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Productivity Rating Method for Labor Productivity Analysis of Packaging Pressing Section, Case Study at PT. X Kudus

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ABSTRACT

Human resource or workforce management to achieve profits in a company can be seen from the level of productivity of its workers. The Productivity Rating method is one method used to measure the level of labor productivity. The measure obtained from this method is the Labor Utilization Rate (LUR), where productivity measurements are not only calculated from the time used for the main work (input), but in calculating productivity also involves the time of the work contribution carried out by each worker. In the Productivity Rating method, worker activities are classified into 3 things, namely Essential Contributory Work, Effective Work, and Ineffective Work. The purpose of the research is to analyze the productivity of the packaging pressing department workers at PT X Kudus using the Productivity Rating method. The productivity measure obtained from this analysis is the Labor Utilization Rate (LUR). The results of the productivity rating analysis show that overall the LUR at PT. X Kudus's pressing department is 57.27%, which means that workers in the pressing department are working productively, although in the LUR analysis there is still one worker who is not working productively.

INTRODUCTION

A company is an organization or business entity that carries out economic activities with the goal of gaining profit. A company's profit can be achieved through good resource management, where one of the resources that needs to be managed by the company is human resources or its workforce. The role of human resources is very important in achieving organizational goals because human resources are the spearhead in an organization. Human resource management or workforce to achieve profit in a company can be seen from the level of productivity of its workers. The level of worker productivity not only affects the company's profits but also affects the duration and costs of operations. Because with the analysis of worker productivity, the company can adjust the success of the schedule implementation with the progress of workers in the field [1]. PT. X Kudus is one of the largest jenang and dodol production companies in Central Java, established in 1910 and has survived until now. Although PT. X Kudus focuses on producing traditional foods, its products are now successfully distributed domestically and abroad, such as in Saudi Arabia, the United Arab Emirates, and other Middle Eastern countries. This success cannot be separated from the human resources or workforce from every part of PT. X Kudus, one of which is the packaging pressing section workers. Pressing is an important part of the packaging process and should not be missed before the product is marketed. Every product at PT. X Kudus

will go through a packaging process which can maintain the product's durability, become an added value for the product, and even increase the company's profits and profits.

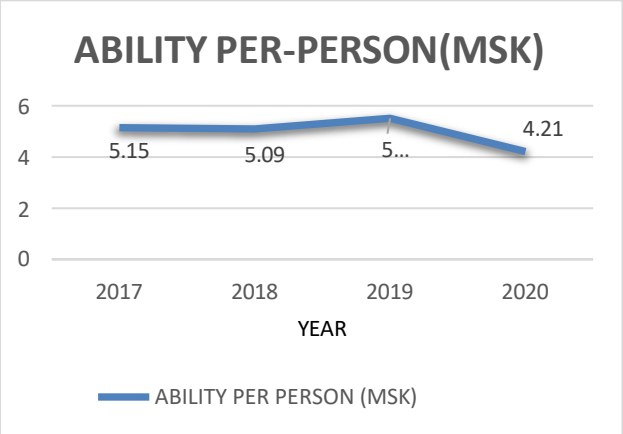

Figure 1. Job Capability Analysis Per Person in the Pressing Section
(Source: PT. X Kudus)

Based on direct observation to the packaging room at PT. X Kudus, it is known that workers are not only focused on pressing activities but also do other jobs such as printing expiration dates on packaging, taking products ready to be pressed, taking and taping cardboard, transporting goods to the warehouse, and others. These other jobs are said to be contributory jobs which must be done with the personal awareness of pressing workers and cannot be left behind, so that each job done has its own productivity value. Supported by the statement of Atifudin et al [2], et al. that not all the time needed to produce an output can all contribute directly to the results obtained. So with such field conditions, the approach to determine the level of labor productivity is to use a method that classifies worker activities [3].

The Productivity Rating method is one method used to measure the level of labor productivity. The measure obtained from this method is the Labor Utilization Rate (LUR), where productivity measurements are not only calculated from the time spent on pressing (input), but also include the time of the work contribution performed by each worker [4]. In the Productivity Rating method, worker activities are classified into three things: Essential Contributory Work, Effective Work, and Ineffective Work.

Research Objectives is to determine the productivity of pressing workers when analyzed using the Productivity Rating method, and to determine the productivity level of pressing workers when analyzed using the Productivity Rating method.

Productivity is defined as the ratio between output (O) and input (I), or the ratio between productivity results and total resources used. Productivity is defined as the relationship between real or physical results (goods or services) and actual input (labor, time, energy) [5]. Productivity as the ratio between total expenditure at a certain time divided by total income during that period, so that productivity [5] can be formulated as follows:

$$\boldsymbol{P} = \frac{O}{I} \quad (1)$$

Notes:

P = *Productivity* unit/hour)

O = *Output* (unit)
I = *Input* (jam)

Output (O) can be expressed in various forms, including:

a. Number of physical units of a product or service
b. Rupiah value of the product/service

Input (I) can be expressed in various forms, including:

a. Amount of time
b. Amount of labor
c. Amount of labor costs
d. Amount of materials

The productivity rating method is one method that can be used to measure productivity. This method has several advantages, including: No equipment costs, No need for special skills, better statistical accuracy, No disruption to workers during their work, and more accurate data obtained because it is based on direct observation [6]

Labor Utilization Rate (LUR) is a percentage obtained by adding effective work to ¼ essential contributory work, then dividing the sum by the total number of observations [4]. Effectiveness can be calculated using the following formula [9]

LUR = (Effective Work + (¼Essential Contributory Work)) / Total Observation x 100% …(2)

$$\boldsymbol{Total\ Observation} = E + C + I \quad \ldots\ldots(3)$$

Notes:
E =*effectivity work*
C =*contributory work*
I = *Ineffective work*

The result of the total observation calculation is the total effective work time plus the contributed work time and the ineffective worker time. If the resulting worker efficiency (LUR) is less than 50%, then the workforce is categorized as less productive, and vice versa, if productivity exceeds 50%, the workforce is categorized as productive [10].

MATERIALS AND METHODS

Research Location, Time, and Method

The research was conducted in October 2023 at PT X in Kudus Regency, Central Java. The study of the pressing department's workforce was conducted over six days, with a total of six workers per shift. The cohesiveness of this workforce significantly influenced the study, which aimed to determine the percentage of workforce productivity and total working time. Observations were conducted on each worker. Observations were conducted using the productivity rating method used for calculation analysis. This method divides workforce activities into three groups: effective work, essential contributory work, and non-useful/ineffective work**.**

Observations were conducted during normal working hours, from 8:00 AM to 4:00 PM, with a one-hour break from 12:00 PM to 1:00 PM (7 working hours). During quiet periods, the pressing department's working hours varied daily, depending on the order volume from the Finished Goods Warehouse.

Research Procedure

The research procedure was conducted systematically as shown below in Figure 2.

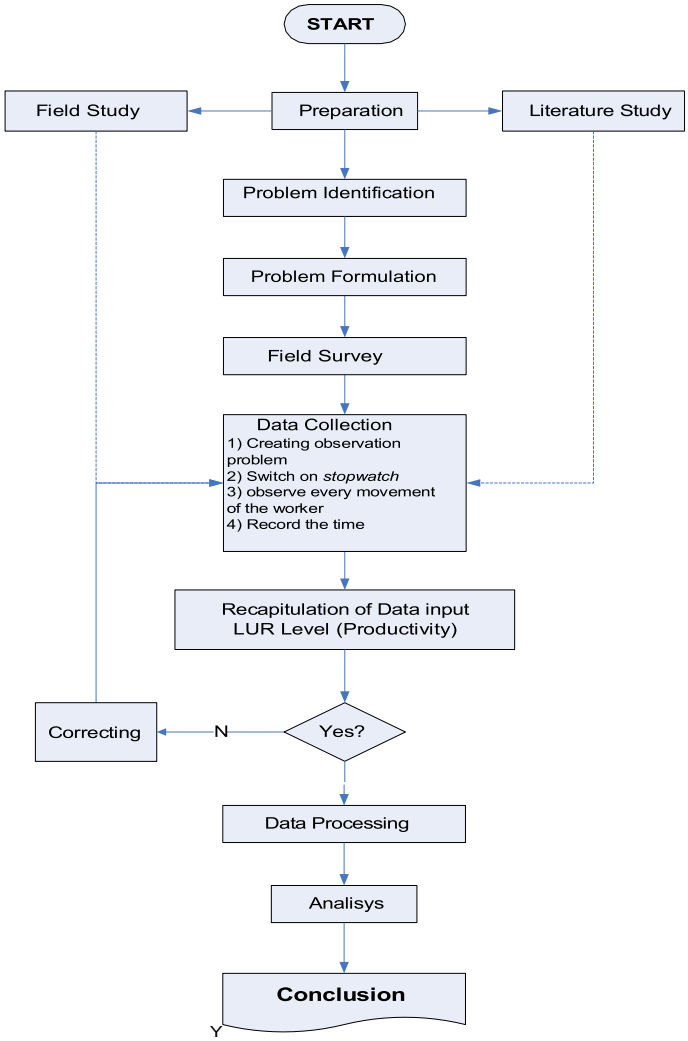

Figure 2. Research Procedure

Data Collection and Processing

Data was collected through interviews, literature review, and observation. The interviews were based on reports from interviews with six pressing workers, one unit head, one pressing unit deputy head, and one HRD representative at PT X Kudus. The literature review was based on references from journals, websites, and archives or documents available at PT X Kudus. Furthermore, observations were made by observing the packaging pressing section in jenang production. Observations were conducted over six days, starting at 8:00 a.m. Western Indonesian Time (WIB) and continuing until completion (working hours varied). In accordance with the Productivity Rating method, all pressing worker activities at PT X Kudus were categorized into three types.

After the activities are classified into 3 types of activities with Effective work symbolized by E, Contribution work symbolized by C, and Ineffective work symbolized by I. Next, an observation table is made. The observation table is made 6 times during the research, because in 6 days the research uses a different observation table every day to make it easier for researchers to process the data.

Data Processing

Data obtained from direct observations in the pressing room were processed to determine the productivity and LUR values for each worker. To calculate worker productivity, the Labor Utilization Rate (LUR) approach was used, using the calculation formula as in Equation (2). The data processing technique in this study used Microsoft Excel computational calculations according to Handayani et al. (2021), due to the complexity of the equipment and its use.

RESULTS AND DISCUSSIONS

Table 1 shows the results of the observations on day 1. Table 4.1 shows that the total effective working time, total contributing working time, and total ineffective working time is 420 minutes. From the average results of all workers, it can be seen that the total contributing working time is much higher than the total effective working time and total ineffective working time. This is because the pressing workers do not only do the work of pressing packaging, but also do work such as picking up cardboard, transporting goods to the warehouse, preparing trolleys, and so on, which are included in the category of contributing work.

When viewed in the effective working time column (Table 4.1.), worker Santoso has the highest total effective working time compared to other workers, namely 234 minutes of total working time. Meanwhile, worker Beni has the smallest total working time, namely 0 minutes of total working time. Conversely, when viewed in the contribution working time column, worker Beni has the highest total contributing working time. This is because on the first day of the study, worker Beni was tasked with carrying out the contributing work, namely printing expiration dates, so that in one day there was no effective work (pressing) carried out by worker Beni.

Table 1 Labor Productivity Day 1

No.	Name	Time			LUR (%)
		E (min)	C (min)	I (min)	
1.	M. Santoso	234	167	19	65,65
2.	Musthofa	162	228	30	52,14
3.	Noor Ahmad Thoha	175	225	20	55,06
4.	Irvan Vicky Ru	183	217	20	56,49
5.	Jami'an	131	276	13	47,62
6.	Beni Rusnandar	0	388	32	23,10
Average		**147,50**	**250,17**	**22,33**	**50,01**

Source: Processed Data, 2023

In the ineffective working time column, Beni's employee had the highest total ineffective working time, at 32 minutes of total work time. Meanwhile, Jami'an's employee had the lowest total ineffective working time, at 13 minutes of total work time. This means that Beni's employee frequently engaged in unnecessary activities during work, such as daydreaming, chatting, drinking, and so on, which fall into the ineffective work category.

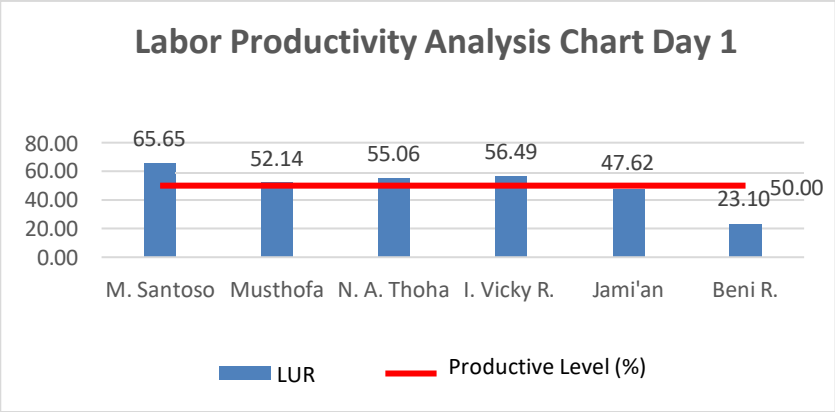

Figure 3. Labor Productivity Analysis Chart Day 1

Figure 3 shows a productivity analysis graph for day 1. Workers Santoso, Musthofa, Thoha, and Vicky have productivity values above 50%, meaning they can be said to be productive. In contrast, workers Jami'an and Beni have productivity values below 50%, meaning they are not yet considered productive.

Table 2 shows the results of the second day's observations, which show that the total effective working time, total contributing working time, and total ineffective working time were 360 minutes. The average results for all workers show that the total effective working time is higher than the total contributing working time and total ineffective working time. Santoso's employee had the highest effective working time, at 221 minutes of total working time, while Beni's employee had the lowest effective working time, at 128 minutes.

Table. 2. Labor Productivity Day 2

No	Name	Time			LUR (%)
		E (min)	C (min)	I (min)	
1.	M. Santoso	221	115	24	69,38
2.	Musthofa	183	145	32	60,90
3.	Noor Ahmad Thoha	136	197	27	51,46
4.	Irvan Vicky Ru	198	132	30	64,17
5.	Jami'an	141	200	19	53,06
6.	Beni Rusnandar	128	196	36	49,17
Average		**167,83**	**164,17**	**28,00**	**58,02**

Source: Processed Data, 2023

When viewed in the contributed work time column (Fig 4), Jami'an workers have the highest contributed work time, at 200 minutes of total work time. This is

because Jami'an workers have the specific responsibility of recording the number of boxes taken from the warehouse. Meanwhile, the worker with the smallest total contributed work time is Santoso. In the ineffective work time column, Beni workers have the highest ineffective work time, at 36 minutes of total work time. This is because Beni is assigned as the muezzin and therefore leaves the work room earlier than the other workers. Meanwhile, Jami'an workers have the smallest ineffective work time, meaning Jami'an workers do the least unnecessary activities during work such as daydreaming, chatting, drinking, and so on, which are included in the ineffective work category.

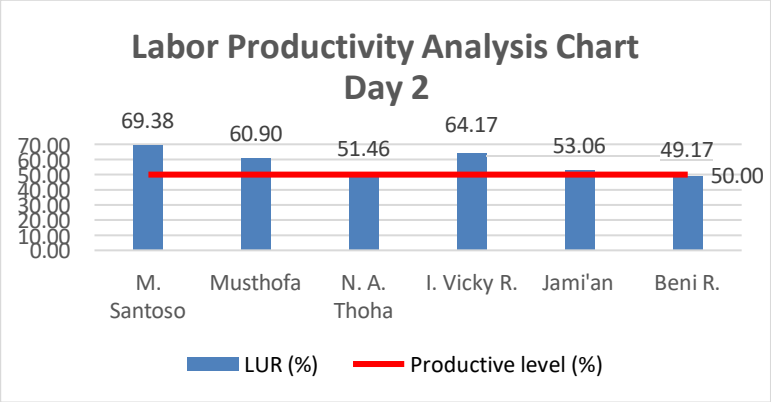

Figure 4. Labor Productivity Analysis Chart Day 2

Figure 4 shows a productivity analysis graph for day 2. Workers Santoso, Musthofa, Thoha, Vicky, and Jami'an have productivity values above 50%, meaning they can be considered productive. Conversely, worker Beni has a productivity value below 50%, meaning Beni is not yet considered productive.

Table 3 shows the results of the third observation, where the total effective working time, total contributing working time, and total ineffective working time were 300 minutes. From the average results of all workers, it can be seen that the total contributing working time is much higher than the total effective working time and total ineffective working time. This is because pressing workers not only perform packaging pressing work, but also perform tasks such as picking up cardboard, transporting goods to the warehouse, preparing trolleys, and so on, which are included in the category of contributing work.

Table 3. Labor Productivity Day 3

No	Name	Time			LUR (%)
		E (min)	C (min)	I (min)	
1.	M. Santoso	170	101	29	65,08
2.	Musthofa	132	141	27	55,75
3.	Noor Ahmad Thoha	129	140	31	54,67
4.	Irvan Vicky Ru	164	108	28	63,67
5.	Jami'an	161	118	21	63,50
6.	Beni Rusnandar	0	267	33	22,25
Average		**126,00**	**145,83**	**28,17**	**54,15**

Source: Processed Data, 2023

When viewed in the effective working time column (Table 3), worker Santoso has the highest total effective working time compared to other workers, namely 170 minutes of total working time. Meanwhile, worker Beni has the smallest total working time, namely 0 minutes of total working time. Conversely, when viewed in the contribution working time column, worker Beni has the highest total contributing working time. This is because on the 3rd day of the study, worker Beni was tasked with carrying out the contributing work, namely printing expiration dates, so that in one day there was no effective work (pressing) carried out by worker Beni.

In the ineffective working time column, Beni had the highest total ineffective working time, at 33 minutes of total work time. Meanwhile, Jami'an had the lowest total ineffective working time, at 21 minutes. This means Beni was more likely to engage in unnecessary activities during work, such as leaving the work area earlier than other workers.

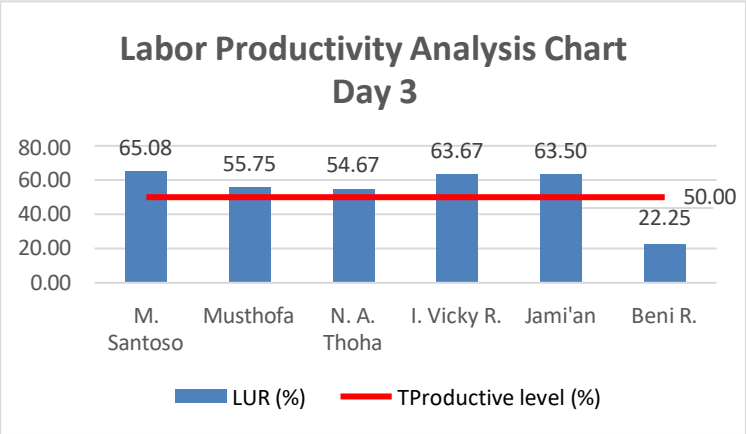

Figure 5. Labor Productivity Analysis Chart Day 3

Figure 5 shows a productivity analysis graph for day 3. Workers Santoso, Musthofa, Thoha, Vicky, and Jami'an have productivity values above 50%, meaning they can be said to be productive at work. In contrast, worker Beni has a productivity value below 50%, meaning Beni is not yet considered productive at work.

Table 4 shows the results of the fourth observation, where the total effective working time, total contributing working time, and total ineffective working time were 300 minutes. The average results for all workers show that the total effective working time is higher than the total contributing working time and total ineffective working time. Worker Vicky had the highest effective working time, at 163 minutes of total working time, while worker Beni had the lowest effective working time, at 125 minutes**.**

Table 4 Labor Productivity Day 4

NO	Name	Time			LUR (%)
		E (menit)	C (menit)	I (menit)	
1.	M. Santoso	144	133	23	59,08
2.	Musthofa	157	112	31	61,67
3.	Noor Ahmad Thoha	135	135	30	56,25
4.	Irvan Vicky Ru	163	104	33	63,00
5.	Jami'an	151	129	20	61,08
6.	Beni Rusnandar	125	140	35	53,33
Rata-Rata		**145,83**	**125,50**	**28,67**	**59,07**

Source: Processed Data (2023)

Looking at the contributed work time column (Table 4), Beni's work time is the highest, at 140 minutes of total work time. This is because Beni's work involves printing expiration dates, which is a contributing task. Meanwhile, Vicky's work time is the lowest, at 104 minutes.

In the ineffective working time column, Beni had the highest ineffective working time, at 35 minutes of total working time. This was because Beni served as the muezzin, leaving the workroom earlier than the other workers. Meanwhile, Jami'an had the lowest ineffective working time, at 20 minutes. This means that Jami'an engaged in the least unnecessary activities during work, such as daydreaming, chatting, drinking, and so on, which fall into the ineffective work category.

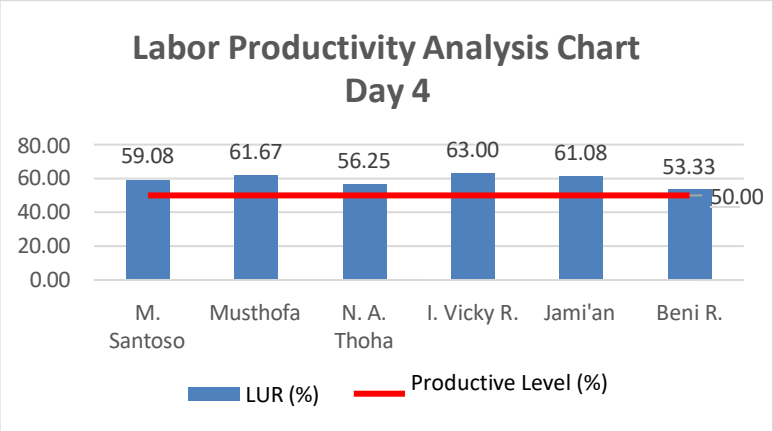

Figure 6. Labor Productivity Analysis Chart Day 4

Figure 6 shows the productivity analysis graph for day 4, workers Santoso, Musthofa, Thoha, Vicky, Jami'an, and Beni have productivity values above 50%, meaning that all workers can be said to be productive at work and there are no unproductive workers.

Table 5 shows the results of the fifth observation, where the total effective working time, total contributing working time, and total ineffective working time were 270 minutes. The average results for all workers show that the total effective working time is higher than the total contributing working time and total ineffective working time. Santoso's employee had the highest effective working time, at 162 minutes of total working time, while Beni's employee had the lowest effective working time, at 135 minutes.

Table 5 Labor Productivity Day 5

NO	Name	Time			LUR (%)
		E (min)	C (min)	I (min)	
1.	M. Santoso	162	97	11	68,98
2.	Musthofa	142	107	21	62,50
3.	Noor Ahmad Thoha	144	108	18	63,33
4.	Irvan Vicky Ru	141	106	23	62,04
5.	Jami'an	151	107	12	65,83
6.	Beni Rusnandar	135	109	26	60,09
Average		**145,83**	**105,67**	**18,50**	**63,80**

Source: Processed Data, 2025

Looking at the contributed work time column (Table 5), Beni has the highest contributed work time, at 109 minutes of total work time. This is similar to Thoha, Musthofa, and Jami'an, with Vicky contributing 108, 107, and 106 minutes, respectively. Santoso, on the other hand, has the lowest total contributed work time, at 97 minutes.

In the ineffective working time column, Beni had the highest ineffective working time, at 26 minutes of total working time. Meanwhile, Santoso had the least ineffective working time, at 11 minutes. This means Santoso engaged in the least unnecessary activities during work, such as daydreaming, chatting, drinking, and so on, which fall into the ineffective work category.

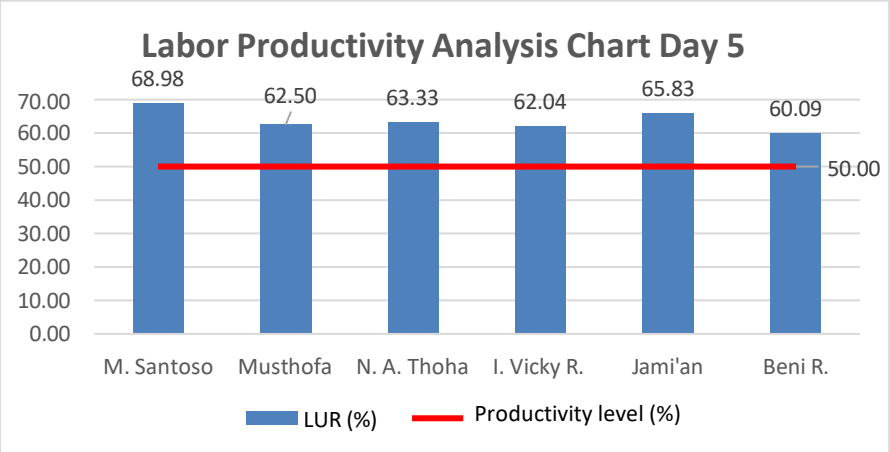

Figure 7. Labor Productivity Analysis Chart Day 5

Figure 7 shows the productivity analysis graph for day 5, workers Santoso, Musthofa, Thoha, Vicky, Jami'an, and Beni have productivity values above 50%, meaning that all workers can be said to be productive at work and there are no unproductive workers.

Table 6 represents the sixth observation, where the total effective working time, total contributing working time, and total ineffective working time are 300 minutes. The average results for all workers show that the total effective working time is higher than the total contributing working time and total ineffective working time. Musthofa's employee has the highest effective working time, at 166 minutes of total working time, while Beni's employee has the lowest effective working time, at 113 minutes.

Tabel 6 Labor Productivity Day 6

NO	Name	Time			LUR (%)
		E (min)	C (min)	I (min)	
1.	M. Santoso	149	127	24	60,25
2.	Musthofa	166	104	30	64,00
3.	Noor Ahmad Thoha	135	130	35	55,83
4.	Irvan Vicky Ru	172	101	27	65,75
5.	Jami'an	131	143	26	55,58
6.	Beni Rusnandar	113	148	39	50,00
Average		**144,33**	**125,50**	**30,17**	**58,57**

Source: Processed Data, 2023

Looking at the contributed work time column (Table 6), Beni had the highest contributed work time, at 148 minutes of total work time. This is because Beni was responsible for printing expiration dates, which is a contributed task. Meanwhile, Vikcy had the lowest total contributed work time, at 101 minutes.

In the ineffective work time column, Beni had the highest ineffective work time, at 39 minutes of total work time, indicating that Beni engaged in the most unnecessary activities. Santoso, on the other hand, had the least ineffective work time, at 24 minutes, indicating that Santoso engaged in the least unnecessary activities during work, such as daydreaming, chatting, drinking, and so on, which fall into the ineffective work category.

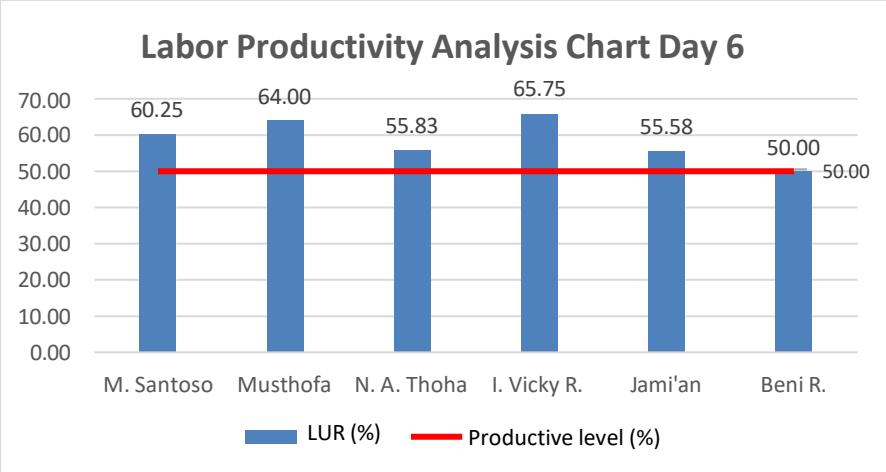

Figure 8. Labor Productivity Analysis Chart Day 6

Figure 8 shows the productivity analysis graph for day 6, workers Santoso, Musthofa, Thoha, Vicky, Jami'an, and Beni have productivity values above 50%, meaning that all workers can be said to be productive at work and there are no unproductive workers.

Recapitulation of Research Results

Based on the 6 days of observations that have been carried out, data processing was then carried out. The following is a summary of the results of calculating the productivity of the pressing department workforce for 6 days:

Table 7. Recapitulation of Labor Productivity Calculation Results

No	Name	PRODUCTIVITY						Ave-rage
		DAY-1	DAY-2	DAY-3	DAY-4	DAY-5	DAY-6	
1.	Santoso	65,65%	69,38%	65,08%	59,08%	69,98%	60,25%	**64,90%**
2.	Musthofa	52,14%	60,90%	55,75%	61,67%	62,50%	64,00%	**59,49%**
3.	Thoha	55,06%	51,46%	54,67%	56,25%	63,33%	55,83%	**56,10%**
4.	Vicky	56,49%	64,17%	63,67%	63,00%	62,04%	65,75%	**62,52%**
5.	Jami'an	47,62%	53,06%	63,50%	61,08%	65,83%	55,58%	**57,78%**
6.	Beni	23,10%	49,17%	22,25%	53,33%	60,09%	50,00%	**42,99%**
Average		**50,01 %**	**58,02 %**	**54,15 %**	**59,07 %**	**63,80 %**	**58,57 %**	**57,27%**

Source: Processed Data, 2023

The results obtained when converted into a graph for the LUR value for each worker during the 6 days of observation are as follows:

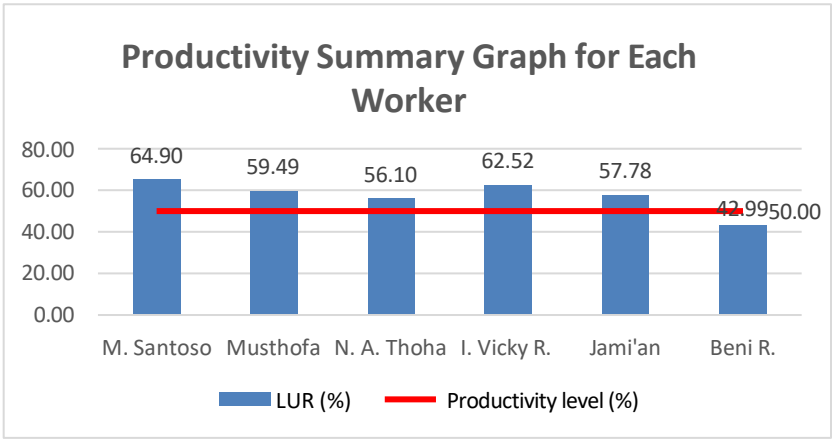

Figure 9. Productivity Summary Graph for Each Worker

As seen in the graph above, workers Santoso, Musthofa, Thoha, Vicky, and Jami'an have LUR values above 50%, thus they can be considered productive workers. Meanwhile, worker Beni has an LUR value below 50%, thus not yet considered productive workers.

This contrasts with the overall LUR values for the pressing workers, as shown in Figure 10 below:

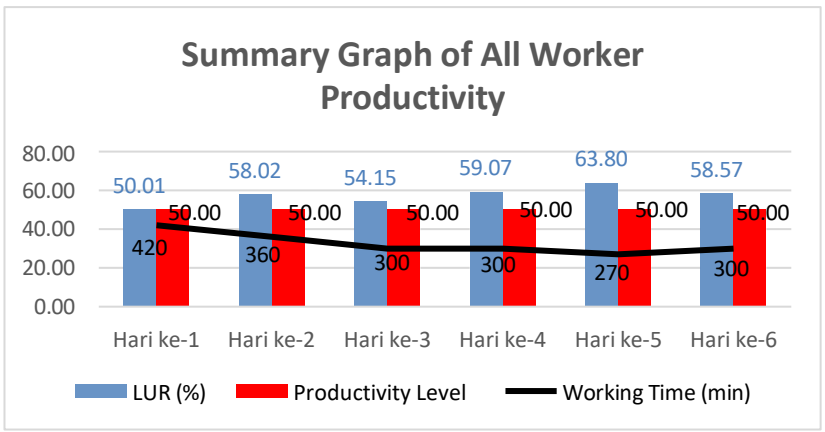

Figure 10. Summary Graph of All Worker Productivity

As seen in the graph above, the LUR of the pressing section workers from day 1 to day 6 has a value of more than 50%, when accumulated the LUR value of the pressing section workers is 57.27%. This means that overall the pressing section workers can be said to be productive at work, even though in the productivity measurement of each worker there is one worker who is not productive at work. Because pressing work is a shared responsibility of the pressing workers, not an individual, so that the shortcomings of one worker can be covered by other workers. In accordance with research by [11] and [12], it is stated that the cohesiveness of the workforce greatly influences the percentage of the level of labor productivity and total working time [13]. In order to overcome the problem of workforce optimization, it is necessary to conduct regular skills training for packing operators [14]. In an effort to increase workforce productivity, there should be participation from all parties and cooperation between all parts of the company so that the smooth running of the production process can be maintained [15].

CONCLUSION

This research conducted, its concluded that there are two main topics aimed at answering the objectives of this study, namely: Workers in the pressing department are considered productive with an overall productivity score above the 50% level. The productivity level of workers in the packaging pressing department at PT. X Kudus is 57.27% using the Productivity Rating Method.

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