recorded each week.

The progress and duration of project activities can be observed through the S-curve, with duration measured in calendar days. The determination of duration days is based on the volume of work completed for each activity. Actual duration days were derived from field monitoring results, typically documented in weekly project reports. This approach mirrors the calculation method used during the planning stage, where the completion of a predefined minimum volume of work qualifies as one duration day. When this threshold is met, the activity is assigned a Performance Intensity (PI) value of 1; otherwise, it remains at 0. These values are summarized in the table to indicate daily performance against the project schedule and serve as a foundation for analyzing overall project time achievement.

In total, the planned duration days amounted to 1,090, while the actual recorded only 531 days. This indicates that by the end of Week 53, the actual project performance remained below the planned target, reflecting a delay or deviation from the original schedule. These findings provide a critical basis for evaluating the project's time performance and support further analysis using the Performance Intensity method.

Table 4: Planned and Acutual Duration Days of The Building Construction Project

Period	Day	Planned	Actual
1	8	40	328
2	15	49	35
3	22	42	21
4	29	42	0
5	36	0	0
6	43	0	0
7	50	0	0
8	57	0	0
9	64	0	0
10	71	0	0
11	78	0	0
12	85	0	0
13	92	0	0
14	99	0	0
15	106	0	0
16	113	0	0
17	120	7	0
18	127	14	7
19	134	14	49
20	141	14	7
21	148	14	7
22	155	21	14
23	162	21	14
24	169	21	14
25	176	21	14
26	183	14	14
27	190	14	7
28	197	7	0
29	204	7	0
30	211	7	0

Period	Day	Planned	Actual
31	218	7	0
32	225	7	
33	232	14	
34	239	7	
35	246	7	
36	253	0	
37	260	0	
38	267	0	
39	274	0	
40	281	7	
41	288	7	
42	295	7	
43	302	14	
44	309	42	
45	316	42	
46	323	49	
47	330	63	
48	337	63	
49	344	91	
50	351	98	
51	358	84	
52	365	70	
53	372	42	
Work Performance		1090	531

Table 5 illustrates a week-by-week assessment of the project's time performance through the Performance Intensity (PI) method, comparing the Planned Performance Intensity (PPI) and Actual Performance Intensity (API) to detect deviations from the schedule. The PPI indicates the expected performance based on the scheduled work duration, while the API reflects the actual field progress. The difference between these values reveals the percentage deviation, which is used to evaluate whether the project is progressing according to plan, falling behind, or exceeding expectations.

PPI is derived by dividing the planned work performance measured in duration days, or the amount of work scheduled for completion by the number of working days allocated in the schedule for a given period. On the other hand, API is obtained by dividing the actual work performance representing the actual volume of work completed by the actual number of working days used in the field during the same period.

The analysis reveals considerable variation in weekly project performance. In the first week, actual performance was exceptionally high, with an API of 41% versus a PPI of only 5%, resulting in a positive deviation of 720%. This suggests that project activities progressed much faster than initially planned. However, this trend was not sustained in subsequent weeks. From Weeks 2 to 4, negative deviations emerged, indicating project delays. In Week 4, a deviation of -100% was recorded due to a lack of actual progress despite planned activities.

Between Weeks 5 and 16, most periods showed no significant activity, either in planning or execution, although some weeks failed to meet scheduled performance. Activities resumed in Week 17, but performance continued to lag behind, with negative deviations persisting. While a few weeks such as Week 19 achieved higher-than-expected performance (e.g., a 250% positive deviation), the general trend remained below target.

By Week 31, most periods continued to show negative deviations, where actual performance consistently fell short of planned targets. This indicates the likelihood of delays if corrective strategies such as schedule acceleration or rescheduling are not implemented. Overall, the use of the Performance Intensity method offers a dynamic and insightful perspective on project time performance and serves as a valuable management tool for schedule monitoring and control.

Table 5: Project Time Performance Period Based on PPI and API

Period	Day	PPI (%)	API (%)	Deviation (%)	Performance
1	8	5.00	41.00	720	Ahead of schedule
2	15	7.00	5.00	-29	Behind of schedule
3	22	6.00	3.00	-50	Behind of schedule
4	29	6.00	0.00	-100	Behind of schedule
5	36	0.00	0.00	0	No activity
6	43	0.00	0.00	0	No activity
7	50	0.00	0.00	0	No activity
8	57	0.00	0.00	0	No activity
9	64	0.00	0.00	0	No activity
10	71	0.00	0.00	0	No activity
11	78	0.00	0.00	0	On schedule
12	85	0.00	0.00	0	On schedule
13	92	0.00	0.00	0	No activity
14	99	0.00	0.00	0	On schedule
15	106	0.00	0.00	0	On schedule
16	113	0.00	0.00	0	No activity
17	120	1.00	0.00	-100	Behind of schedule
18	127	2.00	1.00	-50	Behind of schedule
19	134	2.00	7.00	250	Ahead of schedule
20	141	2.00	1.00	-50	Behind of schedule
21	148	2.00	1.00	-50	Behind of schedule
22	155	3.00	2.00	-33	Behind of schedule
23	162	3.00	2.00	-33	Behind of schedule
24	169	3.00	2.00	-33	Behind of schedule
25	176	3.00	2.00	-33	Behind of schedule
26	183	2.00	2.00	0	On schedule
27	190	2.00	1.00	-50	Behind of schedule
28	197	1.00	0.00	-100	Behind of schedule
29	204	1.00	0.00	-100	Behind of schedule
30	211	1.00	0.00	-100	Behind of schedule
31	218	1.00	0.00	-100	Behind of schedule

Table 6 presents an analysis of the project's time performance based on the Cruise Control Period (CCP) values and the cumulative Actual Performance Intensity (API) for each implementation period of the Building Construction Project X. The CCP serves as a composite indicator of both planned and actual performance, reflecting how closely project execution aligns with cumulative performance targets. In contrast, the cumulative API reflects the accumulation of API values across all periods, offering a comprehensive overview of actual project progress in relation to the time consumed.

The CCP is calculated by dividing the total planned work performance to be achieved by a certain period by the total time consumed from the start of the project to that period. A higher CCP indicates greater performance expectations within that timeframe, implying increased time pressure to meet project milestones. Meanwhile, the cumulative API is computed by dividing the total unachieved or delayed performance relative to the plan by the cumulative time consumption up to the current period.

In the initial stages (Periods 1-4), CCP values remained relatively high (above 5.90), while cumulative API also showed significant figures (41.00 in Period 1, decreasing to 13.44 by Period 4). This suggests that the project was progressing faster than planned, a trend further supported by high positive schedule deviations, reaching up to 720% in the first period.

However, from Periods 5 to 9, project activities came to a halt. As a result, CCP values declined gradually, and cumulative API also decreased due to the lack of recorded actual progress. Despite this stagnation, schedule deviation values remained positive, indicating surplus time relative to planned progress.

Starting from Period 10 through to Period 31, the project resumed progress, but CCP values continued to decline gradually reaching approximately 1.72 in Period 31. This steady decrease in CCP indicates reduced performance compared to the earlier phases of the project. Nonetheless, the cumulative API values also showed a consistent downward trend, and schedule deviations remained positive, albeit diminishing with each subsequent period.

Table 6: Project Time Performance per Period Based on CCP and Cumulative API

Period	Day	CCP	API Cumulatif	Deviation (%)	Peformance
1	8	5.00	41.00	720	Ahead of schedule
2	15	5.93	24.20	308	Ahead of schedule
3	22	5.95	17.45	193	Ahead of schedule
4	29	5.97	13.24	122	Ahead of schedule
5	36	4.81	10.67	122	No activity
6	43	4.02	8.93	122	No activity
7	50	3.46	7.68	122	No activity
8	57	3.04	6.74	122	No activity
9	64	2.70	6.00	122	No activity
10	71	2.44	5.41	122	No activity
11	78	2.22	4.92	122	Ahead of schedule
12	85	2.04	4.52	122	Ahead of schedule
13	92	1.88	4.17	122	No activity
14	99	1.75	3.88	122	Ahead of schedule
15	106	1.63	3.62	122	Ahead of schedule
16	113	1.53	3.40	122	No activity
17	120	1.50	3.20	113	Ahead of schedule
18	127	1.53	3.08	102	Ahead of schedule
19	134	1.55	3.28	112	Ahead of schedule
20	141	1.57	3.17	101	Ahead of schedule
21	148	1.59	3.07	92	Ahead of schedule
22	155	1.66	3.02	82	Ahead of schedule
23	162	1.72	2.98	73	Ahead of schedule
24	169	1.77	2.93	66	Ahead of schedule
25	176	1.82	2.90	59	Ahead of schedule
26	183	1.83	2.86	57	Ahead of schedule
27	190	1.83	2.79	53	Ahead of schedule
28	197	1.80	2.70	50	Ahead of schedule
29	204	1.77	2.60	47	Ahead of schedule
30	211	1.75	2.52	44	Ahead of schedule
31	218	1.72	2.44	41	Ahead of schedule

Table 7 presents the predicted project completion duration based on a period-by-period time analysis of the construction project. The column “Predicted Days to Completion” represents the estimated number of days required from the current period onward until the project is completed. Meanwhile, “Predicted Total Days to Completion” is calculated by adding the last day of the current period to the estimated days to completion, reflecting the total projected duration of the project at each observation point.

In construction project management, accurately forecasting the completion timeline is crucial to ensure smooth execution and achievement of schedule targets. In this study, the estimated duration for project completion is calculated using the Performance Intensity (PI) approach. The formula involves dividing the remaining total duration days by the average Cumulative Actual Performance Intensity (API) observed up to the current period.

More specifically, the remaining duration days represent the effective workdays required to complete the remaining scope of work. The average cumulative API is the mean of actual performance intensity values recorded throughout the observation periods, reflecting the average productivity achieved during the project's execution. By dividing the remaining work duration by this average actual performance intensity, an estimate is obtained for the number of additional days needed to complete the project based on current field conditions. A higher average cumulative API indicates greater efficiency, resulting in a shorter estimated time to completion. Conversely, a lower API suggests extended time requirements due to lower productivity.

The prediction results show that from the initial period through period 17, the estimated time to completion remains constant at 105 days due to project inactivity in several periods. However, beginning from period 18 through period 31, a gradual reduction in the "Predicted Days to Completion" is observed.

Despite this, the "Predicted Total Days to Completion" steadily increases from 121 days in the first period to 301 days in period 31. This trend indicates that although the time remaining to complete the project from each point decreases, the cumulative duration continues to grow significantly. This highlights the potential risk of overall project delay, underlining the importance of timely schedule control and resource management.

Table 7: Predicted Project Completion Duration

Period	Day	Predicted Days to Completion	Predicted Total Days to Completion
1	8	113	121
2	15	108	123
3	22	105	127
4	29	105	134
5	36	105	141
6	43	105	148
7	50	105	155
8	57	105	162
9	64	105	169
10	71	105	176
11	78	105	183
12	85	105	190
13	92	105	197
14	99	105	204
15	106	105	211
16	113	105	218
17	120	105	225
18	127	103	230
19	134	96	230
20	141	95	236
21	148	94	242
22	155	92	247
23	162	90	252
24	169	88	257
25	176	86	262
26	183	84	267
27	190	83	273
28	197	83	280
29	204	83	287
30	211	83	294
31	218	83	301

Table 8 presents the predicted project completion dates based on time performance analysis at two observation periods, namely Period 17 and Period 31. These predictions were obtained using the Performance Intensity (PI) method, which estimates the number of days required to complete the project from each observation point. At Period 17, the project was predicted to be completed by May 13, 2025, which is 77 days earlier than the originally planned schedule. Meanwhile, at Period 31, the estimated completion date is July 29, 2025, representing a 1-day acceleration from the initial target. The difference in these predictions indicates that after early periods of inactivity, the project underwent an acceleration phase, allowing it to get back on track toward meeting its original schedule.

Table 8: Predicted Project Completion Dates in Periods 17th and 31st

Period	Day	Predicted Days to Completion	Predicted Total Days to Completion	Predicted Completion date (End Date of Period + Days to Completion)
17	120	105	225	5/14/2025
31	218	83	301	7/30/2025

4. CONCLUSIONS

The project time performance analysis revealed 100% deviations during several periods, specifically from periods 2 to 4, periods 17 and 18, as well as periods 20 to 25 and 27 to 31, indicating significant discrepancies between planned and actual progress. However, based on calculations using the Performance Intensity (PI) method, it was predicted that the project would be completed earlier than the original schedule on May 14, 2025, in the 17th period, and on July 30, 2025, in the 31st period. Although the project experienced delays due to work stoppages in several periods, acceleration efforts made by the contractor proved effective in realigning the project with its target timeline. The original estimated project duration was 302 days, but the PI analysis in the 31st period predicted completion within 301 days. This suggests that if the contractor maintains the current level of performance, the project could be completed one day ahead of schedule.

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6. REFERENCES

1. Aryani F. Analysis of time management implementation in an environmental road construction project in West Kalimantan. *JeLAST: Journal of Marine Engineering, Urban Planning, Civil Engineering, and Mining*. 2016;1(1).
2. Setiadi IP, Andi A. Monitoring and analysis of project schedules using the Performance Intensity and CPM methods in a hotel project. *Main Dimensions of Civil Engineering*. 2018;5(2):17-25.
3. Sugiyanto S, Umam AN. Analysis of project implementation time performance using the Performance Intensity method. *Rang Teknik Journal*. 2021;4(1):52-67.
4. Atmaja J. Comparative Analysis of Project Completion Acceleration Using the Performance Intensity Method and Microsoft Project (Case Study: Mercu Suar Project, Yogyakarta).
5. Mukti MA. Analysis of the time performance of the ITB Innovation Park construction project using the Performance Intensity method [dissertation]. Bandung: Indonesian University of Education; 2024.
6. Nurhaliza NS. Time performance analysis of a building construction project using the Performance Intensity method [dissertation]. Bandung: Indonesian University of Education; 2023.
7. Santoso A, Prasetyo A. Time performance analysis of the "X" school project using the Performance Intensity method. *Jurnal Dimensi Pratama Teknik Sipil*. 2013;2(2).
8. Setiadi IP, Andi A. Monitoring and analysis of project schedules using the Performance Intensity and CPM methods on a hotel project. *Dimensi Utama Teknik*. 2018;5(2):17-25.
9. Sugiyanto I, Mt M. Project Control Management. Surabaya: Scopindo Media Pustaka; 2020.
10. Sugiyanto S, Umam AN. Time performance analysis of project implementation using the Performance Intensity method. *Rang Teknik Journal*. 2021;4(1):52-67.