

Analysis of Employee Mental Workload Using The NASA-TLX Method (Case Study at PT. ABC)

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Article Information	ABSTRACT
Article History Received : January 14, 2025 Revised : January 25, 2025 Published : January 30, 2025	Human resources are the most important assets for a company. Each worker has their own role and obligations which will result in their own workload. PT. ABC is one of the companies that provides surface finishing services, electroplating services and electrode position painting. From the observation results, there are complaints about insufficient time adjustments to meet targets and demands from superiors for these targets, resulting in increased mental workload. In order to overcome this problem, it is necessary to measure the mental workload felt by employees using the NASA-TLX method, this method measures 6 dimensions of workload including Mental Demand, Physical Demand, Temporal Demand, Performance, Effort and Frustration Level. This study shows the acquisition of workload scores, it is known that 75% of employees have a high category workload and 25% of employees have a very high category workload. The dominant aspects that cause the amount of mental workload of PT.ABC employees are Mental Demand of 19.62%, Effort of 19.40% and Physical Demand of 17.93%. In order to minimize the level of mental workload, namely by adding some workers in the production and quality control sectors.
Keywords: <i>Mental workload; NASA-TLX Method; Employees.</i>	

INTRODUCTION

Human resources are the main aspect in a company, because humans are the main key factor in determining the success of an organization in achieving its targets in carrying out various activities, the organization must manage its human resources optimally. This aims to support the achievement of organizational targets and encourage increased employee performance. Human resources owned by an organization or institution cannot achieve maximum results without being driven by human resources who have the best performance.

According to (Yimam, 2022) Employee performance plays a major role in maximizing overall performance and ensuring their personal goals are aligned with team strategy. This includes planning work results, achieving goals, monitoring, and evaluating results with a focus on developing individual knowledge, skills, and expertise. Performance quality shows the results of the work that has been done, whether profitable or not (Nurhakiki Nazlia Sunarto, 2018).

According to (Rafly Alfianto, 2024) Employees are valuable assets for the company, with many companies paying close attention to the efficiency of their employees. They play an important role in completing tasks and have a major impact on the overall operations of the company. According to (Rolos et al., 2018) Employee performance and workload both have a major impact on the company. Both are interrelated in the organization, the placement of appropriate employee positions is often influenced by their workload history. In this case, it is

implemented so that each employee can improve their performance and feel comfortable when working, and the company's targets can be achieved optimally.

Workload is a series of tasks that must be completed in a part of the Company in a period (Nabila & Syarvina, 2022). Workload refers to the comparison between mental workload capacity and demands to complete tasks in a motivated condition (Nida et al., 2021). According to (Rahdiana et al., 2021) the complexity of mental workload lies in the fact that physical activity and mental activity are always correlated with each other, and these two factors affect how employees view the mental load they receive.

According to (Diana, 2019) workload can be interpreted as a comparison between the ability and capacity of a worker and the work needs that must be met. Workload arises due to an imbalance between the level of expertise and the expected ability. Next, mental workload has a complex relationship related to tasks and performance. Measuring mental workload becomes difficult because of its complexity.

NASA-TLX (National Aeronautics and Space Administration Task Load Index) was introduced in 1981 by Lowell E. Staveland from San Jose State University and Sandra G. Hart from NASA-Ames (Pramesti & Suhendar, 2021). The NASA-TLX method initially developed 9 factors, then simplified into six dimensional factors, which include: Mental Demands, Physical Demands, Temporal Demands, Own Performance, Effort and Frustration Level (Febrilliandika, 2020). Based on experimental calculations, the purpose of subjective mental load analysis is to produce the most optimal measurement scale (Zen & Adrian, 2020). By considering these things that can affect employee performance and health, the application of the NASA-TLX method can help companies develop the productivity and efficiency of each worker.

PT. ABC is a company that provides surface finishing services, electroplating and electrodeposition painting. PT. ABC is a manufacturing industry sector of a limited liability company engaged in engineering serving the largest automotive and electronics industries. Employees are known as human resources, and they are responsible for controlling the organization, supervising, implementing, and planning to achieve maximum goals. With competitive, innovative and creative human resources, the company can maintain its position in the market. The success of an organization depends on the main factor, namely the human resources in it. If human resource management is not optimal, one of the problems that can arise is an imbalance in the workload between employees according to their fields, which can cause work stress.

The findings of the problems that researchers found in the field were: "The adjustment of time in work is not enough to meet the work target, this shows that the workload felt by employees, they complain because there is not enough time to complete the work, while they are still required to meet the set targets and another phenomenon is that superiors demand that work must reach the target, which shows that employees experience stress at work because superiors demand them to complete work to reach the target, even though the time available to complete the work is often insufficient".

According to the results of research findings conducted by several previous researchers, there were differences in results according to research by (Dewi, 2020) who concluded that very high mental pressure can have a negative impact on operator performance. According to (Saputra & Herwanto, 2023) high mental workload requires recommendations for improvement to help workers reduce stress, so that aspects that cause the magnitude of mental workload can be anticipated and minimized.

High work pressure, long working hours, and boring working conditions have caused a significant decline in employee productivity. Therefore, it is important to conduct a thorough analysis of employee mental workload by applying the NASA-TLX method. Through the analysis,

it is proven that workers feel significant workload pressure. So recommendations are needed to overcome this problem.

Based on the phenomena and gaps in the research results above, further research is needed on the analysis of employee mental workload. Therefore, further studies are needed on the analysis of employee mental workload. In addition to the existing problems, it greatly affects the smooth operation of the company, the author is interested in conducting a study entitled "Analysis of Employee Mental Workload Using the NASA-TLX Method (Case Study at PT ABC)".

RESEARCH METHODS

This study uses the NASA-TLX method which is intended for PT.ABC workers. The NASA-TLX method was introduced in 1981 by Lowell E. Staveland from San Jose University and Sandra G, Hart from NASA-Ames. NASA-TLX is one of the subjective approach methods, namely there are 6 aspects to measure mental workload including Mental Demand, Physical Demand, Temporal Demand, Own Performance, Effort and Frustration. The purpose of this study is to analyze the level of mental workload felt by workers, to find out the most dominant factors influencing the level of mental workload when carrying out various activities. With this method there are 2 main stages that respondents must follow, namely weighting and ranking (Chairunnisaa et al., 2022).

In this research, the population studied included all employees of PT. ABC, totaling 20 people. These employees are divided into two sections, namely the production section and the quality control section. Data was collected through distributing questionnaires, and all PT.ABC employees were used as respondents in this research. This research is based on secondary and primary data, primary data was obtained from distributing questionnaires to each employee while secondary data was obtained through research journals, the internet, book sources, and documentation (Novalia & Panjaitan, 2021). The stages of this research can be observed in Figure 1.

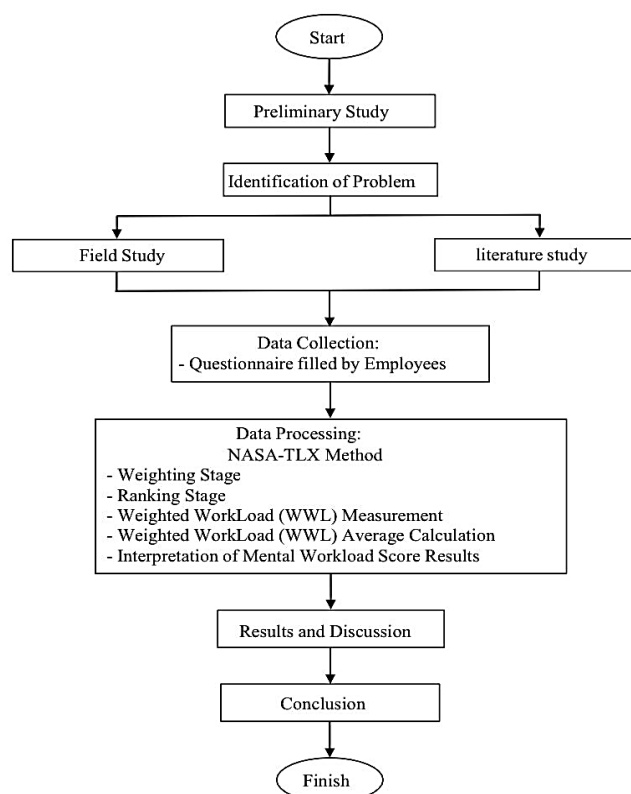


Figure 1. Research flow chart

Data Collection and Data Analysis Techniques

Data Collection Techniques

Data collection techniques are carried out by distributing questionnaires. This method involves giving a set of statements to respondents to fill out. There are 2 types of questionnaires used: weighting questionnaires and rating questionnaires.

1. Weighting

In the weighting questionnaire section that has been given to respondents. Respondents are asked to determine 1 of 2 indicators that are considered the most influential in causing workload. This questionnaire is in the form of a comparison between pairs of indicators.

Table 1. Weighting questionnaire

No	WorkLoad Indicator		
1	<i>Mental Demand (MD)</i>	or	<i>Physical Demand (PD)</i>
2	<i>Mental Demand (MD)</i>	or	<i>Own Performance (OP)</i>
3	<i>Mental Demand (MD)</i>	or	<i>Temporal Demand (TD)</i>
4	<i>Mental Demand (MD)</i>	or	<i>Effort (EF)</i>
5	<i>Mental Demand (MD)</i>	or	<i>Frustration Level (FR)</i>
6	<i>Physical Demand (PD)</i>	or	<i>Temporal Demand (TD)</i>
7	<i>Physical Demand (PD)</i>	or	<i>Own Performance (OP)</i>
8	<i>Physical Demand (PD)</i>	or	<i>Effort (EF)</i>
9	<i>Physical Demand (PD)</i>	or	<i>Frustration Level (FR)</i>
10	<i>Temporal Demand (TD)</i>	or	<i>Own Performance (OP)</i>
11	<i>Temporal Demand (TD)</i>	or	<i>Effort (EF)</i>
12	<i>Temporal Demand (TD)</i>	or	<i>Frustration Level (FR)</i>
13	<i>Own Performance (OP)</i>	or	<i>Effort (EF)</i>
14	<i>Own Performance (OP)</i>	or	<i>Frustration Level (FR)</i>
15	<i>Effort (EF)</i>	or	<i>Frustration Level (FR)</i>

2. Ranking

At this stage, each respondent is asked to give a score rating on 6 mental load indicators, according to the level of mental load experienced while doing the job. Each factor is ranked on a scale of 0-100, indicating levels from low to high.

1. Mental Demand
How much mental and perceptual activity is required in your job (example, thinking, deciding, calculating, remembering, seeing, searching). Is the job easy or difficult, simple or complex, loose or tight?

Low 0 10 20 30 40 50 60 70 80 90 High 100

2. Physical Demand
How much physical activity is required in your job (example, pushing, pulling, twisting, controlling, running, etc.). Is the job easy or difficult, slow or fast, calm or rushed?

Low 0 10 20 30 40 50 60 70 80 90 High 100

3. Temporal Demand
How much time pressure do you feel during the work or elements of the work? Is the work slow and relaxed or fast and tiring?

Low 0 10 20 30 40 50 60 70 80 90 High 100

4. Own Performance
How successful are you in achieving your work targets? How satisfied are you with your performance in achieving those targets?

Low 0 10 20 30 40 50 60 70 80 90 High 100

5. Effort
How much mental and physical effort does it take to reach your level of performance?

Low 0 10 20 30 40 50 60 70 80 90 High 100

6. Frustration Level
How much insecurity, despair, irritation, stress and disturbance do you feel compared to the feelings of safety, satisfaction, fit, comfort and self-satisfaction that you experience while doing the work?

Low 0 10 20 30 40 50 60 70 80 90 High 100

Figure 2. Rating questionnaire

Data Analysis Technique

The sequence of data processing through the NASA-TLX method includes the following steps (Cahyanie & Herwanto, 2021) quoting from (Riono et al., 2018):

a. Calculating Products

Products are calculated by multiplying the rating by the weight. This calculation is carried out on 6 dimensions of load which include (Mental Demand, Physical Demand, Temporal Demand, Performance, Effort and Frustration)

$$\text{Product} = \text{Weight} \times \text{Rating} \dots \dots \dots (1)$$

b. Calculating Weight WorkLoad (WWL)

This is the result of adding 6 products

$$\text{WWL} = \sum \text{Product} \dots \dots \dots (2)$$

c. Calculating the NASA-TLX score

The score is obtained by calculating the value of the average WWL and dividing it by the total weight (total weight = 15)

$$\text{NASA-TLX score} = \text{WWL} / 15 \dots \dots \dots (3)$$

d. NASA-TLX Score Category

In the final stage of data management, the NASA-TLX score results are categorized, based on Staveland and Hart, the score can be used to classify the level of mental workload. There are 5 categories used to group mental workload, both for individuals and groups in a type of work (Masniar et al., 2022). There is an interpretation of the score in the form of (Putra et al., 2023)

Table 2. Nasa-TLX value score categories

No	Interval Skor	Mental WorkLoad Category
1	0-20	Very Low
2	21-40	Low
3	41-60	Currently
4	61-80	Hight
5	81-100	Very Hight

RESULTS AND DISCUSSION

Recapitulation of Responden Data

This research was conducted at PT. ABC, which focuses on certain categories or levels of employees. The data collection process was carried out by distributing questionnaires to 20 respondents who were divided into two parts, namely: Production and Quality Control. The questionnaire was designed to obtain relevant information from employees regarding various aspects related to their work, which was then analyzed to obtain in-depth knowledge of the conditions in the field. It is hoped that this research can provide a clear picture of the dynamics of work at PT. ABC. The following is a table of respondent data.

Table 3. Respondent data

No	Name	Gender	Type of work	Age	Years of Service
1	AW	Man	Production	42	19
2	AR	Man	Production	37	9
3	MS	Man	Production	38	10
4	JA	Man	Production	38	13
5	NN	Man	Production	39	15

No	Name	Gender	Type of work	Age	Years of Service
6	FS	Man	Production	33	4
7	RZ	Man	Production	31	3
8	RN	Man	Production	37	9
9	ER	Man	Production	48	19
10	IS	Man	Production	33	5
11	RS	Man	Production	42	17
12	AWD	Man	Production	36	11
13	PJ	Man	Production	45	18
14	RM	Female	QC	39	18
15	AAP	Female	QC	32	5
16	MR	Man	QC	29	3
17	FZ	Man	QC	34	7
18	JL	Man	QC	28	2
19	AK	Female	QC	25	3
20	CR	Female	QC	33	8

Based on the data listed in table 3, the respondent profile can be illustrated in more detail by separating the data into several categories. First, the age group of respondents is shown in figure 3, which provides a visualization of the age distribution among the research participants. In addition, in figure 4, the data is also broken down by work period group, allowing us to understand the distribution of work experience among the respondents. These two figures together provide a more comprehensive insight into the demographic characteristics of the respondents involved in the study.

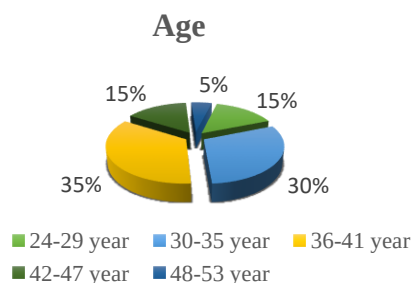


Figure 3. Age group

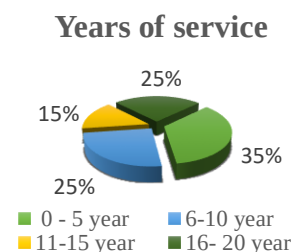


Figure 4. Work period group

Recapitulation of NASA-TLX Questionnaire Results Data Weighting Stage

The questionnaire used in this study includes weighting and rating scale. Data obtained from the weighting carried out by 20 respondents are displayed in detail in Table 4.

Table 4. Recapitulation of the wighting stage

No	Name	Type of Work	Indicator						Total
			MD	PD	TD	OP	EF	FR	
1	AW	Production	3	1	3	3	2	3	15
2	AR	Production	2	4	3	1	4	1	15
3	MS	Production	3	3	2	2	4	1	15
4	JA	Production	2	3	2	4	4	0	15
5	NN	Production	2	2	4	2	4	1	15
6	FS	Production	3	2	4	2	4	0	15
7	RZ	Production	3	3	3	1	2	3	15
8	RN	Production	3	3	3	2	2	2	15
9	ER	Production	2	4	2	3	3	1	15
10	IS	Production	4	3	2	2	4	0	15

No	Name	Type of Work	Indicator						Total
			MD	PD	TD	OP	EF	FR	
11	RS	Production	4	2	3	2	2	2	15
12	AWD	Production	3	4	2	2	3	1	15
13	PJ	Production	4	2	3	3	0	3	15
14	RM	QC	4	2	3	3	2	1	15
15	AAP	QC	3	3	2	2	3	2	15
16	MR	QC	5	3	1	3	1	2	15
17	FZ	QC	3	1	2	2	3	4	15
18	JL	QC	3	2	3	2	1	4	15
19	AK	QC	3	4	5	1	2	0	15
20	CR	QC	3	3	1	4	2	2	15

Table 4 above shows the weighting assessment data from production operators and quality control results obtained through questionnaires showing that high workloads experienced by workers in the Mental Demand (MD) indicator indicate that the highest workload is felt by IS, RS and PJ employees in the production section, as well as RM and MR employees in the quality control section. For the Physical Demand (PD) indicator, a very high workload is felt by AR, ER and AWD workers in the production section, as well as AK employees in the quality control section. In the Temporal Demand (TD) indicator, the dominant burden is felt by NN and FS employees in the production section, as well as AK employees in the quality control section. While in the Effort (EF) indicator, namely by FS and JA employees in the production section. On the other hand, the lowest workload is felt in the Performance (OP) and Frustration Level (FR) indicators where all employees do not feel a high level of frustration.

Rating Stage

The next step is to recapitulate the data related to the assignment of values or ratings to each dimension that has been set. This assessment is obtained from the NASA-TLX questionnaire filled out by PT.ABC employees, where they are asked to choose a score ranging from 0 (lowest) to 100 (highest). This score is given based on the level of work complaints felt by employees in the company. The results of this recapitulation can be observed in table 5

Table 5. Recapitulation of the rating stage

No	Name	Type of Work	Indicator					
			MD	PD	TD	OP	EF	FR
1	AW	Production	50	80	80	70	70	80
2	AR	Production	90	80	70	80	100	40
3	MS	Production	70	80	90	70	70	80
4	JA	Production	70	60	90	90	70	20
5	NN	Production	70	100	60	90	100	20
6	FS	Production	90	70	90	80	80	70
7	RZ	Production	60	80	70	80	90	70
8	RN	Production	80	50	30	80	70	80
9	ER	Production	70	60	90	100	90	40
10	IS	Production	90	90	90	90	100	40
11	RS	Production	70	50	70	60	80	50
12	AWD	Production	80	70	80	70	80	70
13	PJ	Production	70	80	70	80	90	80
14	RM	QC	50	80	80	60	70	70
15	AAP	QC	70	90	60	80	50	30
16	MR	QC	70	80	50	70	80	50
17	FZ	QC	70	80	90	100	70	80
18	JL	QC	70	80	70	60	60	50
19	AK	QC	60	80	90	30	100	50
20	CR	QC	80	60	80	70	100	60

Through table 5 above, the dominant respondents in filling out the questionnaire gave ratings for both the production and quality control sections, for each dimension that produced different values, which is due to the differences in workloads owned by each worker who is affected by various aspects, such as age, work experience and workplace environmental conditions. In the Questionnaire, the Frustration Level dimension rating is the lowest value.

Data Processing

NASA-TLX Score Calculation

After the data from the NASA-TLX questionnaire recapitulation results are collected, the next step is to calculate the NASA-TLX score using the established formula. For the data of respondent number one named (AW), the calculation results from this data management process are in the form of.

1. Calculating the Product Value

$$\text{MD product value} = \text{MD weight} \times \text{MD rating} = 3 \times 50 = 150$$

$$\text{PD product value} = \text{PD weight} \times \text{PD rating} = 1 \times 80 = 80$$

$$\text{TD product value} = \text{TD weight} \times \text{TD rating} = 3 \times 80 = 240$$

$$\text{OP product value} = \text{OP weight} \times \text{OP rating} = 3 \times 70 = 210$$

$$\text{EF product value} = \text{EF weight} \times \text{EF rating} = 2 \times 70 = 140$$

$$\text{FR product value} = \text{FR weight} \times \text{FR rating} = 3 \times 80 = 240$$

2. Calculating the average value of WWL

$$\text{WWL} = \sum \text{Product Value} = 150 + 80 + 240 + 210 + 140 + 240 = 1,060$$

3. Calculating NASA-TLX score

$$\text{WWL score} = \frac{\text{wwl Count}}{15} = \frac{1.060}{15} = 70,67$$

Meanwhile, the calculation results for other respondents can be observed in more detail in table 6. This table presents complete data that includes individual scores from each respondent, which have been calculated using the same method.

Table 6. Weight work load value, product, nasa-tx score and workload category

No	Name	Type of Work	Indicator						WWL	Score NASA-TLX	WorkLoad Category
			MD	PD	TD	OP	EF	FR			
1	AW	Production	150	80	240	210	140	240	1060	70,67	Hight
2	AR	Production	180	320	210	80	400	40	1230	82,00	Very Hight
3	MS	Production	210	240	180	140	280	80	1130	75,33	Hight
4	JA	Production	140	180	180	360	280	0	1140	76,00	Hight
5	NN	Production	140	200	240	180	400	20	1180	78,67	Hight
6	FS	Production	270	140	360	160	320	0	1250	83,33	Very Hight
7	RZ	Production	180	240	210	80	180	210	1100	73,33	Hight
8	RN	Production	240	150	90	160	140	160	940	62,67	Hight
9	ER	Production	120	240	180	300	270	40	1150	76,67	Hight
10	IS	Production	360	270	180	180	400	0	1390	92,67	Very Hight
11	RS	Production	280	100	210	120	160	100	970	64,67	Hight
12	AWD	Production	240	280	160	140	240	70	1130	75,33	Hight
13	PJ	Production	280	160	210	240	90	240	1220	81,33	Very Hight
14	RM	QC	200	160	240	180	140	70	990	66,00	Hight
15	AAP	QC	210	270	120	160	150	60	970	64,67	Hight
16	MR	QC	350	240	50	210	80	100	1030	68,67	Hight
17	FZ	QC	210	80	180	200	210	320	1200	80,00	Hight
18	JL	QC	210	160	210	120	60	200	960	64,00	Hight
19	AK	QC	180	320	450	30	200	50	1230	82,00	Very Hight
20	CR	QC	240	180	80	280	200	120	1100	73,33	Hight

WWL (Weighted Work Load) is a workload score, calculated by adding up the results of the multiplication of six main factors. These factors include Mental Demand, Physical Demand, Temporal Demand, Own Performance, Effort and Frustration Level.

According to table 6 above, it is observed that the product value of each indicator is different, the lowest product value is 0 and the highest is 450, namely in the Temporal Demand (TD) aspect, indicating that a respondent named AK in the quality control section feels limited time in completing his work is required to achieve the target, so that he experiences pressure to work quickly and feels rushed, this can affect the level of stress and reduce the efficiency or quality of the work produced. The highest value of 450 is obtained from the multiplication of the TD indicator weight value through the weighting questionnaire, with the TD indicator rating value from the ranking questionnaire.

All respondents in the table above show values that exceed the normal limit, where the normal limit is scored 60.

Workload Category Recapitulation

The results of the average WWL calculation show a value that describes the category of mental workload felt by workers. There are groups of workload levels experienced by PT. ABC workers. In column table 6 above, it can be observed that the results of data processing show the average WWL value and interpretations that are classified based on the classification of workload in the production and quality control divisions of PT. ABC. The results obtained show the lowest mental workload score of 62.67 which is classified as "high", while the highest mental workload score reaches 92.67 which is classified as "very high". Based on these data, as can be expressed as a percentage of the mental workload score from the application of the NASA-TLX method, namely for 15 employees with a percentage value of 75% at the "high" category level, and there are 5 employees in the "very high" category ranging from 25%. With the existing data, it is observed that the mental burden felt by PT. ABC employees is part of the production and quality control team.

After knowing the level of mental workload for each worker, the next step is to determine the most dominant factor based on the results of the addition and percentage of each aspect.

Comparison of NASA-TLX Elements

Based on data management using NASA-TLX, the dominant aspects can be observed from table 7. From the percentage and summation of each aspect, it can be seen that the dominant aspect influencing PT.ABC's mental workload is Mental Demand (MD) with a percentage of 19.62%, followed by Effort (EF) and Physical Demand (PD) which are 19.40% and 17.93% respectively. Furthermore, the Temporal Demand (TD) and Own Performance (OP) aspects show a percentage of 17.79% and 15.78%. Meanwhile, the Frustration Level (FR) aspect has the lowest percentage, namely 9.48%.

Table 7. Nasa-TLX aspect comparison

Factor	Total Score	Average	%
Mental Demand (MD)	4.390	220	19,62%
Physical Demand (PD)	4.010	201	17,93%
Temporal Demand (TD)	3.980	199	17,79%
Own Performance (OP)	3.530	177	15,78%
Effort (EF)	4.340	217	19,40%
Frustration Level (FR)	2.120	106	9,48%

The Mental Demand aspect shows the extent to which perceptual and mental activities, such as observing, tracing and remembering, are involved in the work being done. At PT. ABC, employees are required to complete daily targets in one working day, high demands cause workers to be unable to complete work within the specified working hours, so that the Mental Demand aspect becomes a factor that greatly influences mental workload. Other aspects that show a relatively high average are Physical Demand & Effort. Effort shows the amount of physical and mental activity expended by employees in order to complete the work. The Physical Demand

aspect shows the amount of physical activity required, such as controlling rotation, pulling and pushing.

Suggested improvements

Based on the results of the NASA-TLX final score calculation, it was observed that 15 employees had a high level of mental workload, then 5 other employees felt a very high burden. The aspects that dominate the final score of the mental workload are Mental Demand, Effort, Physical Demand.

According to (Ramadhan et al., 2014) in research (Nurcahyo & Prasetyo, 2023)"to reduce the mental workload, one of the recommendations given is to add the number of workers, namely by dividing the total mental workload by the existing number with this division, the average workload will be obtained and the addition of workers aims to reduce the average mental workload in the production and quality control sections".

$$\text{Workload} = \frac{\text{Total WorkLoad}}{\text{Number of workers}}$$

Total Workload of Production Employees

$$= 70.67 + 82 + 75.33 + 76 + 78.67 + 83.33 + 73.33 + 62.67 + 76.67 + 92.67 + 64.67 + 75.33 + 81.33 = 992.67$$

Total Workload of Quality Control

$$= 66 + 64.67 + 68.67 + 80 + 64 + 82 + 73.33 = 498.67$$

Table 8. Average workload based on recommendations for additional wokers

Work of Type	Average Mental Workload				
	Initial Conditions	Addition of 1 Employee	Addition of 2 Employee	Addition of 3 Employee	Addition of 4 Employee
Production	76,36	70,91	66,18	62,04	58,39
QC	71,24	62,33	55,41	-	-

Based on the calculation of mental workload in the production department, the total workload was recorded at 992.67 with an average of 76.36 for 13 employees. If the number of employees increases, the average workload per employee decreases. After adding 1 worker, the average workload becomes 70.91 (still relatively high), adding 2 workers reduces the workload range to 66.18 (high), adding 3 workers produces an average of 62.04 (high) and with the addition of 4 workers, the average workload drops further to 58.39 (moderate). Meanwhile, in the quality control department, the total workload was recorded at 498.67 with an average workload of 71.24 for 7 workers. If 1 worker is added, the workload range decreases to 62.33 (high) and the addition of 2 workers further reduces the workload range to 55.41 (moderate). Overall, increasing the number of employees in both the production and quality control departments can reduce the workload per employee. This shows that the addition of workers has the potential to reduce the workload borne by each employee of PT.ABC, which in turn can increase welfare and work productivity.

CONCLUSION

The conclusion of this study is based on the calculation of the NASA-TLX method at PT. ABC in the production and quality control division, it was obtained that 15 people (75%) employees had a "high" level of mental workload and 5 people (25%) employees had a "very high" level of mental workload. Based on table 6, the lowest NASA-TLX score was 62.67 and the highest score was 92.67.

The aspect that most influences the amount of mental workload at PT. ABC is the Mental Demand aspect with a percentage of 19.62%, followed by Effort and Physical Demand at 19.40% and 17.93%, then the Temporal Demand and Own Performance aspects have a percentage of 17.79% and 15.78% while the Frustration Level aspect has a percentage of 9.48%. And the proposal given to minimize mental workload is to increase the number of workers in the production and quality control divisions. The addition aims to reduce the average mental workload felt by workers.

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