



## **Analysis Of Human Resources Based on the Workload Of Production Employees at CV. Pagupon Apparel Using the Nasa-Tlx Method**

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**Abstract:** *This study aims to assess the mental workload of production employees at CV Pagupon Apparel, identify the dimension with the largest contribution to the total workload, and formulate recommendations for work system improvement. A descriptive quantitative approach with a cross-sectional design was employed, involving all 35 production employees through saturated sampling across six departments: Layouting, Printing, Cutting, Sewing, Pressing, and Finishing. Data were collected through observation and the NASA Task Load Index (NASA-TLX) questionnaire and analyzed by calculating the Weighted Workload (WWL) scores. The results showed an average WWL score of 73.60, indicating a high level of mental workload. Of the 35 employees, 32 (91.43%) were classified as having high workload, while 3 (8.57%) were in the very high category. Among the departments, Printing recorded the highest average WWL score (77.75), followed by Pressing (77.25). Temporal Demand was the dimension with the largest contribution to the total workload, accounting for 19.80%, followed by Mental Demand (18.43%) and Frustration (17.19%). Based on these findings, the study recommends improving production scheduling, standardizing visual work instructions, and implementing proportional employee rotation and break scheduling to support workload management.*

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### **Introduction**

The apparel industry is a segment of the textile and garment sector that plays a vital role in national manufacturing. This industry is characterized by multi-stage production processes, order completion targets, quality standards, and strict timeliness requirements (Anwardi et al., 2021). Human resources are central to sustaining these production processes; errors at any

single stage can lead to rework, material waste, delays, and a backlog of work at subsequent stages(Adikarana et al., 2022).

These responsibilities entail a workload that is not merely physical but also cognitive and psychological in nature (Arifin, 2021). CV Pagupon Apparel is a sportswear manufacturing business where employees must complete orders against tight deadlines. Design changes, size variations, or delays in one section often increase time pressure on other sections(Ayuningtyas et al., 2021). If this mental workload is left unmanaged, it can impair concentration, increase the likelihood of errors, heighten stress levels, and compromise product quality (Ambri et al., 2022).

This study focuses on measuring the mental workload of production division employees using the NASA Task Load Index (NASA-TLX) method(Azhari & Suparno, 2024). The primary objectives are to determine the level of mental workload, identify the dominant dimensions affecting employees, and formulate proposals for an ergonomic and optimized work system.

## Research Methods

This study employs a descriptive quantitative method with a cross-sectional approach. The study population consists of all 35 employees in the Production Division of CV Pagupon Apparel. A total sampling technique was used, meaning the entire population served as the sample, distributed across the following sections: Layouting (5 people), Printing (4 people), Cutting (8 people), Sewing (6 people), Pressing (4 people), and Finishing (8 people).

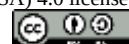
Primary data collection was conducted by administering the National Aeronautics and Space Administration Task Load Index (NASA-TLX) questionnaire. This method measures mental workload based on six key dimensions: Mental Demand, Physical Demand, Temporal Demand, Performance, Effort, and Frustration Level. Data analysis involved weighting via pairwise comparisons, assigning ratings (0–100), calculating weighted product values, and determining the total Weighted Workload (WWL) score.

## Result and Discussion

Based on the NASA-TLX data analysis from 35 respondents, the overall average Weighted Workload (WWL) score was found to be 73.60. This value falls into the "High" workload category. Specifically, 32 respondents (91.43%) fell into the "High" mental workload category, while 3 respondents (8.57%) fell into the "Very High" category. These findings demonstrate that mental workload is a systemic issue across the entire production process at CV Pagupon Apparel.

**Table 1. Average WWL**

| Bagian Produksi | Jumlah Karyawan | Rata-rata WWL | Kategori | Indikator Dominan |
|-----------------|-----------------|---------------|----------|-------------------|
| Layouting       | 5               | 72.00         | Tinggi   | Kebutuhan Waktu   |



|           |   |       |        |                   |
|-----------|---|-------|--------|-------------------|
| Printing  | 4 | 77.75 | Tinggi | Kebutuhan Mental  |
| Cutting   | 8 | 73.25 | Tinggi | Kebutuhan Waktu   |
| Jahit     | 6 | 72.17 | Tinggi | Tingkat Frustrasi |
| Pressing  | 4 | 77.25 | Tinggi | Kebutuhan Mental  |
| Finishing | 8 | 72.12 | Tinggi | Kebutuhan Waktu   |

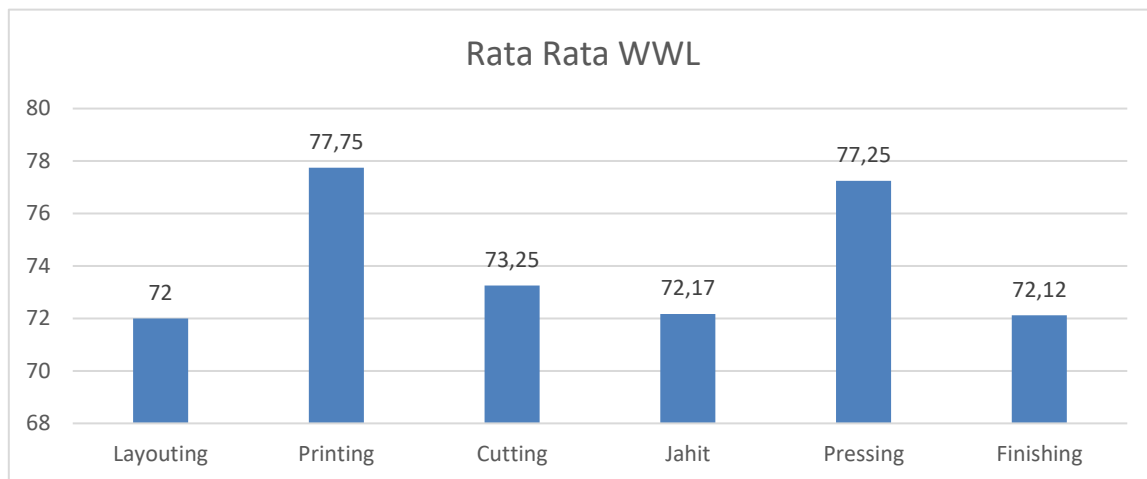


**Image 1. Average WWL**

When analyzed by workstation, the Printing section bears the highest mental workload, with an average WWL score of 77.75. This section demands exceptionally high visual precision to match print colors and minimize product defects. The Pressing section ranks second with an average of 77.25, followed by Cutting (73.25), Sewing (72.17), Finishing (72.12), and Layouting (72.00).

**Table 2. Contribution Indicator NASA-TLX**

| Indikator         | Rata-rata Bobot | Rata-rata Rating | Rata-rata Nilai Tertimbang | Kontribusi WWL |
|-------------------|-----------------|------------------|----------------------------|----------------|
| Kebutuhan Mental  | 2,46            | 83               | 203,43                     | 0,1843         |
| Kebutuhan Fisik   | 1,86            | 73,43            | 134,71                     | 0,122          |
| Kebutuhan Waktu   | 3,23            | 67,43            | 218,57                     | 0,198          |
| Performansi       | 2,46            | 77,29            | 187,43                     | 0,1698         |
| Tingkat Frustrasi | 2,37            | 79               | 189,71                     | 0,1719         |
| Tingkat Usaha     | 2,63            | 64,57            | 170                        | 0,154          |

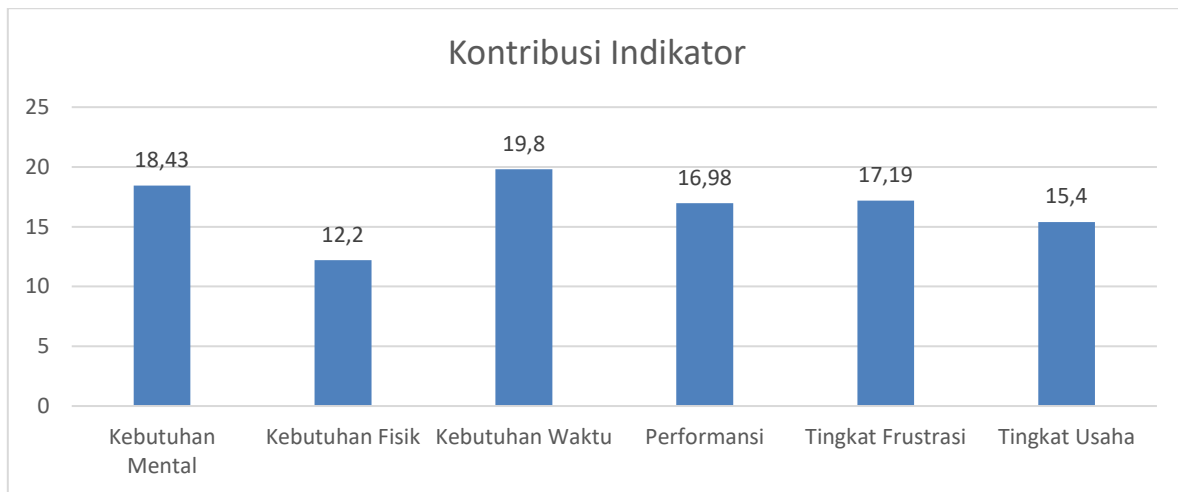


**Image 2. Contribution Indicator NASA-TLX**

Dimensional analysis reveals that Temporal Demand is the primary driver of mental workload, contributing 19.80%. This aligns with the realities of the garment manufacturing industry, which is heavily bound by customer order deadlines and relies on sequential, interdependent processes. The Mental Demand dimension accounts for 18.43%, reflecting the high level of cognitive activity involved in tasks such as interpreting design variations and preventing errors that would necessitate rework. Meanwhile, the Frustration Level is notably high at 17.19%, driven largely by sewing operators who must deal with pattern defects originating from earlier stages of production.

## Conclusion and Recommendation

The study concludes that employees in the Production Division of CV Pagupon Apparel generally experience a high level of mental workload (NASA-TLX score of 73.60). Pressure to meet deadlines (Time Demand) is the dominant factor in the employees' mental workload, regardless of their specific workstation. The Printing and Pressing stations exhibit the highest workloads due to the intense cognitive concentration required and the risk of product defects.

Based on these findings, it is recommended that CV Pagupon Apparel management improve the production scheduling system (by incorporating buffer times between stations), standardize visual instructions to reduce memory load (Mental Demand), and implement a cross-training policy to enable employee rotation when a specific section faces a production overload.

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