

ANALYSIS OF OVERTIME WORK PRODUCTIVITY IN CONSTRUCTION LABOR ON THE SYAMSUDDIN NOOR INTERNATIONAL AIRPORT ACCESS ROAD CONSTRUCTION PROJECT

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ABSTRACT

In order to reach the target plan on the Syamsuddin Noor International Airport Road Construction project, the contractor applied overtime working hours for the labor. The application of overtime working hours requires issues on budget. This overtime productivity measurement is useful to find out the effectiveness of the overtime working hour.

One of the methods for measuring labor productivity is using the partial productivity approach, which can be measured by knowing the input and output values of the equation of partial production. For the calculation of labor productiveness of the Syamsuddin Noor Internasional Airport Access Road Construction project, the input value is the amount of time used per day, whereas the output value is the amount volume of work produced per day.

The result from this analysis with a partial productivity approach found that the average productivity of normal working hours was 1661,87 m/hour for galam pile work and 17,83 m³/hour for embankment work. Furthermore, the average productivity of overtime hours was 2715,46 m/hour for galam pile work and 41,31 m³/hour for embankment work. The results show that overtime working hour productivity is higher than normal working hour productivity, which can be caused by some reasons. The main obstacle is rainy weather that requires work to be temporarily stopped and can only be continued when the rain stops or even sometimes have to wait for the site to be dry enough. The application of overtime working hours increases the wage budget by 30,38%. However, the overtime labor cost applied in the Syamsuddin Noor International Airport Access Road Construction project is not in line with the overtime labor cost based on provisions of PP Number 35 Year 2021.

Keywords: Partial productivity, labor, overtime working hours, overtime labor cost.

1. INTRODUCTION

In road construction projects, labor productivity is critical to the overall smoothness and success of the project. High productivity allows for quick project completion, minimizes traffic disruptions, and delivers the benefits of the infrastructure earlier to the community. Contractors, as an important part of project implementation, also play a major role in improving labor productivity. To be able to determine the right work system and the appropriate amount of labor needed, an increase or decrease in the productivity of masons as a field workforce must be observed.

The construction project of Syamsuddin Noor International Airport Access Road was carried out by PT. Sinar Arengka Setiamaju Contractor which also used labor. In construction projects, a common problem is the ineffective habits of workers, such as chatting, smoking, and resting beyond the proper time. Although overtime work causes work productivity to decrease and results in an increase in labor costs, overtime is still very often found in the implementation of construction projects. There are various reasons why overtime is an option. In this project, work started at the end of the year with the weather entering the rainy season. Therefore, it is necessary to increase working hours (overtime) to pursue targets on certain jobs that are not effectively carried out when the weather is rainy. For example, early works such as galam piling, stone masonry, and optional backfill are more difficult to carry out when it rains.

2. LITERATURE REVIEW

Labor

There are two types of labor in construction, namely suppliers or supervisors and craft labor. The number of providers is only 5-10% of the number of workers supervised. In addition, in terms of labor relations, construction labor is divided into two, namely:

- a. Direct hire workers who are recruited and signed an individual employment contract with the contracting company, followed by training, until they are deemed to have sufficient knowledge and skills.
- b. Piece-rate labor, which is labor that works based on a work bond between a labor supplier and a contractor, for a certain period of time (Sugiono, 2001).

Labor Productivity

In the construction world, productivity is closely related to implementation time. The value of productivity can be measured from the duration of a paraphrase of how long and how much

work is done. The shorter the time it takes to complete a task, the higher the productivity (Umar on Wilson).

Partial Productivity

Partial productivity, also known as single-factor productivity, shows the productivity of a particular factor used to produce an *output*. The Partial Productivity formula is as follows.

$$\text{Partial Productivity} = \frac{\text{Output}}{\text{Input}}$$

Overtime Work

Construction today generally requires a fast implementation time. This is due to various reasons, some of which are to meet project objectives in accordance with the work contract, at the request of the project owner, or for other reasons. Overtime work must be balanced with the readiness of supporting resources, such as labor, materials, and equipment as needed.

3. RESEARCH METHODOLOGY

The problem that is the topic of this final project research is the productivity of overtime working hours in the construction labor of the Syamsuddin Noor International Airport Access Road Development Project. The calculation is done using primary data obtained from interviews in the field and secondary data obtained from the service provider in the form of wage lists and daily reports. Furthermore, the calculation was analyzed using partial productivity measurement. So that the output obtained from this research is the value of productivity during overtime working hours, the value of productivity during normal working hours, and the increase in wages during overtime working hours.

4. RESULT AND DISCUSSION

Labor Productivity in Normal Working Hours

Normal labor productivity that has been calculated using partial productivity measurement can be seen in Table 4.1 and Table 4.2.

Table 4. 1 Productivity of Galam Piling in Normal Working Hours

Date	Daily Work Volume (m)	Working Time per Day	Productivity (m/h)	Weather Description
24/10/2023	20386,8	7	2912,40	Sunny
26/10/2023	9516,3	7	1359,47	Rain
27/10/2023	8680	7	1240,00	Rain

28/10/2023	9557	7	1365,29	Rain
29/10/2023	8210,5	7	1172,93	Rain
30/10/2023	7662,7	7	1094,67	Rain
31/10/2023	8777,5	7	1253,93	Rain
01/11/2023	20274	7	2896,29	Sunny

Table 4. 2 Embankment Productivity in Normal Working Hours

Date	Daily Work Volume (m ³)	Working Time per Day	Productivity (m ³ /h)	Weather Description
26/10/2023	179,08	7	25,58	Rain
27/10/2023	95,06	7	13,58	Rain
28/10/2023	107,6	7	15,37	Rain
29/10/2023	66,36	7	9,48	Rain
30/10/2023	82,5	7	11,79	Rain
31/10/2023	92,8	7	13,26	Rain
01/11/2023	188,5	7	26,93	Sunny
04/11/2023	186,84	7	26,69	Sunny

Furthermore, the average productivity of each job is obtained as follows:

- a) The average productivity of normal working hours on galam piling work

$$\bar{X}_n = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

$$\bar{X}_n = \frac{2611,71 + 1359,47 + 1240,00 + 1365,29 + 1172,93 + 1094,67 + 1253,93 + 1896,29}{8}$$

$$\bar{X}_n = 1661,87 \text{ m}^3/\text{h}$$

- b) The average productivity of normal working hours on embankment work

$$\bar{X}_n = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

$$\bar{X}_n = \frac{25,58 + 13,58 + 15,37 + 9,84 + 11,79 + 13,26 + 26,93 + 26,69}{8}$$

$$\bar{X}_n = 17,834 \text{ m}^3/\text{h}$$

Labor Productivity on Overtime Work Hours

Normal labor productivity that has been calculated using partial productivity measurement can be seen in Table 4.3 and Table 4.4.

Table 4. 3 Productivity of Galam Piling in Overtime Working Hours

Date	Daily Work Volume (m)	Working Time per Day	Productivity (m/h)	Weather Description
23/10/2023	30744,00	11	2794,91	Sunny
25/10/2023	20475,00	11	1861,36	Sunny
02/11/2023	28411,50	11	2582,86	Sunny
03/11/2023	28557,90	11	2596,17	Sunny
04/11/2023	35765,00	11	3251,36	Sunny
05/11/2023	35267,40	11	3206,13	Sunny

Table 4. 4 Embankment Productivity in Overtime Working Hours

Date	Daily Work Volume (m ³)	Working Time per Day	Productivity (m ³ /h)	Weather Description
23/10/2023	387,91	11	35,26	Sunny
24/10/2023	235,93	11	21,45	Sunny
25/10/2023	434,98	11	39,54	Sunny
02/11/2023	663,56	11	60,32	Sunny
03/11/2023	451,12	11	41,01	Sunny
05/11/2023	553,25	11	50,30	Sunny

Furthermore, the average productivity of each job is obtained as follows :

- a) The average productivity of overtime working hours on galam piling work

$$\bar{X}_l = \frac{x_1 + x_2 + x_3 + \dots + x_l}{n}$$

$$\bar{X}_l = \frac{1835,35 + 1861,36 + 2582,86 + 2596,17 + 3251,36 + 3206,13}{6}$$

$$\bar{X}_l = 2715,46 \text{ m/h}$$

- b) The average productivity of overtime working hours on embankment work

$$\bar{X}_l = \frac{x_1 + x_2 + x_3 + \dots + x_l}{n}$$

$$\bar{X}_l = \frac{35,26 + 21,45 + 39,54 + 60,32 + 41,01 + 50,30}{6}$$

$$\bar{X}_l = 41,31 \text{ m}^3/\text{h}$$

Change in Productivity Value

The analysis of changes in productivity of normal working hours and overtime of ordinary excavation work and foundation of the niche on October 23, 2023 - November 5, 2023, is as follows.

1. Productivity Change of Galam Piling

$$\Sigma Productivity = \overline{Xl} - \overline{Xn}$$

$$\begin{aligned}\Sigma Productivity &= 2715,467 - 1661,871 \\ &= 1053,59 \text{ m/h}\end{aligned}$$

$$\text{Ratio} = \frac{2715,467}{1661,871} = 1,634$$

With the conclusion that overtime work productivity is 1.6 times greater than normal work productivity in galam piling work.

2. Change in Embankment Productivity

$$\Sigma Productivity = \overline{Xl} - \overline{Xn}$$

$$\begin{aligned}\Sigma Productivity &= 41,31 - 17,83 \\ &= 23,48 \text{ m}^3/\text{h}\end{aligned}$$

$$\text{Ratio} = \frac{41,31}{17,83} = 2,317$$

With the conclusion that overtime work productivity is 2.3 times greater than normal work productivity in embankment work.

Wage Increase

The value of the increase in labor wages on the project can be found by calculating the presentation of the calculated increase connected to the total overtime wages and the total daily wages of normal working hours.

$$\%Wage \text{ Increase} = \frac{\Sigma total \text{ overtime wages}}{\Sigma total \text{ daily wages}} \times 100\%$$

$$\begin{aligned}\%Wage \text{ Increase} &= \frac{IDR 6,174,000}{IDR 20,020,000} \times 100\% \\ &= 30,389\%\end{aligned}$$

Overtime Pay According to Government Regulation No. 35 of 2021

Based on the calculation, there is a difference between the overtime wages applied to the Syamsuddin Noor International Airport Access Road Construction Project and the overtime wages that should be paid based on the overtime provisions of PP No. 35 of 2021. The wage comparison can be seen in Table 4.5.

Table 4. 5 Comparison of Total Overtime Wages at the Project Site and Overtime Wages in Accordance With The Provisions of PP No. 35 of 2021

	Total Overtime Wages at the Project Site Based on Wage Data	Total Overtime Wage Based on Government Regulation No. 35 of 2021
Operator (3 people)	IDT 3,486,000.00	IDR 5,575,000.00
Daily Worker for Galam Piling (2 People)	IDR 1,344,000.00	IDR 2,160,000.00
Daily embankment Worker (2 People)	IDR 1,344,000.00	IDR 2,160,000.00

5. CONCLUSIONS

Based on the results of data analysis and discussion that has been carried out, the following conclusions can be drawn:

1. The result of labor productivity analysis with a partial productivity approach is :
 - The average productivity values for normal working hours are 1661.87 m/h for galam piling work and 17.83 m³ /h for embankment work.
 - The average productivity values for overtime working hours are 2715.46 m/h for the galam piling work and 41.31 m³ /h for the embankment work.
 - The productivity of overtime working hours has increased from the productivity of normal working hours. In the galam piling work, the productivity of overtime working hours is 1.6 times greater than the productivity of normal working hours. In embankment work, the productivity of overtime working hours is 2.3 times greater than the productivity of normal working hours.
 - From the measurement results, the productivity of normal working hours shows a smaller value. This is because the volume produced during normal working hours is less. Rainy weather becomes an obstacle and causes work to stop temporarily. Meanwhile, the productivity of overtime working hours has a large value because the additional working hours are carried out when the weather is sunny so that work can continue during the specified time and produce a larger volume.
2. The results of the calculation of labor wages after the application of overtime working hours are:
 - The total wage for overtime working hours that must be paid is IDR 6,174,000 with a breakdown of IDR 3,486,000 for operators, IDR 1,344,000 for galam piling daily workers, and IDR 1,344,000 for embankment daily workers.

- Labor wages have increased after the implementation of overtime working hours, namely IDR 6,174,000 or 30.389% from the original IDR 20,020,000.
3. The results of the analysis of the suitability of overtime labor wages based on the overtime provisions of PP No. 35 of 2021 are:
- The total overtime labor wages that must be paid based on the overtime provisions of PP No. 35 of 2021 is IDR 9,895,500 with a description of IDR 5,575,000 for operators, IDR 2,160,000 for galam piling daily workers, and IDR 2,160,000 for embankment daily workers.
 - The total overtime labor rate applied at the project site, which is Rp 6,174,000, does not match the total labor rate that should be based on overtime provisions.

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