E-ISSN 2503 - 1430
ISSN 2541 - 3090

Journal of Industrial Engineering Management
(JIEM Volume 7. No 3 Tahun 2022)

WORKLOAD ANALYSIS TO DETERMINE THE NUMBER OF LABOR IN SOAP PRODUCTION USING THE FULL TIME EQUIVALENT METHOD: A CASE STUDY OF PT. XY

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Article history:
Submitted 5 July 2022
Revised 12 July 2022
Accepted 3 August 2022
Available online 20 December 2022

ABSTRACT

PT. XY is a manufacturing company in Surabaya that produces household hygienic goods, such as soap bars and liquid soap. It is known that the actual condition of production in the company is still not optimal due to the uneven workload at each work station. This also results in workers experiencing excessive workloads that cause fatigue or illness, and there are more unemployed, causing decreased performance. According to the problems above, this research was conducted to determine the value of the workload received and to find out the optimal number of workers so that in the future work can be more effective and efficient. Solving workload analysis problems in this study using the Full Time Equivalent method. Based on the results of the study, it was known that the workload of the bar soap production section was 16 people, 3 people were found in the Normal category and 13 people experienced the workload in the Overload category. While the results of the workload of the liquid soap production section were 19 people, 6 people were found in the Normal category and 13 people experienced a workload in the Underload category. For calculating the optimal number of workers, the results obtained for the production of bar soap need to add 7 people to the workforce and liquid soap production to reduce the workforce by 3 people.

Keywords: ***Full Time Equivalent, Manpower, Workload Anaylisis***

Published By:
Fakultas Teknologi Industri
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DOI : http://dx.doi.org/10.33536/jiem.v7i3.1322

1. INTRODUCTION

Manpower is one of the essential and influential elements behind a company's success. Based on this understanding, it is necessary to optimize the workforce to be effective, which will later contribute to the success of a company (Siagian, 2008). In the current modern era, employee planning is an important step in the analytical process for future organizational needs (Wicaksono, 2021). In managing human resources, there are things that need to be considered, which is the level of workload received by each member of the workforce (Sidiq, 2020). The design of workstations that are not ergonomic can cause excessive energy expenditure, which tends to result in fatigue (Madiun, 2017). Workloads that exceed work capacity or are too excessive can cause fatigue. Meanwhile, a lesser workload will result in losses for the company due to the large number of idle hours from the employees (Fetrina, 2017).

This research aims to analyze the workload received and find out the optimal number of workers in soap production at PT. XY. The Full Time Equivalent method is used to measure the time required to complete a job. This will be converted into the FTE value so that the optimal number of workers can be determined (Kusmindari, 2021). Workload analysis research must observe each element of the work carried out by the workforce accompanied by measuring the average time (Putri, 2018). Workload is included in the main aspect to calculate the number of workers (Ministerial Decree PAN No.1 Year 2020). The workload can be determined through a work unit plan which is then clarified into work targets for each section in the company (Hudaningsih, 2019). Based on the FTE method, the value of the workload received by the workforce is divided into three categories, which are normal workload (fit), excess workload (overload) and low workload (underload) (Laynar, 2020). Workload analysis can also help so that future work can be more effective, comfortable, safe, healthy and efficient (Puspaningtyas, 2021).

It is known from the results of observations made, in the production section at PT. XY experiences workload imbalance at each workstation. This is because there are workers who feel excessive fatigue, causing them to fall ill, and there are workers who feel underutilized (idle) while working. This also affects the fulfillment of daily production targets that have been set by the company. Therefore, it is necessary to recalculate the workload which can later be used as a consideration for deciding to reduce or increase the number of workers in the production section while taking into account the level of workload of each worker so that the workload can be evenly distributed at each workstation soap production at PT. XY.

2. METHODS

This research is quantitative research, conducted by measuring the workload, by looking at the elements and the average completion time and calculating the number of workers in the soap production section.

2.1 Object of Research

The objects studied for this study were 35 workers in the soap production division, with the division of 16 workers in the bar soap division and 19 workers in the liquid soap division at PT. XY by paying attention to each work element at each workstation.

2.2 Research Methodology

Based on the source, the data in the study is divided into two, namely primary data and secondary data (Sukirman, 2021). In this study, primary data was obtained through observation and research in the field by conducting interviews with production workers, production managers and observations. Secondary data is obtained from appropriate literature or company documents related to research.

2.3 Data Analysis Technique

Based on the data that has been collected, then the data will then be analyzed by the FTE method. The FTE method is a method that compares the time to complete various jobs with the existing effective working time (Yasmin, 2019). Measurement of workload can also be interpreted as one of the ways to obtain information about certain sections, by going through the research and review process carried out by analysis (Rachmuddin, 2020).

1. Determine the work unit.
2. Determine the effective working time for one year.
    a. The total number of days in a year (the Gregorian calendar) is deducted by

national and regional holidays, weekends and company leave is called effective working days.

b. The total of the calculation of working hours minus the working time other than the main work (allowance) is called the effective working hours.

3. Determine the value of the allowance
   The purpose is to uncover the factor of worker slack in completing work that is not related to the main task. For example, going to the bathroom, eating, and so on.
4. Calculate the total processing time for each work element.
5. Calculate the workload of workers using the FTE index
   This is to uncover the workload capacity received by each worker in completing his work. Researched on every worker at each work station.
6. Calculate the optimal number of workers using the FTE method
   This is to find out the total number of optimal workers needed for each work station by adjusting the workload received. (Rachmatono, 2019)

3. RESULT AND DISCUSSION

Based on the data processing, there are several steps in obtaining the FTE value index:

3.1 Allowance

Table 1 shows the value of allowances for workers at PT. XY from the allowance table.

Table 1. Allowances Provided by the Company

Factor	Category	Percentage
Energy expended	Very light	6%
Work attitude	Standing on two feet	1%
Work Movement	Normal	0%
Eye fatigue	Blurry vision	2%
Temperature	Normal	3%
Atmospheric conditions	Good	0%
Environmental conditions	Very loud	1%
Personal needs	Male and female	2%
Unavoidable obstacles	-	2%
Total		17%

3.2 Effective Working Hours

PT. XY is one of the companies that implement a 5-day work week, starting from Monday to Friday with one (1) work shift. Working hours start at 08.00 – 17.00 WIT (Western Indonesia Time) with one (1) hour rest time from 12.00 to 13.00 WIT. Effective working time is determined based on Ministerial Decree PAN Number: No.1 of 2020 is shown in table 2. At the stage of calculating effective working time using the formula equation (Irawati, 2017):

Effective Working Days = (A-(B+C+D)) (1)

Table 2. Number of Effective Working Days and Hours 2022

Measurement	Amount	Unit
1 Day	8	Hours
1 Week	5	Days
1 Year	365	Days
Holidays 2022		
National Holidays	16	Days
Weekends	105	Days
Annual Leave	12	Days
Total Holidays	133	Days
Results		
Workdays 2022	232	Days
Work hours /year	1856	Hours
Work hours /year	111360	Minutes

Source: Primary Data

3.3 Production Department Workload

The calculation of the workload in this study was carried out to determine the value of the workload experienced by each worker in the soap production division at PT. XY. The workload value of the bar soap production section is shown in table 3 and liquid soap production in table 4. At the stage of calculating the workload using the FTE method, using the following formula (Lestari, 2018):

$$FTE=\frac{\text{Total Standard time (total } workload)+ allowance}{\text{Total } effective\ work\ (company's\ FTE)} \quad (2)$$

3.3.1 Soap Bars

Table 3. Bar Soap Production Section Workload

Role/Title	FTE Index	Description
Mixing Operator 1	1,05	Normal
Mixing Operator 2	1,01	Normal
Mixing Operator 3	1,00	Normal
Molding 1	1,66	Overload
Molding 2	1,94	Overload
Molding 3	1,84	Overload
Cooling 1	1,79	Overload

Role/Title	FTE Index	Description
Cooling 2	1,54	Overload
Cooling 3	1,31	Overload
Packing P 1	1,72	Overload
Packing P 2	2,13	Overload
Packing P 3	1,79	Overload
Packing Q 4	2,10	Overload
Packing Q 1	1,40	Overload
Packing Q 2	1,39	Overload
Packing Q 3	1,40	Overload

Source: Processed Data, 2022

Based on the results of processing workload data with FTE for bar soap production, the results obtained are that 3 workers experience workloads in the Normal category (FTE 1–1.28), namely mixing operators 1, 2, and 3. In the results of data processing, it can also be noted that there are workers who receive or experience workloads that are certainly uneven, where there are 13 workers whose workloads are in the overload category (FTE > 1.28), namely the Molding Section, Cooling Section, Packing P Section and Packing Q Section. It is also known that the FTE value index of workers in the production of bar soap is the largest in the Packing P 2 section reaching 2.13 while the smallest FTE value index is in the Mixing operator 3 at 1.00.

3.3.2 Liquid Soap

Table 4. Liquid Soap Production Division Workload

Role/Title	FTE Index	Description
Mixing Operator 1	0,71	Underload
Mixing Operator 2	0,72	Underload
Mixing Operator 3	0,71	Underload
Packing P 1	1,26	Normal
Packing P 2	1,10	Normal
Packing P 3	0,98	Underload
Packing P 4	1,10	Normal
Packing P 5	1,11	Normal
Packing P 6	1,09	Normal
Packing P 7	0,96	Underload
Packing P 8	0,94	Underload
Packing P 9	1,11	Normal
Packing Q 1	0,86	Underload
Packing Q 2	0,86	Underload
Packing Q 3	0,76	Underload
Packing Q 4	0,77	Underload
Packing Q 5	0,76	Underload
Packing Q 6	0,87	Underload
Packing Q 7	0,75	Underload

Source: Processed Data, 2022

Based on the results of processing workload data with FTE to produce liquid soap, the results obtained are that 6 workers experience workloads in the Normal category (FTE 1–1.28), which are Packing P 1, 2, 4, 5, 6 and Packing P 9. In the results of data processing, it can also be noted that there are workers who receive or experience workloads that are certainly not evenly distributed, where there are 13 workers whose workloads are in the underload category (FTE 0.00 – 0.99), namely Mixing Operators, Packing Section P 3, 7, 8 and all Packing Section Q . It is also known that the largest FTE value index is in the Packing P 1 section reaching 1.26 while the smallest FTE value index is in the Mixing operator 1 and 3 at 0.71.

3.4 Optimal Number of Workforce

Based on the research objectives where it is necessary to determine the number of workers, this research must pay attention to the total value of FTE and the workload borne by workers for each position. The results of the calculation of the need for the number of workers are shown in table 5 and table 6. At the stage of calculating the need for labor using the FTE method using the formula equation (Oashttamadea,2020) :

$$\text{Required Labor} = \frac{Total\ FTE}{Number\ of\ employes} \quad (3)$$

3.4.1 Optimal Manpower for Bar Soap Production

Table 5. The Need for the Number of Workers in the Bar Soap Production Section

Role	Total FTE	Number of Actual Workforce	Number of Manpower Needs	Recommended Avg FTE
Mixing Operator	3,06	3	3	1,01
Molding	5,44	3	5	1,10
Cooling	4,64	3	4	1,16
Packing X	7,74	4	7	1,19
Packing Y	4,19	3	4	1,05
Total Labor		16	23	

Source: Processed Data, 2022

Based on Table 5, it is known that from the calculation results to determine the optimal number of labor requirements in the bar soap production section at PT. XY is 16 workers in order to have a normal value workload (FTE 1-1.28), so from the actual total workers it is

necessary to add a total of 7 workers by adjusting the required placement.

3.4.2 Optimal Manpower for Liquid Soap Production

Table 6. Requirements for the Number of Workers in the Liquid Soap Production Division

Role	Total FTE	Number of Actual Workforce	Number of Manpower Needs	Recommended Avg FTE
Mixing Operator	2,14	3	2	1,07
Packing X	9,63	9	9	1,07
Packing Y	5,64	7	5	1,13
Total Labor		19	16	

Source: Processed data, 2022

Based on Table 6, it is known that from the calculation results to determine the optimal number of labor requirements in the liquid soap production section at PT. XY is 19 workers in order to have a normal workload (FTE 1-1.28), so from the actual total workers it is necessary to reduce the number of workers by 3 people by re-adjusting the required place.

Although the optimal number of workers has been obtained, in actual conditions, adjustments must be made to matters relating to workers and the workload in order to run well. To optimize performance, readers can change the number of workers according to the interpretation that has been made and rearrange job descriptions at workstations whose workloads have been assessed so that the workload experienced or received by the workforce can be divided evenly.

4. CONCLUSION

Based on the results of measuring the workload using the Full Time Equivalent method, the value for the workload of the bar soap workers was found to be 3 people in the Normal category (FTE 1–1.28) and 13 people with the overload category (FTE < 1.28). While the results of the workload of cream soap workers obtained 6 people in the Normal category (FTE 1–1.28) and 13 people had a workload in the underload category (FTE 0.00 – 0.99). The number of workers in the production of bar soap and liquid soap of PT. XY is known to be still not optimal. So, in order to be optimal, it is necessary to increase the number of workers in the production of bar soap as many as 7 people or from 16 workers to 23 workers with an adjusted placement division at the bar soap production workstation, namely with Mixing Operators totaling 3 people, Molding amounting to 5 people, Cooling amounting to 4 people, Packing P totaling 7 people and Packing Q totaling 4 people. As for the production of liquid soap, it is necessary to reduce the number of workers by 3 people or from 19 workers to 16 workers by dividing the placement at the liquid soap production workstation, namely with Mixing Operators totaling 2 people, Packing P totaling 9 people and Packing Q sectioning 5 people. So that the average value of the workload becomes normal because it is between the FTE index 1-1.28.

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