JKIE (Journal Knowledge Industrial Engineering) Vol. 13, No. 1, August 2026, pp.164-174

http://jurnal.yudharta.ac.id/v2/index.php/jkie

Journal Knowledge Industrial Engineering

E-ISSN: 2541-4461SAYA P-ISSN: 2460-0113

The Effect of Mental Workload Using the Rating Scale Mental Effort Method on Reach Truck Operator Performance at Fast Moving Consumer Goods Industry

Rakay Edhiargo Toyosito[1], Lifia Citra Ramadhanti[2], Rizki Tri Purwanto[3]

[1,3]Department of Industrial Engineering, Universitas Tangerang Raya, Indonesia

[2]Department of Industrial Engineering, Universitas Singaperbangsa Karawang, Indonesia

Corresponding Author : lifia.citra@ft.unsika.ac.id[1]

Article Info

Article history

Received : May 10, 2026

Revised : August 3, 2026

Accepted : August 25, 2026

Published : August 31, 2026

Keywords: (3-5 words).

Mental Workload;

Rating Scale Mental Effort;

Operator Performance;

Productivity;

Reach Truck Operator.

ABSTRACT

This study examines the relationship between mental workload and the performance of reach truck operators in a Fast Moving Consumer Goods Industry using the Rating Scale Mental Effort (RSME) method. Operator performance was measured based on the completion time of put away or take away activities for finished goods products. This research employed a quantitative approach through data collection using questionnaires and direct observation. Data analysis included the Shapiro-Wilk normality test and Spearman correlation test. The results showed that the average mental effort score was 85.35, which falls into the moderate category. The correlation test on reach truck operator work performance indicated a strong and significant negative relationship between mental workload and operator performance, with a correlation coefficient of r=-0.641 and p=0.025. This analysis demonstrates that mental workload affects operator performance in carrying out work activities in the finished goods warehouse at Fast Moving Consumer Goods Industry, although the total RSME score remains within the moderate category.

DOI:https://doi.org/10.35891/jkie.v13i2.6904

1. Introduction

Manufacturing industries are increasingly adopting Industry 4.0 technologies by integrating digital and intelligent systems, including the Internet of Things (IoT), artificial intelligence, and big data, to support more efficient and productive operations. However, in practice, several companies still remain at the Industry 3.0 stage, particularly in warehousing activities that continue to rely on manual material handling operations and are not yet fully integrated with Warehouse Management Systems (WMS).

Warehouses function as facilities for storing raw materials as well as finished products (Herdianzah et al., 2022). A warehouse not only serves as a storage location for goods but also acts as a center of logistics activities involving planning, control, and goods distribution processes (Januarny & Harimurti, 2021). In operational practice, the effectiveness of warehouse systems is highly influenced by operator performance, particularly in put away and take away activities that require precision and punctuality.

Fast moving consumer goods industry or PT XYZ is a company that produces various wafer and biscuit products. To support product distribution, the company manages several types of warehouses, including a finished goods (FG) warehouse that utilizes a drive-in rack storage system. This system provides high-density storage capacity but requires reach truck operators to perform precise maneuvering within narrow rack aisles while following the First In Last Out (FILO) storage principle.

Unlike conventional selective racking systems, drive-in racking requires reach truck operators to maneuver forklifts inside narrow rack aisles while maintaining precise positioning during pallet storage and retrieval. Limited maneuvering space, restricted visibility, and the need to avoid collisions with rack structures demand high levels of concentration, spatial awareness, and operational accuracy. Furthermore, the implementation of the First In Last Out (FILO) storage principle increases task complexity because operators must follow specific storage sequences while meeting productivity targets. These unique operational characteristics make drive-in racking more mentally demanding than standard warehouse storage systems and highlight the importance of evaluating operators' mental workload and its potential impact on work performance. Understanding this relationship is essential because excessive mental workload may reduce operator performance, increase task completion time, and elevate the risk of operational errors during put away and take away activities.

Consequently, high operational demands, including the implementation of zero-handling principles and strict material transfer time targets, can create additional work pressure for operators. Work activities with high demands and effort can contribute to increased mental workload among workers (Rabianor et al., 2026).These conditions have the potential to generate mental workload, which may lead to decreased performance, including longer task completion times and increased operational errors. Workload is a concept that arises from limitations in an individual's capacity to process information. Mental workload refers to the gap between job demands and an individual's capacity to carry out assigned tasks and responsibilities. Mental conditions such as excessive workload and fatigue can significantly reduce performance (Lee et al., 2024).

This study aims to analyze the mental workload of reach truck operators using the Rating Scale Mental Effort (RSME) method and its effect on operator performance in the finished goods warehouse at PT XYZ. In addition, this research also seeks to examine the relationship between mental workload and the work performance of reach truck operators. The results of this study are expected to serve as an evaluation basis for improving work efficiency.

2. Literature Review

A warehouse is a building or facility used to collect and store goods, whether in the form of raw materials, semi-finished goods, or finished products. Warehouses function not only as storage spaces but also as centers of logistics activities involving planning, control, and goods distribution processes (Januarny & Harimurti, 2021).

Work performance reflects how effectively an individual completes assigned responsibilities, which may be influenced by factors such as competence, experience, commitment, and timeliness. The term workplace productivity refers to the achievements generated by individuals or groups within a certain period (Kurnia et al., 2026). Previous research has indicated that excessive mental workload may reduce employees' productivity and operational performance, particularly in work environments requiring sustained concentration (Herlina et al., 2024). Performance is considered high when work targets are completed on time without exceeding established deadlines(Meutia et al., 2024). Conversely, low performance occurs when work targets cannot be completed within the specified timeframe (Mahfira & Andres, 2018).

Workload represents the amount of work or task demands assigned to an individual or organizational unit that must be accomplished within a specified period (Angelo et al., 2022). The measurement of mental workload is one of the important factors required by companies to assess the workload experienced by workers (Oktavera et al., 2024). Mental workload is a crucial factor that influences individual performance within a system(Novasani & Ngizudin, 2022). It describes the level of cognitive demand that workers must fulfill in completing specific tasks (Maulana et al., 2023). Several studies have also reported that increasing cognitive demands during operational activities may reduce workers' performance and should therefore be evaluated as part of ergonomic risk assessment (Sufyan et al., 2024). Mental workload can be influenced by several factors, including the complexity of tasks, environmental conditions such as lighting and noise, required concentration, time constraints, and the balance between available manpower and task demands (Septiani et al., 2024). Empirical evidence demonstrates that critical operational stressors—such as stringent time demands, task complexity, and technical infrastructure constraints—significantly aggravate workers' overall mental workload (Hakim & Aminuddin A.P, 2024).

Previous studies have shown that mental workload is closely associated with workers' productivity and operational performance across various industrial sectors (Firmansyah & Widodo, 2025). Higher cognitive demands may reduce concentration, decision-making ability, and task accuracy, particularly in jobs requiring continuous attention during material handling activities (Azizah et al., 2025). Furthermore, mental workload levels vary depending on task characteristics and workplace conditions, indicating that different operational environments require different workload assessment approaches (Nurbi et al., 2025). In forklift operations, operators are required to maintain productivity while ensuring maneuvering accuracy and workplace safety, making them susceptible to increased mental workload (Yusuf et al., 2025). Moreover, prolonged mental demands may contribute to fatigue, which can negatively influence work performance and increase the risk of operational errors (Wirda et al., 2023).

The Rating Scale Mental Effort (RSME) provides a subjective assessment of the mental effort perceived by workers while performing their tasks (Amanda & Nugraha, 2024). Additionally, the National Aeronautics and Space Administration Task Load Index (NASA-TLX) has been widely recognized as a robust multidimensional tool for evaluating overall subjective mental workload across critical operational roles (Zidan et al., 2024). Its practical application allows workers' perceived mental effort to be assessed relatively quickly and has demonstrated sensitivity across different types of industrial activities (Loske & Klumpp, 2021). Furthermore, subjective evaluation methods such as the Rating Scale Mental Effort (RSME) have been effectively utilized to quantify cognitive demands and mental effort levels across various task environments (Jimmy et al., 2022).This method consists of six assessment indicators: Workload (WL), Task Difficulty (TD), Work Performance (WP), Mental Effort (ME), Work Anxiety (WA), and Work Fatigue (WF) (Azizah et al., 2025). These six indicators are subsequently developed into a questionnaire as presented in the following table:

Table 1. RSME Mental Workload Rating Questionnaire

Indicator	Question	Rating Score (0–150)
WL (Workload)	In your opinion, how heavy is your work?	…..
TD (Task Difficulty)	In your opinion, how difficult is your current job?	…..
WP (Work Performance)	How do you assess your own performance while working?	…..
ME (Mental Effort)	In your opinion, how much mental effort do you exert while working?	…..
WA (Work Anxiety)	How much anxiety do you experience while working?	…..
WF (Work Fatigue)	How much fatigue or exhaustion do you feel after working?	…..

Source: Data Processing, 2026

To calculate the final score using the RSME method, the following equation is applied:

$$RSME\ Score = \frac{\sum Indicator\ Scores}{6}$$

Based on the final score calculation, the mental workload level can then be classified into workload categories as presented in the following table:

Table 2. Effort Categories and Final Scores of the RSME Method

No	Effort Category	Effort Category
1	Extreme	137 – 150
2	Very High	115 – 136
3	High	89 – 114
4	Moderate	52 – 88
5	Low	34 – 51
6	Very Low	16 – 33

Source: Data Processing, 2026

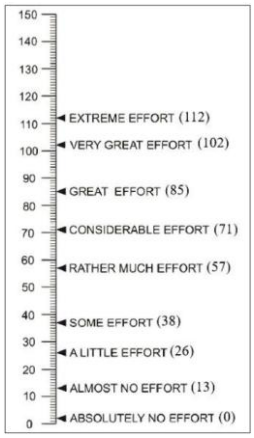

Figure 1. RSME Scale
Source: Data Processing, 2026

Several previous studies have investigated mental workload in different industrial settings using various assessment methods. A review of these studies is essential to identify existing findings, research limitations, and the research gap addressed in the present study. A summary of relevant previous studies is presented in Table 3.

Table 3. Summary of Previous Studies

No	Author	Object	Method	Main Findings	Research Gap
1	Mahfira & Andres (2018)	Production Operator	NASA-TLX	Mental workload affects performance.	Not reach truck.
2	Maulana et al. (2023)	Manufacturing Worker	RSME	Mental workload measurement.	No performance analysis.
3	Oktavera & Widodo (2024)	Logistics Worker	Mental Workload	High workload decreases effectiveness.	Not warehouse handling.
4	Amanda & Nugraha (2024)	Industrial Worker	RSME	RSME is practical.	Not drive-in rack.
5	Azizah et al. (2025)	Automotive Employee	NASA-TLX & RSME	Compared both methods.	Not reach truck.
6	Nurbi et al. (2025)	Forklift Operator	NASA-TLX	Lighting affects mental workload.	Did not analyze RSME or performance.

7	Yusuf et al. (2025)	Forklift Operator	NASA-TLX	High mental workload among forklift operators.	No relationship with operator performance.
8	Wirda et al. (2023)	Industrial Worker	RSME & SOFI	Mental workload is related to fatigue.	Not warehouse material handling.

Source: Compiled by the authors from various studies, 2026

Based on the previous studies summarized in Table 4, most research has focused on evaluating mental workload among manufacturing workers or warehouse employees in general. However, limited studies have specifically examined reach truck operators working in drive-in racking systems, where restricted maneuvering space, limited visibility, and high operational precision create unique cognitive demands. Therefore, this study aims to fill this research gap by analyzing the effect of mental workload on the performance of reach truck operators using the RSME method.

3. Methodology

A quantitative research design was applied to examine the association between mental workload and the performance of reach truck operators in the finished goods warehouse at PT XYZ. The approach allows the variables under investigation to be represented numerically and subsequently evaluated through statistical analysis. The overall research framework adopted in this study is presented in Figure 2.

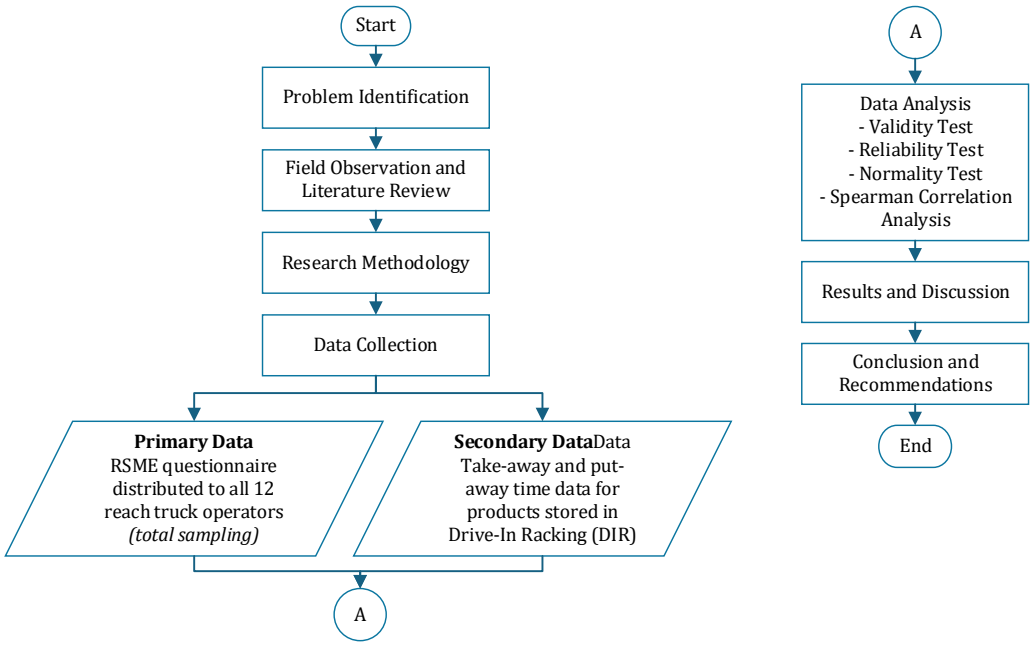

Figure 2. Research Framework
Source: Data Processing, 2026

The respondents comprised all 12 reach truck operators responsible for put-away and take-away activities. Given the limited population size, total sampling was used so that every identified operator participated in the study. The respondent characteristics observed included age, length of service, and work experience. The following table presents the respondent data of reach truck operators in the finished goods warehouse at Fast Moving Consumer Goods Industry.

Table 4. Respondent Data

Name	Age (Year)	Length of Service
Operator 1	24	1 year, 5 months

Operator 2	21	1 year, 1 month
Operator 3	27	1 year, 5 months
Operator 4	23	1 year
Operator 5	27	6 months
Operator 6	24	2 years, 1 month
Operator 7	31	2 years
Operator 8	24	6 months
Operator 9	22	1 year, 1 month
Operator 10	23	1 year, 8 months
Operator 11	23	8 months
Operator 12	28	2 years

Source: Data Processing, 2026

Data collection was conducted through questionnaire distribution, field observation, and documentation. The data collection method for reach truck operator performance involved recording the completion time of put away and take away processes for finished goods products in the drive-in rack system at Fast Moving Consumer Goods Industry. The collected data were then analyzed through several stages, beginning with the Shapiro-Wilk normality test (Lisanne et al., 2024). For the Shapiro–Wilk test, H_0 represented a normal data distribution, whereas H_1 indicated that the observed data did not follow a normal distribution.

The relationship between mental workload and operator performance was examined through correlation analysis to identify the strength and direction of the association between the two variables. Correlation coefficient values range from -1 to +1, where positive values represent a direct relationship, negative values indicate an inverse relationship, and values close to zero reflect a weak or no relationship.

Spearman's rank correlation was used to assess the association between mental workload and operator performance. The null hypothesis (H_0) stated that no significant association existed between the variables, whereas H_1 indicated the presence of a significant association. The significance level was set at 0.05. H_0 was retained when the p-value exceeded 0.05 and rejected when the p-value was equal to or below 0.05. Statistical calculations were performed using Minitab.

4. Results and Discussion

The mental workload of 12 reach truck operators was assessed using the Rating Scale Mental Effort (RSME) questionnaire with a measurement scale ranging from 0 to 150. The scores obtained from each assessment indicator were averaged to determine the final mental workload score and subsequently classified into the corresponding workload category, as presented in Table 5.

Table 5. Results of Mental Workload Assessment Using the RSME Method

Respondent	Indicator						Total	Score	Category
	WL	TD	WP	ME	WA	WF			
Operator 1	70	40	75	50	30	30	295	49,17	Low
Operator 2	70	35	75	75	70	100	425	70,83	Moderate
Operator 3	140	100	120	120	80	140	700	116,67	Very High
Operator 4	90	90	90	100	85	80	535	89,17	High
Operator 5	80	95	95	100	80	100	550	91,67	High
Operator 6	80	90	90	80	80	100	520	86,67	Moderate
Operator 7	60	80	80	60	80	60	420	70,00	Moderate
Operator 8	85	30	85	90	40	30	360	60,00	Moderate
Operator 9	60	60	80	50	80	50	380	63,33	Moderate

Operator 10	130	130	140	110	70	80	660	110,00	High
Operator 11	100	110	100	100	120	100	630	105,00	High
Operator 12	120	110	120	120	110	120	700	116,67	Very High
Average Score								85.35	Moderate

Source: Data Processing, 2026

To illustrate the scoring procedure, an example of the RSME score calculation for one respondent is presented below.

Example of RSME Score Calculation:

$$RSME\ Score = \frac{\sum Indicator\ Scores}{6}$$

$$Operator\ 1\ Score = \frac{WL + TD + WP + ME + WA + WF}{6}$$

$$Operator\ 1\ Score = \frac{70 + 40 + 75 + 50 + 30 + 30}{6}$$

$$Operator\ 1\ Score = 49.17$$

After obtaining the final mental workload score for each respondent, operator performance was evaluated based on the completion time required to perform put away and take away activities. The performance data are presented in Table 6.

Table 6. Reach Truck Operator Performance Based on Put Away and Take Away Completion Time

No	Name	Time (Seconds)
1	*Operator 1*	88.31
2	*Operator 2*	89.08
3	*Operator 3*	75.11
4	*Operator 4*	84.38
5	*Operator 5*	58.85
6	*Operator 6*	76.76
7	*Operator 7*	74.59
8	*Operator 8*	89.05
9	*Operator 9*	72.81
10	*Operator 10*	55.56
11	*Operator 11*	68.84
12	*Operator 12*	57.39

Source: Data Processing, 2026

After obtaining the mental workload scores and work performance data, both variables were subjected to a normality test using the Shapiro–Wilk method before conducting the correlation analysis.

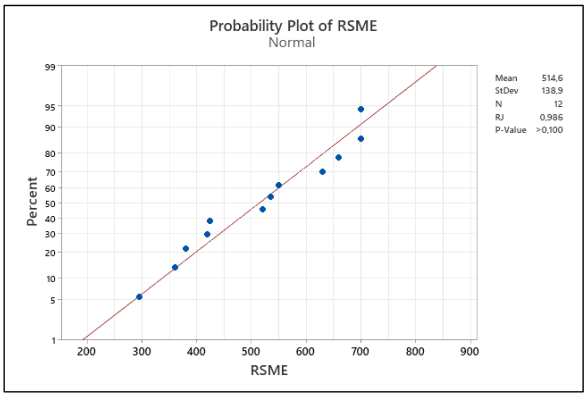

Figure 3. RSME Normality Test
Source: Data Processing, 2026

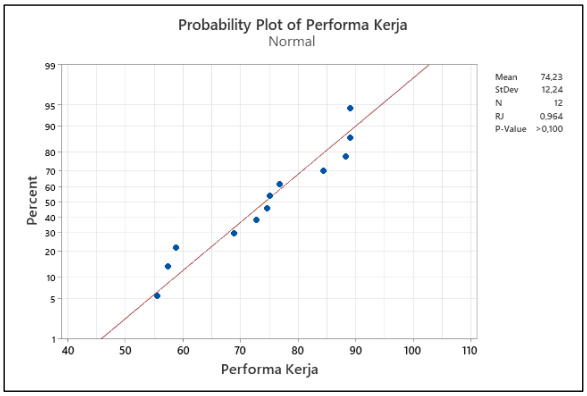

Figure 4. Work Performance Normality Test
Source: Data Processing, 2026

Table 7. Interpretation of Normality Test Results

Variable (Method)	p-value	Significance Level	Description
RSME	> 0.100	0.05	Normal
Work Performance	> 0.100	0.05	Normal

Source: Data Processing, 2026

The normality test indicated that both the RSME data and work performance data were normally distributed ($p > 0.05$), indicating that the null hypothesis (H_0) was accepted. However, Spearman correlation analysis was employed because the RSME scores were treated as ordinal data, in accordance with the statistical procedure described in the methodology. All statistical analyses were performed using Minitab software.

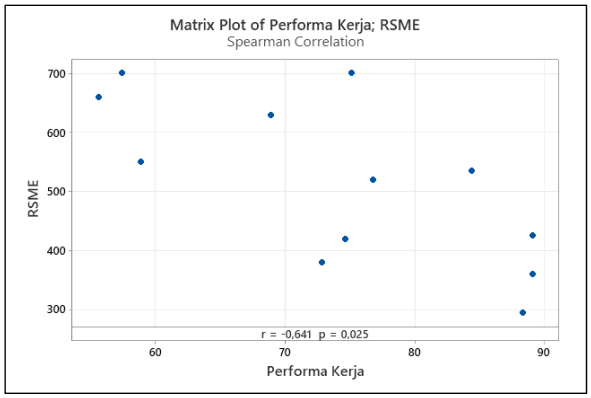

Figure 5. Spearman Correlation Test
Source: Data Processing, 2026

The results of the Spearman correlation analysis are presented in Table 8

Table 8. Interpretation of Spearman Correlation Results

Method	Work Performance	(r)	p-value	(α)	Correlation	Strength
RSME	Work Performance	-0.641	0.025	0.05	Negative	Strong

Source: Data Processing, 2026

The Spearman correlation analysis revealed a significant negative relationship between mental workload and operator performance (r=–0.641, p=0.025). This finding indicates that higher mental workload was associated with lower operator performance, as reflected by longer completion times during put away and take away activities.

These findings are consistent with previous studies reporting that increased mental workload tends to reduce operator performance and operational efficiency (Azizah et al., 2025; Loske & Klumpp, 2021). In warehouse environments, operators working in complex storage systems require higher levels of concentration and precision, making them more susceptible to performance degradation when mental workload increases.

5. Conclusion

The study showed that mental workload measured using the RSME method significantly affected the performance of reach truck operators at Fast Moving Consumer Goods Industry. The average RSME score was 85.35, indicating a moderate workload level. The correlation analysis revealed a significant negative relationship between mental workload and operator performance (r=-0.641; p=0.025).

References

Amanda, M. D., & Nugraha, I. (2024). *Analisis Pengukuran Beban Kerja Mental Pekerja Produksi CV. Hikmah Jaya Garment Menggunakan Metode NASA-TLX dan RSME*. https://jurnal.utb.ac.id/index.php/indstrk

Angelo, S., Widodo, L., & Sukania, W. (2022). Analisis Ergonomi Beban Kerja Mental Seara Kualitatif Terhadap Siswa SMA dan SMK Dalam Pembelajaran Luring dan Daring Pada Masa Pandemi Covid-19. In *Jurnal Mitra Teknik Industri* (Vol. 1, Number 2).

Azizah, F. N., Rinaldi, N., & Al-Muqaffa, W. (2025). Assessing Mental Workload of Automotive Factory Employees Using NASA-TLX and RSME Methods. *Jurnal Ilmiah Teknik Industri*. https://doi.org/10.23917/jiti.v24i1.8363

Firmansyah, A. P., & Widodo, S. R. (2025). Pengaruh Beban Kerja Fisik dan Beban Kerja Mental Bagian Produksi Terhadap Produktivitas Pekerja Menggunakan Metode CVL dan NASA-TLX di PT. SXX. *Jurnal Manajemen Teknologi Dan Teknik Industri*, *7*(2), 90–99. https://doi.org/10.30737/jurmatis.v7i2.6407

Hakim, & Aminuddin A.P, R. A. (2024). Analyzing Cognitive Ergonomics and Key Determinants of Mental Workload in PDPT Operators at Universities. In *Journal of Industrial Engineering* (Vol. 10, Number 1).

Herdianzah, Y., Ahmad, A., Saleh, A., Syukur, A., Malik, R., & Wahyuni P. Dwi. (2022). Pengaruh Penerapan Warehouse Management System Terhadap Kinerja Gudang Pada PTP Nusantara XIV Persero. In *Metode Jurnal Teknik Industri* (Vol. 8, Number 2).

Herlina, L., Mariawati, A. S., Aprilianti, W., Umyati, A., Merdiana, N., Sonda, A., & Yadi, Y. H. (2024). Analisis Keluhan Musculoskeletal Disorders (MSDs) Dan Beban Kerja Mental Pada Operator Forklift Dan Helper Dengan Metode Nordic Body Map (NBM) Dan NASA-TLX (Studi Kasus PT. Asahimas Chemical). *Journal of Systems Engineering and Management*, *03*(01), 13–20. https://doi.org/10.62870/joseam.vxix.24705

Januarny, T. D., & Harimurti, C. (2021). Pengaruh Tata Letak Gudang Terhadap Kelancaran Produktifitas Bongkar Muat Di Gudang PT. NCT. In *Jurnal Logistik Indonesia* (Vol. 5, Number 1). http://ojs.stiami.ac.id

Jimmy, Widodo, L., & Sukania, I. W. (2022). Analisis Ergonomi Terhadap Beban Kerja Mental Siswa SMP Selama Masa Pembelajaran Luring dan Daring. In *Jurnal Mitra Teknik Industri* (Vol. 1, Number 1).

Kurnia, I., Safariyani, E., & Sari, R. P. (2026). *Analisis Produktivitas Kerja Karyawan pada Departemen Logistik dengan Metode Regresi Linear Berganda di PT KLM*. https://jurnal.utb.ac.id/index.php/indstrk

Lee, C., Shin, M. J., Eniyandunmo, D., Anwar, A., Kim, E., Kim, K., Yoo, J. K., & Lee, C. (2024). Predicting Driver's mental workload using physiological signals: A functional data analysis approach. *Applied Ergonomics*, *118*. https://doi.org/10.1016/j.apergo.2024.104274

Lisanne, K., Jonathan, G., Rainer, R., & Bernhard, B. (2024). Investigation of eye movement measures of mental workload in healthcare: Can pupil dilations reflect fatigue or overload when it comes to health information system use? *Applied Ergonomics*, *114*. https://doi.org/10.1016/j.apergo.2023.104150

Loske, D., & Klumpp, M. (2021). Learning effects and mental fatigue of forklift operators in food retail logistics: An empirical analysis through the lens of behavioral operations management. *IFAC-PapersOnLine*, *54*(1), 19–24. https://doi.org/10.1016/j.ifacol.2021.08.071

Mahfira, I. R., & Andres, D. (2018). Analisis Pengukuran Beban Kerja Mental dan Fisik dengan Kinerja Karyawan Menggunakan Metode Nasa Task Load Index (Nasa-TLX) pada Departemen Manufaktur di PT. Petnesia Resindo. *Jurnal Teknik Industri*.

Maulana, I., Widhiarso, W., & Dewi, G. S. (2023). Analisis Pengaruh Beban Kerja terhadap Tingkat Kelelahan Pekerja Industri Rumah Tangga Keripik Tempe. *Jurnal INTECH Teknik Industri Universitas Serang Raya*, *9*(1), 33–41. https://doi.org/10.30656/intech.v9i1.5619

Meutia, S., Bakhtiar, & Velayati, A. (2024). Pengukuran kinerja karyawan menggunakan metode behaviorally anchored rating scales dan management by objective (Studi Kasus: AHASS Honda Service Lhokseumawe). *JENIUS : Jurnal Terapan Teknik Industri*, *5*(1), 14–21. https://doi.org/10.37373/jenius.v5i1.606

Novasani, R. J., & Ngizudin, R. (2022). Pengukuran Beban Kerja Pada Pegawai Kampus Menggunakan Cardiovascular Load Dan NASA-TLX. In *Jurnal Teknik Industri* (Vol. 8, Number 2).

Nurbi, R. S., Sugiono, & Nursasongko, M. (2025). Analysis of Mental Workload on Forklift Operators Due to Changes in Environmental Light Intensity. *Journal of Engineering and Management in Industrial System*, *13*(1), 14–27. https://doi.org/10.21776/ub.jemis.2025.013.01.2

Oktavera, I., Widodo, L., & Ahmad. (2024). Analisa Ergonomi Beban Kerja Mental dan Fisik Terhadap Pengendara Ojek Online Wanita Terhadap Dihapusnya Program Lady Grab. In *Jurnal Mitra Teknik Industri* (Vol. 3, Number 2).

Rabianor, Tambun, M. S. M. O. S. S., Rizali, M., & Tumanggor, A. H. U. (2026). *Analisa Beban Kerja Mental pada Driver Ojek Online Roda Dua Menggunakan Metode NASA-TLX di Kota Banjarmasin*.

Septiani, W. S., Rusy, R. I. P. R., & Adisuwiryo, S. A. (2024). Minimize Mental Workload and Fatigue of Horizontal Directional Drilling Worker Using Rating Scale Mental Effort and

Swedish Occupational Fatigue Inventory Methods. *JURNAL TEKNIK INDUSTRI*, *14*(2), 103–116. https://doi.org/10.25105/jti.v14i2.21084

Sufyan, A. A. S., Mulyana, Y., Kusumadewi, A., & Santang, I. E. (2024). Sainteks: Jurnal Sain dan Teknik Study of Ergonomic Teory Physical and Mental Workload Measurement On Warehouse Division's Operators Of PT. X Using Objective Workload And Subjective Workload Assessment. *Jurnal Sain Dan Teknik*, *06*(02). https://doi.org/10.37577/sainteks.v6i02.786

Wirda, Batubara, H., & Rahmawati, R. (2023). *Pengukuran Tingkat Kelelahan dan Beban Kerja Mental Operator Forklift Menggunakan Metode IFRC dan NASA TLX di PT. XYZ*. https://jurnal.untan.ac.id/index.php/jtinUNTAN/issue/view/2162

Yusuf, R., Fais, M. A., & Chusaini, A. (2025). Identifikasi beban kerja mental operator forklift PT. NDIS menggunakan metode NASA-Task Load Index. *Jurnal Teknik Industri Terintegrasi*, *8*(1), 485–491. https://doi.org/10.31004/jutin.v8i1.35759

Zidan, M. F., Apriani, R. A., Basuki, D. E., Wibowo, L. F. N., & Mukarim, R. N. (2024). *Analysis of Mental Workload on Sugar Production Mechanical Workers Using the Nasa-TLX Method* (Vol. 10, Number 1).