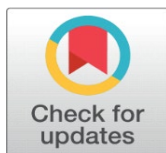


ANALYSIS OF COMPARISON OF CERAMIC FLOOR INSTALLATION PRODUCTIVITY AND WAGE COST BASED ON LABOR COMPOSITION

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ABSTRACT

Completion time of construction project that consist of many work items should not exceeds the given time requirement and the cost should not exceed the planned budget. This study analyzed a work item that is floor ceramic installation by acquiring the comparison of labor productivity and the comparison of wage cost based on different labor compositions. Out of the three (3) studied labor compositions in floor ceramic installation, the composition that consist of 2(two) masons and 2(two) journeymen produces the highest productivity that is 1,73 m² and based on the productivity the incurred wage cost, composition 2(two) is the cheapest with IDR. 9.046, -/m².

Keywords: Productivity, Wage Cost, Floor Ceramic, Labor

1. INTRODUCTION

The success of a construction project cannot be separated from project time and cost management. Completion time of construction project should not exceed the given time requirement and the costs must not exceed the planned budget. Budget plan that will be used to implement a construction project is made in the form of stages that with time span so that there is a possibility of cost change. One of the cost change reasons is the punctuality of project implementation that determined by the labour productivity in executing the work items of construction project. In other

words, labour productivity affects the profitability of a project. One of work items which implementation punctuality determined by labour productivity is floor ceramic installation.

Construction labour is an important factor for a construction project, and when implementing the project, the labour composition can be vary so that the wage cost will be varied too.

A study by Mulya concludes that as a whole realization price is smaller than budget plan. A study by [Zainuri et al. \(2015\)](#) shows that 5(five) masons and 5(five) journeymen produce different productivity. [Alfanarrochmah and Sigit \(2019\)](#) state that floor ceramic installation productivity is 1,143 m²/hour and the wage cost is IDR. 9.642, -/m². This study analyses labour productivity in floor ceramic installation with different labour compositions as the base for calculating wage cost so that it can be known to what extent the composition of labour affects productivity and wage cost that must be spent.

Early hypotesys describes that different labour compositions produce different productivity and wage cost. The objective of this study is to find out the labour productivity of floor ceramic installation based on different labour composition and to find out the comparison of wage cost in floor ceramic installation based on different labour composition.

The boundaries of this study are:

- 1) The study was conducted in a project in Purbalingga Regency
- 2) The study was conducted for floor ceramic installation which ceramic size is 50x50 cm
- 3) The study was conducted by performing hearing, observation, and field research on floor ceramic installation

2. MATERIAL AND METHOD

2.1. CALCULATION OF LABOR COST

Labour cost in work implementation is calculated by estimating the capability of labour to complete their work in a specified time. There are several works that its execution performed by a group of labour such as floor ceramic installation. For floor ceramic installation it is consist of mason and journeymen.

labour cost calculation in work implementation cannot be calculated by directly using standard cost from work unit cost analysis. This is because work unit cost analysis is using estimation of approximation number.

When excecuting work the involved labour are counted and labour composition and labour capability in completing work are needed to find out.

Therefore, if labour composition and capability to completing work can be set then the requirement of labour, implementation time, and cost can be calculated.

2.2. PRODUCTIVITY MEASUREMENT

Productivity program began with measuring productivity in project site. Without knowing the actual condition of project site, it would be difficult to arrange productivity improvement program. The measurement results are used to conduct evaluation by comparing what had happened with what should be happened. The evaluation results are used to planned the productivity rate target that directed to improve the previous project.

2.3. FACTORS THAT AFFECT PRODUCTIVITY

Four primary categories of factors that affect project productivity are classified by Kaming (1970) in Ervianto (2005)

1) Methods and Technology

Consist of engineering design, construction method, work order, and work measurement factors.

2) Site Management

Consist of planning and scheduling, site arrangement, site communication, material management, equipment management, and labour management factors.

3) Work Environment

Consist of work safety, physical environment, supervision quality, work security, work training, and participation factors.

4) Human Factor

Consists of labour wage rate, work satisfaction, incentive, profit distribution, foreman-labour working relationship, colleagues working relationship, and absenteeism factors.

According to Iman Suharto (1995), the variables that affect the productivity of labour can be grouped into:

- 1) Site physical condition and equipment
- 2) Supervision, Planning, and Coordination
- 3) Composition of work team
- 4) Overtime
- 5) Project Size
- 6) Experience curve
- 7) Direct labour versus sub-contract labour and work density

While according to Purnomo Sukirno (1999), factors that affect the productivity of construction project are:

- 1) The type of work
- 2) Resources
- 3) The condition of work environment
- 4) Contract requirements
- 5) Work Method

This study used observation method that is directly observing the masons and journeymen when installing floor ceramic.

2.4. DATA COLLECTION METHOD

Data collection is carried out in the form of primary and secondary data. Primary data collection carried out by conducting survey, observation, and interview while secondary data is collected from literature study and online media.

2.5. SAMPLE PLANNING AND DATA COLLECTION

The samples that will be used in the study are determined after determining alternatives of labour composition in floor ceramic installation that will be executed in a project. labour compositions that be observed are:

- 1) Composition 1, consist of 1(one) masons and 1(one) journeyman
- 2) Composition 2, consist of 2(two) masons and 1(one) journeyman
- 3) Composition 3, consist of 2(two) masons and 2(two) journeymen

The observation is conducted in 7(seven) working days in a row towards the same subject everyday based on the observed composition. Meanwhile the size of the floor ceramic is 50 x 50 cm.

2.6. DATA PRESENTATION

The observation result provides data of labour work performance during the required time (7 work hours) for each labour composition. Then, labour productivity is calculated to determine the wage cost. From the presentation of data, a conclusion can be made.

3. RESULT AND DISCUSSION

After 7 days in a row of observation towards 3(three) labour compositions, the result of each composition is obtained.

Composition 1

Consist of 1(one) mason and 1(one) journeyman. In this composition to conducted floor ceramic installation one ceramic mason is assisted by one journeyman. The obtained results can be seen in [Table 1](#) as follows:

Table 1

Table 1 Observation result of floor ceramic installation of composition 1			
No	Observation Day	Work performance in 7 work hours	Work Performance /hour
1	1	9,65	1,38
2	2	11,30	1,61
3	3	10,15	1,45
4	4	10,15	1,45
5	5	10,65	1,52
6	6	10,90	1,56
7	7	10,15	1,45
AVERAGE		10,42	1,49

In reference to [Table 1](#) it can be seen that floor ceramic installation have an average productivity of 1042 m²/7 work hours or 1,49 m²/hour.

Composition 2

Consist of 2(two) masons and 1(one) journeyman. In this composition to execute floor ceramic installation two ceramic masons are assisted by one journeyman. The obtained results can be seen in [Table 2](#) as follow:

Table 2

Table 2 The Observation Result of Floor Ceramic Installation of Composition 2			
No	Observation Day	Work performance in 7 work hours	Work Performance /hour

1	1	22,6	1,61
2	2	22,6	1,61
3	3	22,6	1,61
4	4	24,35	1,74
5	5	25,6	1,83
6	6	24,1	1,72
7	7	22,6	1,61
AVERAGE		23,49	1,68

In reference to [Table 2](#) it can be seen that floor ceramic installation have an average productivity of 23,49 m² /7 work hours for 2(two) masons or 1,68 m²/hour for 1(one) mason.

Composition 3

Consist of 2(two) masons and 2(two) journeymen. Unlike composition 2, in this composition to execute floor ceramic installation two ceramic masons are assisted by two journeymen. The obtained results can be seen in [Table 3](#) as follows:

Table 3

Table 3 The Observation Result of Floor Ceramic Installation of Composition 2			
No	Observation Day	Work performance in 7 work hours	Work Performance /hour
1	1	24,10	1,72
2	2	24,60	1,76
3	3	24,10	1,72
4	4	23,60	1,69
5	5	24,45	1,75
6	6	24,60	1,76
7	7	23,60	1,69
AVERAGE		24,15	1,73

In reference to [Table 3](#) it can be seen that floor ceramic installation have an average productivity of 24,15 m² /7 work hours with 2(two) masons or 1,73 m²/hour with 1(one) mason.

Productivity of the three compositions are tabulated in [Table 4](#) as follow:

Table 4

Table 4 Productivity Recapitulation of floor ceramic instalation for each composition		
No	COMPOSITION	Work Performance /hour
1	Composition 1 1(one) mason, 1(one) journeyman	1,49
2	Composition 2 2(two) masons, 1(one) journeyman	1,68
3	Composition 3 2(two) masons, 2(two) journeymen	1,73

In reference to [Table 4](#) for composition 1 work performance per hour is 1,49 m², composition 2 is 1,68 m², and composition 3 is 1,73 m². The productivity comparison among composition 1: composition 2: composition 3 is 1; 1,13: 1,16.

Therefore, it can be stated that labour composition in floor ceramic installation affects the productivity that will be produced, that an addition of mason and journeyman can increase the productivity of floor ceramic installation.

4. ANALYSIS AND DISCUSSION OF WAGE COST

The productivity of each composition is used as a base in counting wage cost for installing floor ceramic per m². Meanwhile the amount of wages that should be paid per 7 (seven) work hours to 1(one) mason is IDR. 77.500 and to 1(one) journeyman is IDR. 57.500, -. The amount of wages issued for each composition can be seen in [Table 5](#) below:

Table 5

Table 5 Amount of wages of each composition				
No	COMPOSITION	MASON WAGES (IDR)	JOURNEYMAN WAGES (IDR)	TOTAL WAGES (IDR)
1	Composition 1 1(one) mason, 1(one) journeyman	77.5	57.5	135
2	Composition 2 2(two) masons, 1(one) journeyman	155	57.5	212.5
3	Composition 3 2(two) masons, 2(two) journeymen	155	115	270

Therefore, the calculation of wages that must be paid for each m² of floor ceramic installation can be seen in [Table 6](#) below:

Table 6

Table 6 The amount of wages for each m ² of floor ceramic installation				
No	COMPOSITION	Total Wages (IDR)	Output of floor ceramic installation (m ²)	Wages for Floor Ceramic Installation per m ²
1	Composition 1 1(one) mason, 1(one) journeyman	135	10,42	12.956
2	Composition 2 2(two) masons, 1(one) journeyman	212.5	23,49	9.046
3	Composition 3 2(two) masons, 2(two) journeymen	270	24,15	11.18

In reference to [Table 6](#) it is obtained that floor ceramic installation wage of composition 1 is IDR. 12.956, -/m², composition 2 is IDR. 9.046, -/m², and composition 3 is IDR. 11.180/m². It showed that labour composition with 2(two) masons and 1(one) journeyman requires the cheapest wages.

5. CONCLUSION

Based on the analysis and discussion, it can be concluded that out of 3(three) labour compositions that had been observed in floor ceramic installation, composition that consist of 2(two) masons and 2(two) journeymen produced the highest productivity that is 1,73m². Based on productivity, out of 3(three) observed composition amount of wages paid, the cheapest is composition 2 with IDR.9046, -/m².

CONFLICT OF INTERESTS

None.

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REFERENCES

- Alfianarrochmah, I. Sigit, A. (2019). Analisis Produktivitas Tenaga Kerja Pekerjaan Pemasangan Keramik dengan Menggunakan Metode MPDM (Analysis of Labor Productivity in Floor Ceramic Installation by MPDM Method) (Studi Kasus Proyek Rumah Kost Daerah Sleman, Yogyakarta), Case study of boarding house project in Sleman, Yogyakarta.
- Ervianto, W. I. (2004). Teori Aplikasi Manajemen Proyek Konstruksi (Theory of Management Application of Construction Project), Andi Offset, Yogyakarta.
- Ervianto, W. I. (2005). Manajemen Proyek Konstruksi (Construction Project Management), Edisi Revisi, Andi offset, Yogyakarta.
- Harijanto, S. (2006). Efektivitas waktu kerja kelompok tukang (Work time effectivity of mason team), Jurnal Teknik Sipil (civil engineering journal, 7(1).
- Istiyati, Y. (2017). Analisis Produktivitas Pekerjaan Pemasangan Keramik pada Daerah Luas dan Sempit kaitannya dengan RAB dan RAP (Studi Kasus Proyek Pembangunan EL Kost Maguwoharjo Depok Sleman Yogyakarta), UII, Yogyakarta, Analysis of Floor Ceramic Installation Productivity in wide and narrow area related to Budget Plan and Project Plan, Case study at boarding house EL construction project in Depok, Sleman, Yogyakarta.
- Laksono, T. D., Wiyanti, D. S. (2021). The Analysis of Comparison of Floor Ceramic Installation Productivity Based on The Composition of Labor, 8(7), 19-25. <https://doi.org/10.29121/ijetmr.v8.i7.2021.985>
- Mulyadarma, D. A. (2020). Analisis Produktivitas Pekerjaan Pemasangan Keramik dengan MPDM (Method Productivity Delay Model) yang Berkaitan dengan RAP dan Realisasi Anggaran Pelaksanaan, UII, Yogyakarta, UII Productivity Analysis of Floor Ceramic Installation using MPDM (Method Productivity Delay Model) in relation to Project Budget and Budget Reaization.
- Nasrul, (2016). Studi Analisis Perbandingan Komposisi Tenaga Kerja pada Pekerjaan Pemasangan Keramik antara SNI dan di lapangan, ITP, Study of Analysis of Comparison between SNI 2013 Floor Ceramic Installation labor composition and its Implementation.
- Pamuji, (2008). Pengukuran produktivitas pekerja sebagai dasar perhitungan upah kerja pada anggaran biaya, Tugas Akhir Program Studi Teknik Sipil, Universitas Sumatera Utara. Measurement of Labor Productivity as the Basis for Calculating Wages in Budget, Civil Engineering Thesis.
- Sleman (2019). Analysis of Labor Productivity in Floor Ceramic Installation by MPDM Method.
- Soeharto, I. (1999). Manajemen Proyek dari Konseptual Sampai Operasional, Erlangga, Jakarta, Project Management from Conceptual to Operational.
- Sritomo, W. (1995). Ergonomi, Studi Gerak dan Waktu, Edisi Pertama, Guna Widya, Jakarta, Ergonomic of Motion and Time Studies, First Edition.
- Sugiyono, (2011). Metode Penelitian Kuantitatif Kualitatif dan R & D, Alfabeta, Bandung, Quantitative, Qualitative, and R&D Research Method.
- Zainuri, Z. Yanti, G. & Megasari, S. W. (2015). Analisis Produktivitas Tukang Keramik, Siklus : Jurnal Teknik Sipil, 1(1), 109-118.