

Comparative Analysis of The Cost of Laying Red Bricks on Building Works

(Case Study: Cigarette Depot Building PT. Gudang Garam Tbk)

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KEYWORDS	ABSTRACT
Coefficient; Labour Productivity; SNI 2022; SSHBJ	Technological development continues to fulfill people's needs for work comfort. A non-structural work that has an important role in building construction projects, such as labor productivity of red brick wall installation work. This research was conducted to analyze the comparison of the average labor coefficient and labor requirements in the field with SNI 2022, as well as comparing labor wages in the field with SSHBJ. This research was conducted by conducting unstructured interviews with the site manager, to obtain primary data on the construction project of the PT Gudang Garam Tbk, cigarette depot building. This research uses quantitative methods. From the results of this analysis, the average value of the foreman's labor coefficient in the field is 0.0141: 1.0150 OH SNI, head mason in the field 0.0205: 0.0100 OH SNI, mason in the field 0.0100: 0.0100 OH SNI, helper mason in the field 0.1215: 0.3000 OH SNI. The following are the results of the comparison of the average labor requirements of foremen in the field 1: 1 OH SNI, head masons in the field 2: 1 OH SNI, mason in the field 10: 9 OH SNI, mason helper in the field 11: 28 OH SNI. Where the average wage of labor in the field is compared with SSHBJ, where for the foreman's labor in the field Rp 288,066.67: 178,500.00 SSHBJ, head mason in the field Rp 141,646.15: 245,323.08 SSHBJ, masons in the field Rp 1,635,361.54:1,260,000.00 SSHBJ, mason helper Rp 4,359,871.79: 1.120.512,82 SSHBJ.

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1. Introduction

Wall masonry work is an important aspect of construction projects, to increase the effectiveness and efficiency of the work as well as achieve the desired level of comfort (Maharani et al., 2022). One trend that is popular today is the use of Hebel Blocks, but it should be noted that this type of wall pair is not waterproof, which can increase the cost of using special paints. On the other hand, the use of red brick is considered more efficient and economical, although it may be less optimal in terms of aesthetics. Although the manufacture is manual and varies in size, red brick has good waterproofness, making it a good choice for the safety and strength of the overall sustainable building structure (Kristiana & pujiandi, 2016; Sinolungan et al., 2020; Syahdan, 2017).

In the process of wall installation, problems such as non-compliance with standard procedures,

unevenness of the wall surface, variations in the quality and size of bricks, poor sand, wall dryness, and lack of cement in stucco mortar can hinder the progress of the construction project (Hernandi & Tamtana, 2020). To overcome this, it is necessary to use appropriate installation methods and techniques, follow recommended construction guidelines, and involve a skilled and experienced workforce to achieve strength, safety, and comfort in building structures (Kartika et al., 2020; Kementerian PUPR, 2022).

In the implementation of construction projects in the field, the use of labor and the determination of labor wages are important aspects that must be taken into account. In construction projects, the value of the labor coefficient and labor needs used in the field will differ by SNI 2022 (Akbar et al., 2020; Sinolungan et al., 2020). In analyzing labor wages, contractors generally use the unit price of work based on their cost index, which is based on previous experience in completing construction work (Putra & Sulistio, 2020). Because this construction project is carried out in the Banten Province area, the author uses SSHBJ as a labor wage comparison index based on the labor coefficient regulated in SNI 2022.

Brick wall installation is one of the jobs that requires a large volume of work and a significant amount of labor. Therefore, project control is important to ensure the project runs according to the plan that has been set. This study aims to analyze the comparison of the average power coefficient and the comparison of the average labor needs in the field with SNI 2022 in wall installation work. In addition, this study also analyzed the comparison of the average wage of labor in the field with SSHBJ.

2. Materials and Methods

Location and Time of Research

Research location Jl. Raya CILEGON KM3 Kagungan Serang District, Serang City, Banten Province. The research implementation time starts on October 25, 2022 – February 2023

Research Equipment

- a. Stationery and other aids
- b. Working Drawings,
- c. Handphone
- d. Laptop,

Primary Data

Primary data is data that can be directly in the field by the object of research. Primary data collection is carried out by: Field observations in order to find out the process of work in the field with the data needed in the form of work volume, number of workers, and labor wages. The interview was conducted to find out the daily productivity of the red masonry work obtained, which is 39 working days.

Data Seconds

Secondary data is data obtained through intermediaries or indirectly. This sber data is obtained and recorded by other parties with existing evidence, as well as archives both published and unpublished, along with secondary data:

- a. Masonry work report data,
- b. Analysis of the unit price of SNI 2022 work on guidelines for labor coefficient on wall work
- c. Price List Unit Wages used by the project
- d. SSHBJ as a guideline for labor wages for construction project work in the Banten region

Data Analysis

- Obtain data on labor productivity in the field containing the volume of work, the number of workers and use 39 working days as a sample.
- Obtaining wages for workers in the field.
- Calculating the coefficient of labor in the field.
- Comparing the average labor coefficient in the field with the Indonesian National Standard in 2022.
- Calculating labor needs based on the SNI 2022 coefficient.
- Comparing the average need for workers in the field with SNI 2022.
- Calculating labor wages based on SSHBJ based on labor needs in SNI 2022.
- Comparing the average wage of workers in the field with SSHBJ.

3. Results and Discussions

Based on the results of the survey conducted, a daily volume calculation was obtained that resulted in the target work achieved and the number of workers per day. Which will be used to determine labor as follows.

Table 1 Field Manpower Needs

Recapitulation of Observations					
Day to -	Work Volume (m ²)	Foreman	Head Handyman	Handyman	Handyman Helper
1	23,55	1	1	2	3
2	30,28	1	1	3	4
3	33,65	1	1	3	5
4	30,28	1	1	3	4
5	33,65	1	1	3	5
6	37,01	1	1	3	6
7	26,92	1	1	3	3
8	47,1	1	1	4	6
9	60,56	1	1	6	8
10	67,3	1	1	6	10
11	60,56	1	1	6	8
12	90,84	1	2	9	12
13	100,95	1	2	10	14
14	90,84	1	2	9	10
15	70,65	1	2	6	9
16	111,03	1	2	12	15
17	94,2	1	2	10	10
18	121,12	1	2	14	14
19	134,6	1	2	16	16
20	121,12	1	2	13	15
21	134,6	1	2	15	17
22	148,04	1	2	18	18
23	107,68	1	2	12	12
24	100,93	1	2	9	13
25	131,23	1	2	14	17
26	124,49	1	2	14	15
27	137,96	1	2	15	18
28	137,95	1	2	16	17
29	94,2	1	2	9	10
430	114,39	1	2	11	12

31	114,39	1	2	10	12
32	134,58	1	2	11	13
33	104,31	1	2	10	11
34	100,94	1	2	9	9
35	114,4	1	2	11	11
36	121,14	1	2	14	14
37	134,59	1	2	16	16
38	134,59	1	2	15	16
39	114,4	1	2	8	9

1. Labor Coefficient

In the use of the data attached to **Table 1**, the following analysis calculations to find the value of the labor coefficient are carried out: (Basari et al., 2014)

a. Day 1 Labor Efficiency Calculation

$$\begin{aligned}
 1. \text{ Foreman} &= \frac{\text{The Number of Workers}}{\text{Dayli Productivity}} = \frac{1}{23,55} = 0,0425 \text{ OH} \\
 2. \text{ Head Handyman} &= \frac{\text{The Number of Workers}}{\text{Dayli Productivity}} = \frac{1}{23,55} = 0,0425 \text{ OH} \\
 3. \text{ Bricklayer} &= \frac{\text{The Number of Workers}}{\text{Dayli Productivity}} = \frac{2}{23,55} = 0,0849 \text{ OH} \\
 4. \text{ Handyman Helper} &= \frac{\text{The Number of Workers}}{\text{Dayli Productivity}} = \frac{3}{23,55} = 0,1274 \text{ OH}
 \end{aligned}$$

With the example of the formula above to find the productivity coefficient in the field for labor (foreman, chief handyman, mason, and handyman assistant) from days 1 to 39, the average value of the labor coefficient in the field will be compared with SNI 2022 which can be seen in **table 2**:

Table 2 Comparison of the Average Coefficient of Labor in the Field with SNI 2022,

No	Labor	Unit	SNI 2022	Field
1	Foreman	OH	0,0150	0,0141
2	Head Handyman	OH	0,0100	0,0205
3	Bricklayer	OH	0,1000	0,1000
4	Handyman Helper	OH	0,3000	0,1215

2. Manpower Needs

By using available field volume data, researchers can analyze to determine labor needs in the field using the SNI 2022 coefficient as a guideline, with the following calculations: (Nordiansyah et al., 2021)

1. Labor Calculation Based on SNI Day to -1,

$$\begin{aligned}
 \text{Tenaga Kerja} &= \text{SNI Coefficient} \times \text{Daily Productivity} = \text{Result} \\
 \text{A.Foreman} &= 0,015 \times 23,55 = 0,353 \\
 \text{B.Head Handyman} &= 0,01 \times 23,55 = 0,236 \\
 \text{C.Handyman} &= 0,1 \times 23,55 = 2,355 \\
 \text{D.Handyman Helper} &= 0,3 \times 23,55 = 7,065
 \end{aligned}$$

With this formula, labor needs are obtained from the first day to the 39th day, with the average value of labor needs per day that will be compared with actual needs in the field, as listed in **table 3**:

Table 3 Comparison of Average Labor Needs in the Field with SNI 2022

No	Labor	Unit	SNI 2022	Field
1	Foreman	OH	1	1
2	Head Handyman	OH	1	2
3	Bricklayer	OH	9	10
4	Handyman Helper	OH	28	11

3. Labour Wages,

Wages are closely related to human resources, namely labor. However, wage standards vary in different regions (Puraro et al., 2019). In this study, because the project is located in Banten Province, the Standard Unit Price of Service Goods (SSHBJ) is used as a reference to compare labor wages (Pemerintah Provinsi Banten, 2021). A comparison between SSHBJ wage standards and actual wages in the field can be seen in **Table 4**:

Table 4 Field Work Wage Price and SSHBJ

No	Item Description	Specifications	Unit	Field Price	SSHBJ Price
1	Wages	Foreman	OH	178.500	193.700
2	Wages	Head Handyman	OH	142.800	178.200
3	Wages	Bricklayer	OH	130.000	175.700
4	Wages	Handyman Helper	OH	100.000	155.000

This provision is a regulation regarding the labor wages of foremen, chief handymen, masons, and handyman assistants, based on SSHBJ provisions, which will analyze labor wages in the construction project of the Cigarette Depot of PT. Gudang Garam Tbk. Where the formula used is as follows:

- a. Labor Wage Formula,
1. Foreman's wages = Total. Labour x Foreman Wages (SSHBJ/SNI)
 2. Head Handyman wages = Total. Labor x Wages Head handyman (SSHBJ/SNI)
 3. Bricklayer wages = Total. Labor x Wages Bricklayer (SSHBJ/SNI)
 4. Handyman wages = Total. Labor x Handyman helper wages (SSHBJ/SNI)

In this formulation, a comparison is obtained between the total amount of wages spent on labor and the average wages of labor paid can be seen in **Table 5** and **Table 6**.

Table 5 Comparison of SSHBJ Labor Wages with Field

No	Labor	SSHBJ	Field
1	Foreman	Rp 11.234.600,00	Rp 6.961.500,00
2	Head Handyman	Rp 5.524.200,00	Rp 9.567.600,00
3	Bricklayer	Rp 63.779.100,00	Rp 49.140.000,00
4	Handyman Helper	Rp 170.035.000,00	Rp 43.700.000,00
TOTAL		Rp 250.572.900,00	Rp 109.369.100,00

Table 6 Comparison of SSHBJ Workforce Wages With Field

No	Labor	SSHBJ	Field
1	Foreman	Rp 288.066,67	Rp 178.500,00
2	Head Handyman	Rp 141.646,15	Rp 245.323,08
3	Bricklayer	Rp 1.635.361,54	Rp 1.260.000,00
4	Handyman Helper	Rp 4.359.871,79	Rp 1.120.512,82
TOTAL		Rp 6.424.946,15	Rp 2.804.335,90

Discussion

In this study, the main objective is to find a comparison of the average labor coefficient and labor needs in the field compared to the standards set by SNI 2022 (Prasetyo et al., 2022). In addition, this study aims to assess the comparison of the average wages of workers in the field with the wage standards listed in SSHBJ. So based on the results of the research conducted are as follows:

a. Labor Coefficient

The foreman workforce in the field has a lower coefficient index than SNI, while the head handyman in the field has a higher coefficient index than SNI, for the masonry workforce in the field has the same coefficient index as SNI, for the assistant craftsman in the field has a lower coefficient index than SNI. The difference between the labor coefficient index in the field and the standards set in SNI is caused by the achievement of masonry work per day. Because the procedure for bricklaying work in the field is certainly different from SNI standards.

b. Manpower Needs

The foreman workforce has the same labor needs as SNI (Listianingsih, 2021), for the head handyman in the field uses 2 while SNI uses 1 worker, for masons in the field uses 10 while SNI uses 9 workers, for the workforce of handyman helpers in the field using 11 while SNI uses 28 workers. From these results, it can be seen that labor needs also affect the value of labor efficiency.

c. Labour Wages

After obtaining the value of the SNI labor coefficient index and SNI labor needs, the results of labor wages based on SSHBJ were obtained (Puraro et al., 2019). Where foreman workers in the field have lower wages than SSHBJ, for head craftsman labor in the field is higher than SSHBJ, for masonry labor in the field is lower than SSHBJ, for assistant craftsman labor in the field is much lower than SSHBJ. From these results, it can be seen that the value of SSHBJ is higher than in the field, where the value of SSHBJ will not always be high.

4. Conclusion

Based on the results of the analysis and discussion, it can be concluded that in terms of comparing the coefficients, needs, and wages of workers in the field with SNI 2022, each aspect can be concluded in detail as follows:

From the results of the analysis comparing the average labor coefficient in the field with SNI 2022, it was obtained that the value of the foreman's labor coefficient in the field was 0.0141 OH, lower than SNI of 0.0150 OH. The workforce of the head handyman in the field has a coefficient value of 0.0205 OH twice than SNI of 0.0100 OH. Then the masonry workforce in the field has a coefficient value of 0.1000 OH equal to an SNI of 0.0100 OH. Where the workforce of handyman helpers in the field has a coefficient of 0.1215 OH even does not reach half of the SNI coefficient of 0.3000 OH. So it can be stated that the value of the SNI labor coefficient index is higher than in the field, because it is related to different time and energy needs.

From the results of the analysis comparing the average need for the number of SNI 2022 workers with the field, it is obtained that the labor needs of the foreman workforce in SNI are 1 OH the same as in the field. For the workforce of the head handyman at SNI, 1 OH is needed while in the field using 2 OH. Then the masonry workforce has a labor requirement at SNI is 9 OH while in the field it uses 10 OH. Where the labor of handyman helpers needed in SNI is 28 OH while what has been applied in the field is too little, namely 11 OH. So it can be stated that the need for labor in SNI is more than in the field due to the influence of the labor coefficient index.

From the results of the analysis of the average comparison of workers' wages based on the number of SSHBJ workers in the field, it was obtained that the labor wage needs needed for foreman workers at SSHBJ were IDR 288,066.67 while in the field it was IDR 178,500.00 with a difference of IDR 109,566.67. For head handyman labor, labor wages based on SSHBJ are required at Rp 141,646.15 and in the field at Rp 245,323.08 with a difference of Rp 103,676.93. Then the wages of masonry workers required at SSHBJ amounted to Rp 1,635,361.54 and in the field amounted to 1,260,000.00 with a difference of Rp 375,361.54. Where the wages of handyman helpers needed at SSHBJ are IDR 4,359,871.79 and in the field are IDR 1,120,512.82 with a difference of IDR 3,239,358.97. So it can be stated that the value of SSHBJ labor wages is higher than in the field, this is because it is based on the influence of the coefficient index and labor needs.

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