

**ANALYSIS OF EMPLOYEE MENTAL WORKLOAD
USING NASA-TLX AND RSME APPROACH AT PT.
SUPERNOVA PALAPA NUSANTARA (MAIN BRANCH)**

UNDERGRADUATE THESIS

**Submitted to the International Undergraduate Program in Industrial
Engineering in Partial Fulfilment of Requirement for the Degree of Sarjana
Teknik at the Faculty of Industrial Technology
Universitas Islam Indonesia**



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2024**

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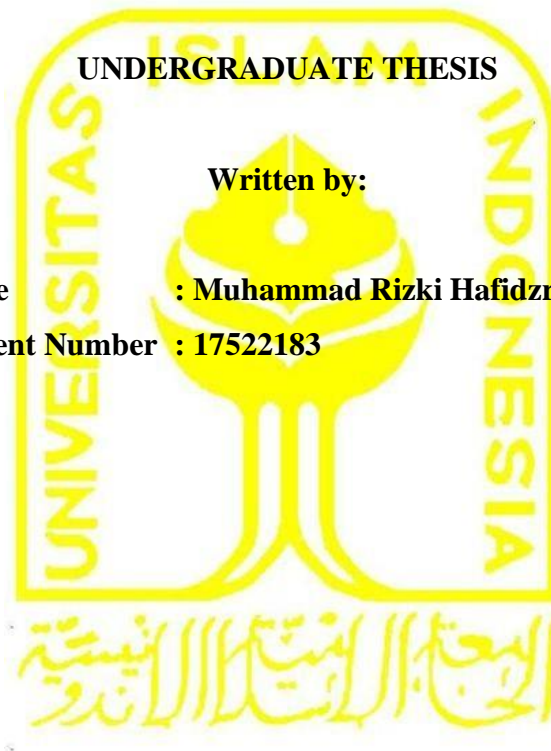
ANALYSIS OF EMPLOYEE MENTAL WORKLOAD USING NASA-TLX AND RSME APPROACH AT PT. SUPERNOVA PALAPA NUSANTARA (MAIN BRANCH)

UNDERGRADUATE THESIS

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Yogyakarta, July 28nd, 2024

Supervisor,

A handwritten signature in black ink, appearing to be 'HS' with a flourish.

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EXAMINER'S APPROVAL PAGE**ANALYSIS OF EMPLOYEE MENTAL WORKLOAD USING NASA-TLX AND RSME APPROACH AT PT. SUPERNOVA PALAPA
NUSANTARA (MAIN BRANCH)****UNDERGRADUATE THESIS**

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*Yogyakarta, August – 2024***Board of Examiners****Dr. Harwati S.T., M.T.**

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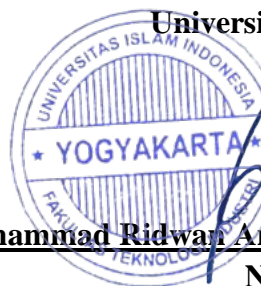
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DEDICATION PAGE

To my dear parents, whose endless love, patience, and unwavering belief in me have made this journey possible. Your support has been my greatest strength.

To my advisor, for your insightful guidance and thoughtful mentorship throughout this research. Your dedication and expertise have been invaluable.

To my friends, whose encouragement and positivity have kept me motivated during the most challenging times.

And to everyone who has offered their support along the way, your belief in my work has been deeply appreciated.

Thank you for being an essential part of this achievement.

MOTTO

“It’s fine to fake it until you make it, until you do, until it true”.

PREFACE

Al-hamdu lillahi rabbil alamin experienced all the thanks given to Allah SWT as the strength and guidance that blessed the author to complete the report of the Scripture at PT. Supernova Palapa Nusantara City of Bandung and complete this thesis as part of the requirement to obtain a Bachelor of Engineering degree with the research title "Analysis of Mental Workloads in the Department Using NASA-TLX and RSME Methods", Also, greetings dedicated to the beloved Prophet Muhammad SAW, who has brought mankind to the whole world of knowledge as at present.

This report is dedicated to my family and all readers, especially students from the Department of Industrial Engineering as collective knowledge. Therefore, the author would like to thank those who have always sent support and motivation in completing the script report to the author namely:

1. Allah SWT, for all the uncountable blessings and Prophet Muhammad, SAW for His guidance in the right way.
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The author also thanked all the parties who have been involved in the process of completing the thesis research that cannot be mentioned one by one. May Allah reward them for their good deeds with greater grace and guidance so that they may receive good for us all.

The author recognizes that there are still shortcomings and weaknesses in this report. Therefore, the author apologizes and expects criticism and advice so that further research can be improved.

Yogyakarta, 18 July 2024



Muhammad Rizki Hafidzrahman
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ABSTRACT

Nowadays, mentality is an important thing for everyday life for humans, because with a good mentality, the quality of work results can be maximized and can be adjusted to the needs of a company. This study aims to analyze mental performance in the department using the NASA-TLX and RSME methods. Quantitative methods are used in this study, using questionnaires, observations, interviews, library studies, and documentation for data collection. The sample was taken by taking 50 employees working at PT. Supernova Palapa Nusantara. The results of the study at PT. Supernova Palapa Nusantara showed that factors such as effort and frustration contributed significantly to mental workload. In addition, there was significant variation in mental workload among employees, with some experiencing higher stress due to heavy mental demands. This study produced several recommendations to improve mental well-being and work efficiency. These recommendations include adjusting tasks to reduce mental and temporal demands, stress management training, and creating a supportive work environment. By implementing these steps, companies can improve employee motivation and productivity, as well as provide a long-term positive impact on the organization.

Keywords: Mentality, NASA-TLX, RSME, Mental Workload, Employee Performance

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CHAPTER I

INTRODUCTION

1.1 Background

Nowadays mental becomes important for everyday life for humans, because with good mental creation, the quality of the result of work can be maximized and able to adapt to the needs of a company. The importance of being a qualified human resource then will create competition with other humans to be able to master a particular field according to the talents and abilities that it has.

PT Supernova Palapa Nusantara is a company that operates in the field of information technology and services. We provide a wide range of technology services and solutions to meet business needs and challenges in the digital world. As a company committed to helping companies and organizations optimize operations, improve efficiency, security, productivity, and deal with ongoing technological change and innovation, Supernova Palapa Nusantara provides a range of services ranging from application development, database management, system integration, data analysis, artificial intelligence (AI), to hardware and related technology support.

PT Supernova Palapa Nusantara which has several divisions and parts within the company so that the job can run well consists of Sales Marketing Department Employee, Financial Controller Employees, Production Manager, Financial Administration Employment, Human Resource Employee. To the entire goal desired by the company, PT Supernova Palapa Nusantara faces a major challenge in the mental health of human resources. The fast-growing and timelessly changing conditions of the technology industry require companies to always have a workforce that is not only technically competent but also able to adapt to changes and innovations that are so fast and dynamic.

Human resources can be said that an employee who works in a company

has an important role and responsibility for the tasks and work given by a leader so that in terms of quality will affect the outcome of work. Therefore, the mental health of employees in the company is not entirely in good condition, so it can affect the productivity of the company, and is unprepared for future changes and challenges.

Therefore, special attention is needed to employees who work at PT Supernova Palapa Nusantara by paying attention to the health conditions of employees such as counseling programs, recreational activities, and balance support. Taking care of the health condition of the employees will affect the formation of mental health conditions to be better. To form a qualified employee for the entire division then without the appointment of the proper training program in place, employees can be left behind in the skills and knowledge necessary to perform their duties effectively. It leads to employees being left behind and not following the developments that fit the current circumstances.

When the mental health of an employee who works in the company obviously leads to an unfavorable working environment and loss of motivation. In industries that often require fast work and heavy pressure, it is important to maintain the well-being of employees so that they remain productive and do not experience exhaustion. It involves managing stress, providing support facilities, and building a positive, collaborative work culture.

Performance management is also an important aspect of the entire division that works in the company. Clear definitions and measurements of employee performance help the company its strategic goals. However, this is not an easy task because it requires a system that is transparent, fair, and capable of providing constructive feedback to employees. Without effective performance management, it is difficult for a company to ensure that all employees contribute to their full potential. To attract and maintain the quality and skill of the entire staff of the Supernova Division, Palapa Nusantara must offer a competitive compensation package. In addition to salaries, benefits such as health insurance, leave, and other welfare programs are essential for employee satisfaction and loyalty.

To maintain the overall mental health of employees it is necessary to pay attention to aspects such as physical health, but also mental and emotional health. Programs such as counseling, recreational activities, and work-life balance support are part of the company's efforts to ensure that employees feel appreciated and supported in all aspects of their lives. By facing and overcoming all these challenges, it is expected that all employees in the division at the company PT Supernova Palapa Nusantara will be the backbone in supporting the achievement of the company's strategic goals. Through sustained efforts in recruitment, training, performance management, and employee welfare.

Based on the explanation from the background above, the researchers raised the theme of this research under the title “**Analysis of Mental Work in Departments using NASA TLX and RSME methods. PT Supernova Palapa Nusantara**”.

1.2 Problem Formulation

Based on the explanation from the background above, the researchers formulated several formulae of problems consisting of:

1. What affects the mental health of employees at PT. Supernova Palapa Nusantara becoming not running properly?
2. How the mechanism and result of NASA TLX and RSME analyzation of employee mental health at PT. Supernova Palapa Nusantara?

1.3 Research Objectives

Here are the purposes of the research carried out by the researchers:

1. To analyze what causes and affects mental health running well.
2. To find out the results of the mental health analysis of employees at the company PT. Supernova Palapa Nusantara using NASA TLX and RSME methods.

1.4. Benefits of Research

Here are the benefits of the research conducted by the researchers:

1. As a basis for PT. Supernova Palapa Nusantara to improve the quality of employees to create an atmosphere while working well.
2. To evaluate based on indicators of analysis using NASA TLX and RSME methods.

1.5. Research Limitations

The study needs research restrictions aimed at making the discussion of the research conducted focused on the results of the analysis of the performance of employees and its relationship to the mental health of employees who work at PT. Supernova Palapa Nusantara using NASA TLX and RSME methods and will be known results of analysis using such methods.

1.6. Systematic Research

The research is structured into several chapters, and each chapter will be described as follows:

CHAPTER I INTRODUCTION

This section explains the background of the research, the formula of the problem, the purpose of the study, the benefits of research, the limitations of research, and the systematics of research.

CHAPTER II LITERATURE REVIEW

This section describes the theoretical studies related to research. sources are taken from this research from scientific papers such as journals, books, and other valid sources.

CHAPTER III RESEARCH METHODOLOGY

This section explains the research methodology used in this study.

CHAPTER IV DATA PROCESSING AND RESEARCH RESULTS

This section discusses the results of the analysis of mental work in departments using NASA TLX and RSME methods at PT Supernova Palapa Nusantara.

CHAPTER V DISCUSSION

This section describes in detail the results obtained on the analysis of mental work in departments using NASA TLX and RSME methods at PT Supernova Palapa Nusantara.

CHAPTER VI CONCLUSIONS AND RECOMMENDATIONS

This section explains the results and conclusions of the research carried out about the analysis of mental work in departments at PT Supernova Palapa Nusantara.

BIBLIOGRAPHY

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CHAPTER II

LITERATURE REVIEW

2.1 Analysis

Faizal et al (2021) defined analysis as the process of breaking up a complex topic or substance into smaller pieces to gain a better understanding. Thus, Hidayat and Mukhlisin (2020) elaborate that attitude or attention to something, facts, and phenomena, that able to decompose into parts and recognize the connections of those parts in the whole for analysis. In addition, it can identify the signs of the components, their relationships with each other, and their functions in integrated research (Septiani et al, 2020).

2.2 Mental Health

Mental health, according to medical science, is a condition that enables the optimal physical, intellectual, and emotional development of a person and that development goes hand in hand with the conditions of others. Mental health is a condition in which a person does not feel guilty about himself, has a realistic assessment of himself, and is able to accept his shortcomings or weaknesses, the ability to face the problems of his life, to have satisfaction in his social life, and to have happiness in his life. The family is the first environment of the child that is very influential for early, middle, and late child development (Anggraini et al, 2020).

Rafifah et al (2022) explained mental health more comprehensively and saw at mental health in a "positive" way. He argues that mental health is a person who continually grows, develops, and matures in his life, accepts responsibility, and finds adjustment (without paying too much for himself or the community) in participating in the maintenance of social rules and actions in his culture. The World Federation for Mental Health defines mental health as a condition that allows for optimal physical, intellectual, and emotional development, as long as it is

appropriate to the circumstances of others. A mentally healthy society is a society that allows its members to develop according to their abilities.

Alfiana Nur Widiasmara (2022) Mental health is the individual's ability to avoid the symptoms of mental disorders and symptoms, and mental health is also the ability of the individual to adapt to himself, to others, and to the community in which he or she is. Mental health is the realization of harmony between the functions of the mind and the ability to cope with the common problems that occur and can get the positive things of happiness and ability that exist in him.

From some of the opinions above then can be concluded mental health is a condition in which a person does not feel guilty about himself, has a relativistic assessment of himself, and is able to accept his shortcomings or weaknesses, the ability to cope with the problems of his life, to have satisfaction in his social life, and to have happiness in his life.

2.3 Workload

Kirana, et al (2023) A workload is the number of activities that an organization unit or a position holder has to complete systematically using a position analysis technique, a workload analysis technique, or another management technique within a certain period in order to obtain information about the efficiency and effectiveness of the work of an organizational unit. A workload is something that is perceived to be beyond the ability of the worker to do his job. The capacity of a person required to perform the task according to expectation (performance expectation) differs from the capacity available at the time. The difference between the two indicates the level of difficulty of the task that reflects the workload. Excessive workloads will have an unfavorable impact on the general staff, which will cause both physical and mental exhaustion and emotional reactions such as headaches, digestive disorders, and irritability.

According to Putri, et al (2023), a workload is the amount of work or work that has to be completed by a person within a certain period of time. The workload involves not only the amount of work, but also the complexity, the level of

responsibility, and the time limits. The level of workload is determined by the human capacity and available resources. Too heavy tasks can cause stress, and fatigue, and have an adverse impact on employee well-being, while too light loads may not fully utilize individual resources.

Ohorela (2021) Workload is one of the aspects that should be taken into account by any company because the workload is the one that can increase employee productivity. Every work that a man does is a burden of work for him, the burden depends on how the person works. From an ergonomic point of view, any workload a person receives must be consistent and balanced with both physical abilities, cognitive abilities, and the limitations of the human being who receives the load. Workload is the average frequency of activity of each job over a certain time. The workload covers both physical and mental workload. The workload is essentially one of the elements to be taken into account for a workforce to high work compatibility and productivity in addition to the additional burden of the working environment and capacity.

From some of the opinions above then can be concluded workload is a volume of work or a record of work that can indicate the volume produced by a number of employees in a particular part. The amount of work to be done by a group or person in a given time or the workload can be seen from an objective and subjective point of view.

2.3.1 *Workload Indicator*

Here are some indicators of the workload (Putri et al, 2023).

a. Continuous improvement in work

Indicates an attitude or strategy in which a person or organization seeks to improve the efficiency, productivity, and quality of work continuously.

b. Completing challenging tasks

Represents the talent or dedication of an individual or team to manage, complete, and complete tasks effectively that require greater effort or

solving more difficult problems. It indicates that when faced with a difficult task, a person or team does not run or give up, but sees the challenge as an opportunity to grow, learn, and significant results.

c. Target to reach

Refers to an exact goal or goal that is expected to be achieved by a person, team, or organization while working. It indicates that a specific performance target has been defined and anticipated to be attained as part of a task or project being implemented.

d. Working Standard

Refer to a criterion or measurement of performance developed to assess the extent to which a particular job or activity has been carried out or completed. It indicates that a job standard sets expectations or expectations about the quality, quantity, or level of performance required in performing a particular task.

2.3.2 *Factors Affecting Workloads*

According to Ohorela (2021), below are some factors that influence the workload among others.

a. Task Requirements Factor

The argument regarding this factor is that the workload can be determined from the analysis of the tasks performed by the worker. However, individual differences must always be taken into account.

b. Effort or Power

The amount spent on a job may be a naturally intuitive form of workload. Nevertheless, since the increase in duty demands has occurred, the individual may not be able to increase the level of effort.

c. Performance

Most workload studies focus on the level of performance to be achieved. However, performance measurement alone will not be able to present a complete workload matrix.

2.3.3 *Workload Measures*

Ohorela (2021) Here are some things that affect the measurement of the workload among others.

a. Subjective Measurement

This measurement is based on the assessment and depreciation by the worker of the burden of work he feels in completing a task. (rating scale).

b. Performance Measurement

This is a measurement obtained by observing the aspects of behavior/activity displayed by the worker. One type of performance measure is time-measured degradation. The measure of performance using time is a method to determine the completion time of a job done by a worker who has a particular qualification, in a defined working environment and worked at a specific working time.

c. Physiological measurement

Measurement that measures the level of workload by knowing some aspects of the physiological response of the worker when completing a particular task/ worker. Measurements are usually performed on pupil reflexes, eye movements, muscle activity, and other bodily responses.

2.4 **Nasa TLX Method**

Zahra, Heru Prastawa (2023:77) The NASA-TLX method is a subjective measurement method used to analyze the mental workload encountered by workers who have to perform various activities in their work. The method was developed by Sandra G. Hart of NASA-Ames Research Centre and Lowell E. Staveland of San Jose State University in 1981 based on the emergence of the need for subjective measurement consisting of a scale of nine factors simplified into six: Mental demand (MD), Physical demand (PD), Temporal demand (TD),

Performance (P), Effort(E), Frustration level (FR). (Event Scoring). Here are six mental burden indicators to be observed based on NASA-TLX.

Table 2. 1 NASA-TLX Indicator

Scale	Rating	Description
Mental Demand (MD)	Low, High	How much mental and perceptual activity it takes to see, remember and search. Whether the work is difficult, simple or complex, loose or tight.
Physical Demand (PD)	Low, High	The amount of physical activity required (such as pushing, pulling and controlling the rotation). Is the job easy or demanding? Slow or fast, loose or busy, calm or exhausting?
Temporal Demand (TD)	Low, High	The amount of pressure associated with the time perceived during the work element continues. Whether work is slow or relaxed or fast and exhausting
Own Performance (OP)	Good, Bad	How great is the fulfilment of a man's work, and how satisfied he is with his work?
Effort (EF)	Low, High	How hard mental and physical work is needed to finish the job
Frustration (FR)	Low, High	How insecure, desperate, offended, disturbed, compared to the feeling of security, satisfaction, comfort and self-satisfaction felt

Andriansyah, et al (2023) The NASA-TLX method, or National Aeronautics and Space Administration Task Load Index is a method for conducting psychological workload analysis for workers who have to perform several activities. This method was developed on the basis of consideration for subjective measurement requirements and covers a scale consisting of nine factors (task difficulty, time stress, type of activity, physical strength, mental strength, performance, depression, stress, and fatigue). In another sense, NASA-TLX is a method used to measure mental workload, which can be divided into objective as well as subjective forms. In the objective method, the mental workload is measured by considering several working physiological criteria.

Nadhim, Ayudhyah Eka Apsari (2023) The NASA-TLX method is a

subjective approach to measuring mental workload, where employees are asked to give their opinion on the work they are doing.

2.5 Previous Research

Previous research is an attempt by researchers to find comparisons and later to find theories that correlate with the research theme. Previous research helps research to position research as well as refer to the originality of research. In this section, the researcher lists various previous research results related to the research to be carried out, as well as researchers gather sources from some references such as journals, books, or other publications that can be said to be valid, then makes a summary, whether published or unpublished research. Here are some previous studies that have been collected by the researchers:

1. Pradhana Heru Prastawa (2022) with the title of research **Analisis Beban Kerja Mental Operator Mesin Pemotongan Kayu Pada Bagian Produksi Perum Perhutani Brumbung Dengan Metode NASA TLX**. The research explains that emerging problems require industry owners to think more so that pioneering industries can survive or even advance from this global competition. Good human resources are an important asset for a company. Employees who have good work performance will definitely have a positive impact on the company. Work performance is related to the workplace, which usually refers to work standards that match good quality and productivity. Workload is a term used to describe the price or cost of achieving a target activity. One way of adjusting the workload is by measuring the load. The workload analysis method used in this study is NASA-TLX. NASA-TLX is one of the methods of subjectively measuring mental workload.
2. Fenyvian, et al (2022) with the title of research **Pengukuran Beban Kerja Mental dan Tingkat Kelelahan Menggunakan Metode NASA-TLX dan Sofi pada Karyawan PT. XYZ**. The research

explains production of tempeh chips in UMKM XYZ still uses manual methods and is repeatedly and monotonous as in the process of sorting and frying tempeh, as well as a poor working environment can create a physical and mental workload, so it can affect the quality of the product. The study aims to measure the physical and mental workload of workers as well as work area design and application of self-protection equipment. Physical workload was measured using the calculation %CVL, mental workload was measured using the NASA-TLX questionnaire. The results of the research are that the physical workload perceived by the workers was 30.4%, so the physical labour load entered the classification that needed improvement but was not urgent. While the level of mental workload was obtained, the results showed that the rate of mental labour load received by the worker belonged to the highest category. This can be seen from the calculation of the average weighted workload (WWL) of 65.33.

3. Manurung, et al (2022) with the title of research **Pengukuran Beban Kerja Mental dan Beban Kerja Fisik Berdasarkan Metode NASA-TLX dan CVL Pada Karyawan UMKM XYZ**. The research explains Working as an IT employee is rated to have a considerable amount of mental workload and exhaustion. This is because the work done includes monotonous work as well as involving mental activities such as processing data and designing. Besides, timing accuracy is also an indicator of work assessment. Based on this, it is necessary to research the mental workload and the level of labour fatigue experienced by employees of PT. XYZ, as well as the influence of the mental labour load on the rate of fatigue. The research finds that the mental workload experienced by employees of the company is in the high category with an average WWL of 72.00 and the most influential dimension is the effort rate (effort) of 276.25. A simple linear regression test obtained the result that the mental workload had no partial influence on the rate of

labour fatigue.

CHAPTER III

RESEARCH METHOD

3.1 Research Object

PT Supernova Palapa Nusantara has a strategic branch office in Bandung, West Java. This location was chosen to serve the needs of customers in Bandung and surrounding areas more effectively and efficiently. Here are more details about the company's location in Bandung. The address of the Branch Office is Jl. Ciwulan No.34, Cihapit, Kec. Bandung Wetan, Bandung City, West Java 40114.

3.2 Research Method

Afif, et al (2023) Quantitative research method is the attempt of a researcher to find knowledge by giving data in the form of numbers. The numbers obtained are used to perform descriptive analysis, simply quantitative studies are scientific research that is systematically structured on parts and to find causality of correlation. The researchers will analyze research related to the Analysis of Mental Work in Departments using NASA TLX and RSME methods in PT Supernova Palapa Nusantara.

Agustianti et al (2022) Quantitative research methods are based on the philosophy applied in population surveys. Then the sample taken in the quantitative method is the employees who work in the company.

Ramdhan (2021) Quantitative research method is also a type of research that underlies or obtains data in numerical form, to obtain certainty about the problem faced and obtain answers from the numbers produced based on the answers of the sample.

3.3 Data Collection Techniques

Data collection techniques are the most important step in research because the main purpose of research is to obtain data. The following are the data collection

techniques used by researchers among others:

a. Questionnaire

Novaldy, Asep Mahpudin (2022) A questionnaire is a technique that collects data from a number of people or respondents through a set of questions to be answered. By providing a list of the questions, the answers obtained are then collected as data. As a research instrument, the method used is a closed questionnaire using the Likert Scale. The questionnaire must measure the validity and reliability of the data so that the research produces valid and reliable data. This research will be conducted phase-by-phase dissemination of questionnaires to employees who work to get the necessary samples related to how the mental health condition of employees working at PT Supernova Palapa Nusantara.

b. Observation

Wawuru (2023) Observation techniques are used to observe the behavior and activity of participants at the site of the study. In these observations, the researchers perform the activity of recording things observed in person. Such activities can be done both structured and unstructured. In this case, researchers can be involved to observe directly how the conditions of employees who work at PT. Supernova Palapa Nusantara.

c. Interview

Wawuru (2023), employed the interviews technique, which is an information-digging technique through a direct conversation between the researchers and the company of PT. Supernova Palapa Nusantara. The researchers conducted a session of interviews with the entire division aimed at obtaining an explanation of exactly how the conditions of the employees who work in the company.

d. Literature Study

Wawuru (2023) The study of libraries relates to theoretical study

through references related to values, cultures, and developing norms of the social situation studied. A literature study is a series of research method activities by gathering library data, such as reading, recording, and processing research materials. In this study, researchers gather references that come from books or journals.

e. Documentation

Wawuru (2023) Documentation is the technique of collecting data by taking from records, documentation, or administration that corresponds to the problem being studied. In this study documentation is obtained from documents of the research object studied.

3.4 Population and Sample

a. Population

Suhardi, et al (2020) A population is a region of generalization consisting of objects or subjects that have certain characteristics that the researcher defines to be studied and then draws conclusions. The population surveyed in this investigation is employees from the entire division that works at PT. Supernova Palapa Nusantara which amounts to 50 people employees.

b. Sample

Suhardi, et al (2020) Samples are part of the quantity and characteristics of the population, whereas the size of the sample is a measure to determine the magnitude of the samples taken in the conduct of a study. The sample is part or representative of the population being studied or part of the object being represented. In this study, sampling was applied to employees who worked throughout the division at the company PT. Supernova Palapa Nusantara. The sample will be done by taking as many as 50 employees who work at PT. Supernova Palapa Nusantara.

CHAPTER IV

DATA COLLECTION AND PROCESSING

4.1 Data Collection

4.1.1 Background

PT Supernova Palapa Nusantara is a company established in 2010, headquartered at Jl. Ciwulan No.34, Cihapit, Kec. Bandung Wetan, Kota Bandung, West Java. Since its inception, the company has experienced rapid growth with various product lines encompassing consumer electronic devices, industrial components, and technology solutions. The company's commitment to innovation, quality, and customer satisfaction has been the main pillars of its business journey for over two decades. PT Supernova Palapa Nusantara has strategically chosen the location for its branch office in Bandung, West Java.

From the outset, PT Supernova Palapa Nusantara has focused on developing high-quality products that meet the needs of both domestic and international markets. By adopting advanced technology and best practices in its production processes, the company can produce reliable and durable products. Their flagship products, such as televisions, audio devices, and household appliances, have gained wide recognition and dominate the local market. In facing global competition, PT Supernova Palapa Nusantara continuously conducts research and development (R&D) to ensure its products remain relevant and innovative. The company's R&D division consists of a team of experts dedicated to creating the latest technological solutions that align with market trends and consumer needs. Continuous investment in R&D enables the company to regularly launch new products, maintaining its competitive position in the market.

In addition to focusing on products, PT Supernova Palapa Nusantara also prioritizes excellent customer service. The company has an extensive after-sales service network, ensuring that every customer receives the necessary technical support and repair services. Training programs for service technicians are regularly conducted to ensure they are always prepared to face any technical challenges that may arise. Regarding

sustainability, PT Supernova Palapa Nusantara is committed to implementing environmentally friendly business practices. The company utilizes clean production technologies and recyclable raw materials to minimize environmental impact. These efforts not only help protect the environment but also enhance the company's image as a socially responsible entity.

Human resources are the greatest asset for PT Supernova Palapa Nusantara. The company continuously invests in employee development through various training and career development programs. Employees are encouraged to continually improve their skills and knowledge to contribute optimally to the company's growth. An inclusive and conducive work environment is also created to support creativity and innovation. In its marketing strategy, PT Supernova Palapa Nusantara employs a holistic approach. They combine traditional and digital media to reach a wider audience. Creative and sustainable marketing campaigns help strengthen brand awareness and drive sales. Additionally, the company frequently participates in industry exhibitions and events to showcase its latest products and establish relationships with potential business partners.

PT Supernova Palapa Nusantara plans to continue expanding its market and enhancing its product portfolio. With a vision to become a leader in the global electronics industry, the company is committed to continuous innovation, improving product quality, and providing the best service to customers. Through the right strategies and full dedication, PT Supernova Palapa Nusantara is optimistic about achieving sustainable growth and long-term success. Additionally, PT Supernova Palapa Nusantara's strategic location provides a competitive advantage. Being close to consumers or markets allows for easier and more efficient marketing processes. This proximity also enhances direct interaction with customers, ultimately increasing customer satisfaction and loyalty. The selection of the branch office location in Bandung was made by considering several important factors, one of which is the level of business competition in the chosen area. By selecting the right location, PT Supernova Palapa Nusantara can manage business competition and maximize existing market potential.

A strategic location also impacts the company's operational efficiency. Being in an accessible location allows the company to reduce transportation and logistics costs.

Furthermore, being close to business and industrial centers facilitates access to resources and other business partners. The strategic location influences PT Supernova Palapa Nusantara's marketing strategy. Being in the heart of Bandung city enables the company to reach a wider target market more easily. This allows the company to implement more effective marketing strategies and increase brand visibility in the local market. Despite having a strategic location, PT Supernova Palapa Nusantara must also face challenges such as high rental costs and intense competition. To address these challenges, the company can optimize office space usage and enhance operational efficiency to reduce costs. Overall, the selection of PT Supernova Palapa Nusantara's branch office location in Bandung is a strategic decision that can support the company's business growth. By leveraging the strategic location, the company can improve operational efficiency, expand market reach, and enhance customer satisfaction. This success must be supported by appropriate business strategies that are adaptive to market changes.

4.1.2 Problem Formulation

Based on the explanation from the background above, the researchers formulated several formulae of problems consisting of:

1. What affects the mental health of employees at PT. Supernova Palapa Nusantara is not running properly?
2. How the mechanism and result of NASA TLX and RSME analysis of employee mental health at PT. Supernova Palapa Nusantara?

4.1.3 Research Objectives

The following are the objectives of the research conducted by the researcher:

1. To analyze what causes and influences mental health to run well.
2. To find out the results of the analysis of employee mental health at PT. Supernova Palapa Nusantara using the NASA TLX and RSME methods.

4.1.4 Research Limitations

In this study, it is necessary to conduct research limitations that aim to ensure that the

discussion of the research conducted is focused on the results of employee performance analysis and its relationship to the mental health of employees working at PT. Supernova Palapa Nusantara using the NASA TLX and RSME methods and the results of the analysis using these methods will be known.

4.1.5 Literature Review and Related Theories

4.1.5.1 Inductive Study

The following are previous studies on the analysis of employee mental workload using NASA-TLX and RSME methods:

No	Author	Title	Result
1	Pradhana Heru Prastawa	Analysis of Mental Workload of Wood Cutting Machine Operators in the Production Section of Perum Perhutani Brumbung Using the NASA TLX Method	This study emphasizes the importance of good human resources for company performance. The NASA-TLX method is used to measure mental workload subjectively, which is crucial for adjusting workload.
2	Fenyvian, et al	Measurement of Mental Workload and Fatigue Levels Using the NASATLX and Sofi Methods on Employees of PT. XYZ	The physical workload of workers is 30.4%, requiring improvement. The mental workload is in the highest category with an average WWL of 65.33, indicating the need for workplace design and personal protective equipment.
3	Manurung, et al	Measurement of Mental and Physical Workload Based on the NASATLX and CVL Methods on Employees of UMKM XYZ	The mental workload of employees is in the high category with an average WWL of 72.00. The most influential dimension is the level of effort at 276.25, but there is no partial effect on fatigue levels.

4.1.5.2 Deductive Research

1. Workload

A workload is defined as the number of activities an organization unit or position holder must complete systematically using various management techniques within a certain period to assess efficiency and effectiveness. It is perceived as something beyond the worker's ability to perform their job, with the difference between expected and available capacity indicating task difficulty. Excessive workloads can lead to physical and mental exhaustion, causing issues like headaches, digestive disorders, and irritability (Kirana et al., 2023). A workload encompasses the amount of work, complexity, responsibility level, and time limits that a person must complete within a certain period. The workload level is determined by human capacity and available resources, with overly heavy tasks causing stress and fatigue, negatively impacting employee well-being. Conversely, too-light workloads may not fully utilize individual resources (Putri et al., 2023).

The indicators of the workload (Putri et al, 2023):

- a. Continuous improvement in work Indicates an attitude or strategy in which a person or organization seeks to improve the efficiency, productivity, and quality of work continuously.
- b. Completing challenging tasks Represents the talent or dedication of an individual or team to manage, complete, and complete tasks effectively that require greater effort or solving more difficult problems. It indicates that when faced with a 9 difficult task, a person or team does not run or give up, but sees the challenge as an opportunity to grow, learn, and significant results.
- c. Target to reach Refers to an exact goal or goal that is expected to be achieved by a person, team, or organization while working. It indicates that a specific performance target has been defined and anticipated to be attained as part of a task or project being implemented.
- d. Working Standard refers to a criterion or measurement of performance developed to assess the extent to which a particular job or activity has been carried out or completed. It indicates that a job standard sets expectations or expectations about

the quality, quantity, or level of performance required in performing a particular task

Ohorela (2021) Here are some factors that influence the workload among others:

a. Task Requirements Factor

The argument regarding this factor is that the workload can be determined from the analysis of the tasks performed by the worker. However, individual differences must always be taken into account. a. Effort or Power The amount spent on a job may be a naturally intuitive form of workload. Nevertheless, since the increase in duty demands has occurred, the individual may not be able to increase the level of effort.

b. Performance

Most workload studies focus on the level of performance to be achieved. However, performance measurement alone will not be able to present a complete workload matrix.

Ohorela (2021) Here are some things that affect the measurement of the workload among others:

a. Subjective Measurement

This measurement is based on the assessment and depreciation by the worker of the burden of work he feels in completing a task. (rating scale).

b. Performance Measurement

This is a measurement obtained by observing the aspects of behaviour/activity displayed by the worker. One type of performance measure is time-measured degradation. The measure of performance using time is a method to determine the completion time of a job done by a worker who has a particular qualification, in a defined working environment and worked at a specific working time.

c. Physiological Measurement

Measurement that measures the level of workload by knowing some aspects of the physiological response of the worker when completing a particular task/

worker. Measurements are usually performed on pupil reflexes, eye movements, muscle activity, and other bodily responses.

2. Mental Workload

Mental health, according to medical science, is a condition that enables the optimal physical, intellectual, and emotional development of a person and that development goes hand in hand with the conditions of others. Mental health is a condition in which a person does not feel guilty about himself, has a realistic assessment of himself, and is able to accept his shortcomings or weaknesses, the ability to face the problems of his life, to have satisfaction in his social life, and to have happiness in his life. The family is the first environment of the child that is very influential for early, middle, and late child development (Anggraini et al, 2020).

Rafifah et al (2022) explain mental health more comprehensively and look at mental health in a "positive" way. He argues that mental health is a person who continually grows, develops, and matures in his life, accepts responsibility, and finds adjustment (without paying too much for himself or the community) in participating in the maintenance of social rules and actions in his culture. The World Federation for Mental Health defines mental health as a condition that allows for optimal physical, intellectual, and emotional development, as long as it is appropriate to the circumstances of others. A mentally healthy society is a society that allows its members to develop according to their abilities.

Alfiana Nur Widiasmara (2022) Mental health is the individual's ability to avoid the symptoms of mental disorders and symptoms, and mental health is also the ability of the individual to adapt to himself, to others, and to the community in which he or she is. Mental health is the realization of harmony between the functions of the mind and has the ability to cope with the common problems that occur and can get the positive things of happiness and ability that exist in him.

3. Nasa TLX Method

Zahra, Heru Prastawa (2023:77) The NASA-TLX method is a subjective

measurement method used to analyze the mental workload encountered by workers who have to perform various activities in their work. The method was developed by Sandra G. Hart of NASA-Ames Research Centre and Lowell E. Stave land of San Jose State University in 1981 based on the emergence of the need for subjective measurement consisting of a scale of nine factors simplified into six: Mental demand (MD), Physical demand (PD), Temporal demand (TD), Performance (P), Effort(E), Frustration level (FR). (Event Scoring). Here are six mental burden indicators to be observed based on NASA-TLX.

Andriansyah, et al (2023) The NASA-TLX method, or National Aeronautics and Space Administration Task Load Index is a method for conducting psychological workload analysis for workers who have to perform several activities. This method was developed on the basis of consideration for subjective measurement requirements and covers a scale consisting of nine factors (task difficulty, time stress, type of activity, physical strength, mental strength, performance, depression, stress, and fatigue). In another sense, NASA-TLX is a method used to measure mental workload, which can be divided into objective as well as subjective forms. In the objective method, the mental workload is measured by considering several working physiological criteria.

4. RSME Method

The Rating Scale Mental Effort (RSME) technique serves as a tool for evaluating the mental workload encountered by employees. Developed by Zijlstra in 1985, the RSME is a subjective measurement approach that utilizes a single scale. It collects data using a scale ranging from 0 to 150, which includes several references or anchor points to guide the assessment (Nurrianti et al., 2019). This method identifies seven key reference points: Very great effort, Very effort, Quite large effort, Small effort, Very small effort, Almost no effort, and No effort at all.

4.1.6 Demographic Data Respondent

Table 4. 1 *Demographic Data Respondent*

No	Name	Age	Gender	Working Time	Rest Time	Position	Job Description
1	Alif	27	Male	8	1	Sales Marketing Department	Evaluate and check export and local shipments
2	Annisa	26	Female	8	1	Financial Controller	Payment of bills/production costs, company financial planning.
3	Pramudi	31	Male	8	1	Production Manager	Planning, implementing, and controlling effective and efficient production strategies
4	Devia	24	Male	8	1	Financial Administration	Evaluate and optimize financial procedures and control finances, create and update daily records, and assist with payroll administration.
5	Daniel	28	Male	8	1	Human Resource	Recruitment.
6	Agoes	28	Male	8	1	Software Engineer	Develops and maintains software
7	Juliana	34	Female	8	1	Project Manager	Oversees project timelines and goals
8	Alisia	29	Female	8	1	Data Analyst	Analyzes data trends and patterns
9	Boby	45	Male	8	1	Operations Lead	Manages daily operations
10	Karelin	31	Female	8	1	HR Specialist	Handles recruitment and training
11	Dany	38	Male	8	1	Marketing Head	Leads marketing strategies
12	Emima	27	Female	8	1	Graphic Designer	Designs visual content
13	Fitra	40	Male	8	1	Sales Manager	Directs sales team and strategies
14	Grace	33	Female	8	1	Accountant	Manages financial records
15	Hendry	36	Male	8	1	IT Support	Provides technical support
16	Ivianti	30	Female	8	1	Content Writer	Creates written content
17	Jakabudi	42	Male	8	1	Logistics Manager	Oversees supply chain operations
18	Kelly	26	Female	8	1	Customer Service	Assists customers with inquiries
19	Rahim	39	Male	8	1	Product Manager	Manages product development
20	Mia	32	Female	8	1	UX Designer	Designs user experiences
21	Dayat	37	Male	8	1	Quality Analyst	Ensures product quality
22	Olivia	29	Female	8	1	Business Analyst	Analyzes business processes
23	Budianto	41	Male	8	1	Finance Manager	Manages financial planning
24	Quena	35	Female	8	1	Legal Advisor	Provides legal guidance
25	Riyan	28	Male	8	1	Network Engineer	Manages network infrastructure
26	Sarah	31	Female	8	1	PR Specialist	Manages public relations
27	Tomy	44	Male	8	1	Procurement Lead	Oversees purchasing activities

28	Yuma	30	Female	8	1	Event Coordinator	Plans and executes events
29	Victor	38	Male	8	1	Security Officer	Ensures safety and security
30	Wendy	27	Female	8	1	Social Media Manager	Manages social media presence
31	Safri	36	Male	8	1	Warehouse Supervisor	Oversees warehouse operations
32	Yati	33	Female	8	1	Research Scientist	Conducts scientific research
33	Eriko	40	Male	8	1	Maintenance Lead	Manages maintenance tasks
34	Abbimayu	29	Female	8	1	Administrative Assistant	Supports administrative tasks
35	Beben	34	Male	8	1	Technical Writer	Writes technical documentation
36	Siti	28	Female	8	1	HR Assistant	Assists HR department
37	Sukri	37	Male	8	1	Systems Analyst	Analyzes IT systems
38	Ella	32	Female	8	1	Training Coordinator	Organizes training programs
39	Fino	35	Male	8	1	Compliance Officer	Ensures regulatory compliance
40	Gina	31	Female	8	1	Executive Assistant	Supports executive tasks

The demographic data presented in Table 4.1 provides a comprehensive overview of the respondents' profiles, including their age, gender, working time, rest time, position, and job description. This dataset is crucial for understanding the workforce composition and the diversity of roles within the organization. The data reveals a balanced distribution of male and female employees across various departments, highlighting the organization's commitment to gender diversity. The age range of the respondents spans from 24 to 45 years, indicating a mix of both young and experienced professionals contributing to the company's operations. The age distribution among the respondents shows a concentration of employees in their late 20s to early 30s, with the youngest being 24 and the oldest 45. This suggests a relatively young workforce, which could imply a dynamic and adaptable work environment. Gender distribution is fairly balanced, with a slight male predominance. This balance is reflected across different roles, from technical positions like Software Engineer and Network Engineer to creative roles such as Graphic Designer and Content Writer. Such diversity can enhance team collaboration and innovation, as varied perspectives are brought to the table. The dataset categorizes employees into various roles, each with specific responsibilities. For instance, roles like Financial Controller and Finance Manager focus on financial planning and management, while

positions such as Project Manager and Operations Lead are pivotal in overseeing project timelines and daily operations. The presence of specialized roles like UX Designer and Data Analyst indicates the company's emphasis on user experience and data-driven decision-making. This diversity in job roles suggests a well-rounded organizational structure that supports both operational efficiency and strategic growth. The demographic data provides valuable insights into the organization's human resource strategy. The uniform working and rest times across all roles suggest a standardized work schedule, which can facilitate coordination and productivity. The variety of roles and the balanced gender distribution reflect an inclusive workplace culture that values both technical expertise and creative input. This data can inform future recruitment strategies, ensuring that the organization continues to attract a diverse and skilled workforce. Additionally, understanding the current demographic makeup can help in tailoring employee development programs to enhance skills and career progression opportunities within the company.

4.1.7 Description of Data Collection Methods

The following is how to collect data from each method.:

1. National Aeronautics and Space Administration Task Load Index (NASA-TLX)

The following are the steps for collecting data using the NASA-TLX method, as follows:

- a. Step 1:

Respondents will choose one of the 2 choices (compare) that are most dominant when respondents do their work. For example, respondents will choose between Mental Demand or Physical Demand, which is more dominant when respondents do their work.

	MD	PD	TD	OP	EF	FR
MD						
PD						
TD						
OP						
EF						
FR						

Figure 4. 1 Weighting NASA-TLX

b. Step 2:

At this stage, respondents will give a rating of 0 – 100 according to the questions provided from each dimension they feel when doing their work.

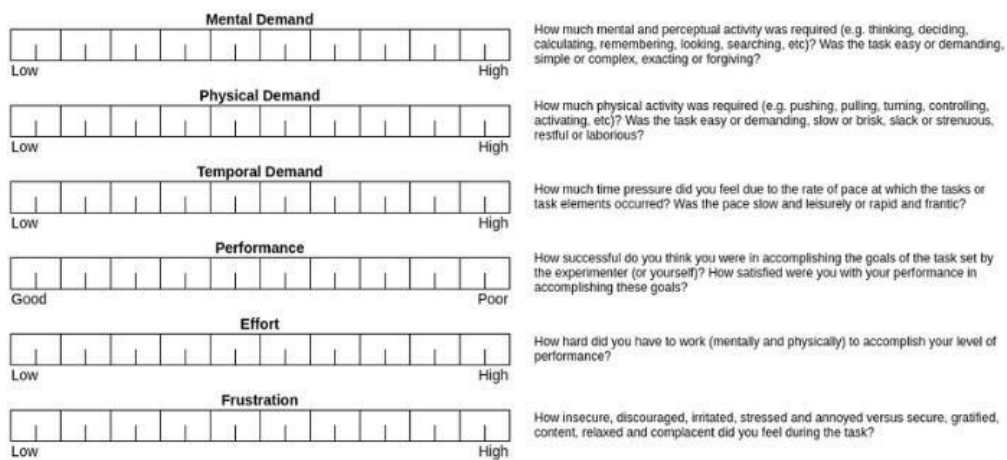


Figure 4. 2 Rating NASA-TLX

c. Step 3:

After getting the value of Weighting and Ratings, the product value will be done with the formula:

$$Produk = rating \times bobot faktor$$

Figure 4. 3 Product Value

d. Step 4:

After obtaining the product value, the Weighted Workload (WWL) is summed up with the formula:

$$WWL = \sum \text{produk}$$

Figure 4. 4 Weighted Workload Value

e. Step 5:

After getting the total WWL, the score or average WWL is calculated using the formula: The value of 15 is obtained from the total comparison between weights:

$$\text{Skor} = \frac{\sum \text{produk}}{15}$$

Figure 4. 5 Average WLL Value

f. Step 6:

After getting the score, the researcher can categorize the mental workload experienced by the respondents.

Table 4. 2 NASA-TLX Category

Score	Category
0 - 9	Very Low
10 - 29	Low
30 - 49	Medium
50 - 79	High
80 - 100	Very High

g. Step 7:

Conduct an analysis based on the category scores obtained from each respondent

2. Rating Scale Mental Effort (RSME)

a. Step 1:

Respondents were asked to choose from a score of 0 – 150 with descriptions at several reference points corresponding to the mental effort required to complete the task.



Figure 4. 6 Scale RSME

The scale contained in the RSME:

1. Very Great Effort 138
2. Very Effort 112
3. Quite Large Effort 85
4. Small Effort 57
5. Very Small Effort 38
6. Almost No Effort 13
7. No Effort at all 0

4.1.8 Research Flow

The following is the flow of this research which is described by a flow chart:

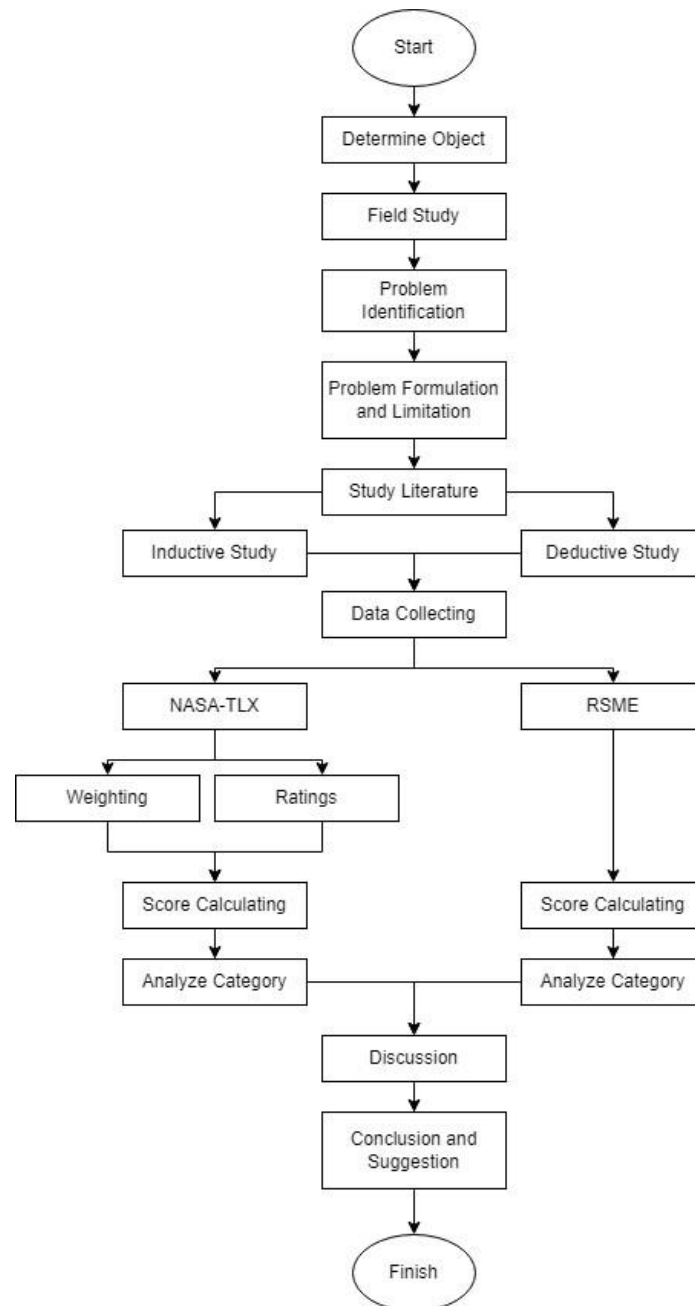


Figure 4. 7 Flowchart Research

Flowchart explanation:

1. This research begins with Determining the Object of research. The object of research chosen is the mental workload of the workforce of PT Supernova Palapa Nusantara

2. Next, conduct a Field Study to find out the situation in the field directly.
3. After that, Identify Problems related to the object of research to get problems that occur.
4. Formulate Problem Formulation and Limits for Research.
5. Conduct a Literature Study to get a strong theoretical basis for research. Literature studies are carried out with two approaches, namely Inductive Studies and Deductive Studies. Inductive Studies come from the results of research that has been done and Deductive Studies come from existing general theories.
6. Data collection was carried out by distributing or directly interviewing respondents with NASA-TLX and RSME questionnaires.
7. After that, data processing was carried out using the NASA-TLX and RSME methods to obtain the final category or score owned by respondents with each method.
8. Analyzing each method to find out the results obtained.
9. After that, discuss the results of the analysis as a whole. Then the final score will be averaged to represent the mental workload owned by the workforce of PT Supernova Palapa Nusantara.
10. In the conclusions and suggestions section, the researcher briefly explains the answers to the predetermined problem formulations and suggestions that can be made by the PT Supernova Palapa Nusantara.

4.2 Data Processing

4.2.1 NASA-TLX Category

The following are the calculation steps of the NASA-TLX method:

a. Step 1: Weighting calculation

In this step, respondents will choose one of 2 options (compare) between the two most dominant dimensions when respondents do their work. For example, respondents will choose between Mental Demand or Physical

Demand which is more dominant when respondents do their work. As in Figure 4.1, there are 15 comparisons for all dimensions (6 dimensions). The following is the weighting data:

Table 4. 3 Weighting Calculation

No	Name	Indicators						Total
		MD	PD	TD	P	E	F	
1	Alif	2	4	3	1	5	0	15
2	Annisa	3	1	2	3	4	2	15
3	Pramudi	1	2	4	3	5	0	15
4	Devia	1	2	4	3	5	0	15
5	Daniel	2	2	4	4	3	0	15
6	Agoes	3	2	3	2	4	1	15
7	Juliana	1	2	4	3	5	0	15
8	Alisia	2	2	4	4	3	0	15
9	Boby	3	1	2	3	4	2	15
10	Karelin	1	2	4	3	5	0	15
11	Dany	2	2	4	2	5	0	15
12	Emima	3	2	3	2	4	1	15
13	Fitra	2	2	2	4	5	0	15
14	Grace	3	1	2	3	4	2	15
15	Hendry	1	2	4	3	5	0	15
16	Ivianti	2	2	3	4	4	0	15
17	Jakabudi	3	1	2	3	4	2	15
18	Kelly	1	2	4	3	5	0	15
19	Rahim	2	2	3	4	4	0	15
20	Mia	2	2	3	3	5	0	15
21	Dayat	3	2	3	2	4	1	15
22	Olivia	2	2	4	3	4	0	15
23	Budianto	3	1	2	3	4	2	15
24	Quena	1	2	4	3	5	0	15
25	Riyan	2	2	4	4	2	1	15
26	Sarah	1	2	4	3	5	0	15
27	Tomy	2	2	3	3	4	1	15
28	Yuma	3	1	2	3	4	2	15
29	Victor	1	2	4	3	5	0	15
30	Wendy	2	2	3	3	5	0	15
31	Safri	2	2	4	4	3	0	15
32	Yati	3	1	2	3	4	2	15

33	Eriko	1	2	4	3	5	0	15
34	Abbimayu	2	2	4	2	3	2	15
35	Beben	2	2	2	4	5	0	15
36	Siti	3	1	2	3	4	2	15
37	Sukri	1	2	4	3	5	0	15
38	Ella	2	2	4	4	3	0	15
39	Fino	3	2	3	2	4	1	15
40	Gina	3	1	2	3	4	2	15

Description: MD: Mental Demand, PD: Physical Demand, TD: Temporal Demand, P: Performance, E: Effort, F: Frustration

Based on the data presented in Table 4.3 regarding the weighting calculations using NASA-TLX, several patterns and trends can be observed in the participants' perceptions of workload. Each participant assessed six workload indicators: Mental Demand (MD), Physical Demand (PD), Temporal Demand (TD), Performance (P), Effort (E), and Frustration (F). The total score for each participant is 15, indicating that despite variations in the assessment of each indicator, their overall perception of workload remains consistent. Some participants, such as Alif, Pramudi, Devia, and others, assigned a zero score to the Frustration indicator, suggesting that they did not feel frustrated during the task. Conversely, participants like Annisa and Bobby assigned scores to Frustration, indicating a certain level of frustration during task execution. The indicators of Mental Demand and Temporal Demand often received higher scores, as seen in participants like Annisa and Bobby, indicating that the tasks required significant mental concentration and might have been performed under time pressure. Conversely, Physical Demand tended to receive lower scores, suggesting that the tasks were not very physically demanding. Overall, although there is variation in the assessment of each indicator, the same total score indicates that participants have a balanced perception of workload, albeit with different focuses on certain aspects of the task. This can provide insights for task managers to adjust certain aspects of the tasks to reduce

perceived workload, particularly in the mental and temporal aspects.

b. Step 2: Rating

At this step, the respondent will give a rating of 0 - 100 according to the questions that have been provided from each dimension (6 dimensions).

The following are the ratings result data:

Table 4. 4 Ratings

No	Name	Indicators					
		MD	PD	TD	P	E	F
1	Alif	10	40	20	20	40	40
2	Annisa	40	40	30	30	40	40
3	Pramudi	60	50	60	50	50	50
4	Devia	40	60	60	50	60	60
5	Daniel	60	40	60	50	50	40
6	Agoes	40	40	20	30	40	40
7	Juliana	60	60	60	50	50	50
8	Alisia	10	40	20	20	40	40
9	Boby	40	40	30	30	40	40
10	Karelin	50	60	60	50	60	50
11	Dany	60	60	60	40	40	30
12	Emima	60	40	50	60	60	40
13	Fitra	60	40	60	50	50	60
14	Grace	10	40	20	20	40	40
15	Hendry	50	60	50	40	60	40
16	Ivianti	60	60	50	40	50	60
17	Jakabudi	60	60	60	60	40	60
18	Kelly	40	60	50	40	40	60
19	Rahim	40	60	50	40	40	10
20	Mia	40	20	20	40	40	40
21	Dayat	60	50	40	40	60	60
22	Olivia	60	40	40	60	60	60
23	Budianto	60	40	40	60	40	60
24	Quena	50	40	40	60	40	60
25	Riyan	50	40	40	10	40	20
26	Sarah	30	40	40	40	60	50
27	Tomy	40	40	60	60	50	40
28	Yuma	40	60	60	60	50	40

29	Victor	40	60	40	60	60	60
30	Wendy	40	40	60	60	40	60
31	Safri	50	40	40	60	40	60
32	Yati	50	40	40	10	40	20
33	Eriko	20	40	40	40	60	50
34	Abbimayu	40	40	60	60	70	40
35	Beben	40	60	60	60	60	40
36	Siti	40	40	60	40	60	50
37	Sukri	40	40	10	40	60	50
38	Ella	40	40	60	60	50	40
39	Fino	40	60	60	60	40	40
40	Gina	40	40	60	40	60	50

Notabene: MD: Mental Demand, PD: Physical Demand, TD: Temporal Demand, P: Performance, E: Effort, F: Frustration

Based on the data presented in Table 4.4 regarding workload indicator assessments, we can observe variations in the participants' perceptions of workload. Each participant evaluated six indicators: Mental Demand (MD), Physical Demand (PD), Temporal Demand (TD), Performance (P), Effort (E), and Frustration (F). Some participants, such as Pramudi and Devia, gave high ratings on almost all indicators, indicating that they perceive a high workload across various aspects. For instance, Pramudi scored 60 on Mental Demand, Temporal Demand, and Frustration, suggesting that the task is highly demanding mentally and temporally and causes significant frustration. Devia also showed a similar pattern with high scores on Physical Demand and Frustration. Conversely, participants like Alif and Alisia gave lower ratings, particularly on Mental Demand and Temporal Demand, indicating that they might not find the task very demanding mentally or time-wise. Alif, for instance, gave a score of 10 on Mental Demand, suggesting that the task is not very cognitively demanding for him. The indicators of Physical Demand and Frustration tend to receive more varied assessments. For example, Rahim gave a low rating on Frustration, indicating that he did not feel very frustrated during the task, while other participants like Devia gave high ratings, indicating a higher level of frustration. Overall, this data shows

that although there is variation in workload perception among participants, some indicators such as Mental Demand and Temporal Demand are often rated higher, suggesting that the tasks might be more mentally and temporally demanding. This can provide insights for task managers to adjust certain aspects to reduce perceived workload, particularly in mental and time aspects.

c. Step 3: Product value calculating

After getting the weight and rating values, the next step is to calculate the product with the formula in Formula 4.1 which explains the Product formula. The following is one of the calculations of the product value of Mr. Alif and the result data:

Table 4. 5 Product Value

Name	Indicators					
	MD	PD	TD	P	E	F
Alif	20	160	60	20	200	0
Annisa	120	40	60	90	160	80
Pramudi	60	100	240	150	250	0
Devia	40	120	240	150	300	0
Daniel	120	80	240	200	150	0
Agoes	120	80	60	60	160	40
Juliana	60	120	240	150	250	0
Alisia	20	80	80	80	120	0
Boby	120	40	60	90	160	80
Karelin	50	120	240	150	300	0
Dany	120	120	240	80	200	0
Emima	180	80	150	120	240	40
Fitra	120	80	120	200	250	0
Grace	30	40	40	60	160	80
Hendry	50	120	200	120	300	0
Ivianti	120	120	150	160	200	0
Jakabudi	180	60	120	180	160	120
Kelly	40	120	200	120	200	0
Rahim	80	120	150	160	160	0
Mia	80	40	60	120	200	0
Dayat	180	100	120	80	240	60
Olivia	120	80	160	180	240	0

Budianto	180	40	80	180	160	120
Quena	50	80	160	180	200	0
Riyan	100	80	160	40	80	20
Sarah	30	80	160	120	300	0
Tomy	80	80	180	180	200	40
Yuma	120	60	120	180	200	80
Victor	40	120	160	180	300	0
Wendy	80	80	180	180	200	0
Safri	100	80	160	240	120	0
Yati	150	40	80	30	160	40
Eriko	20	80	160	120	300	0
Abbimayu	80	80	240	120	210	80
Beben	80	120	120	240	300	0
Siti	120	40	120	120	240	100
Sukri	40	80	40	120	300	0
Ella	80	80	240	240	150	0
Fino	120	120	180	120	160	40
Gina	120	40	120	120	240	100

Notabene: MD: Mental Demand, PD: Physical Demand, TD: Temporal Demand, P: Performance, E: Effort, F: Frustration

Based on the data presented in Table 4.5 regarding the product values of various workload indicators, we can observe variations in the participants' perceptions of workload. Each participant evaluated six indicators: Mental Demand (MD), Physical Demand (PD), Temporal Demand (TD), Performance (P), Effort (E), and Frustration (F). The participant with the highest product value is Juliana, with high values in Physical Demand (120), Temporal Demand (240), and Effort (250), indicating that she experiences a significant workload in terms of physical, time, and effort. Conversely, the participant with the lowest product value is Grace, who has low values across almost all indicators, particularly in Mental Demand (30) and Physical Demand (40), suggesting that she experiences a lighter workload compared to other participants. Overall, this data shows significant variation in workload perception among participants, with some experiencing heavier loads in certain aspects such as physical and time, while others perceive lighter workloads. This can provide insights for task managers to

adjust certain aspects to reduce perceived workload, especially in areas rated highly by participants.

d. Step 4 & 5: Weighted Workload (WWL) and Average WWL Calculations and Score

After getting the product value from each respondent, the next step is to calculate WWL and Average WWL to determine the mental workload category using the formulas in Formula 4.2 and Formula 4.3. The following is one of the calculations of WWL and Average WWL and the result data:

$$\text{Formula WWL} = \sum \text{Product}$$

$$\text{Formula Average WWL} = \frac{\sum \text{Product}}{15}$$

The results of the calculations in this study are presented in Table 4.7 below.:

Table 4. 6 WWL & Average WWL

Name	Product Value						WWL	Average WWL
	MD	PD	TD	P	E	F		
Alif	20	160	60	20	200	0	460	30.67
Annisa	120	40	60	90	160	80	550	36.67
Pramudi	60	100	240	150	250	0	800	53.33
Devia	40	120	240	150	300	0	850	56.67
Daniel	120	80	240	200	150	0	790	52.67
Agoes	120	80	60	60	160	40	520	34.67
Juliana	60	120	240	150	250	0	820	54.67
Alisia	20	80	80	80	120	0	380	25.33
Boby	120	40	60	90	160	80	550	36.67
Karelin	50	120	240	150	300	0	860	57.33
Dany	120	120	240	80	200	0	760	50.67
Emima	180	80	150	120	240	40	810	54.00
Fitra	120	80	120	200	250	0	770	51.33
Grace	30	40	40	60	160	80	410	27.33
Hendry	50	120	200	120	300	0	790	52.67
Ivianti	120	120	150	160	200	0	750	50.00
Jakabudi	180	60	120	180	160	120	820	54.67
Kelly	40	120	200	120	200	0	680	45.33
Rahim	80	120	150	160	160	0	670	44.67
Mia	80	40	60	120	200	0	500	33.33

Dayat	180	100	120	80	240	60	780	52.00
Olivia	120	80	160	180	240	0	780	52.00
Budianto	180	40	80	180	160	120	760	50.67
Quena	50	80	160	180	200	0	670	44.67
Riyan	100	80	160	40	80	20	480	32.00
Sarah	30	80	160	120	300	0	690	46.00
Tomy	80	80	180	180	200	40	760	50.67
Yuma	120	60	120	180	200	80	760	50.67
Victor	40	120	160	180	300	0	800	53.33
Wendy	80	80	180	180	200	0	720	48.00
Safri	100	80	160	240	120	0	700	46.67
Yati	150	40	80	30	160	40	500	33.33
Eriko	20	80	160	120	300	0	680	45.33
Abbimayu	80	80	240	120	210	80	810	54.00
Beben	80	120	120	240	300	0	860	57.33
Siti	120	40	120	120	240	100	740	49.33
Sukri	40	80	40	120	300	0	580	38.67
Ella	80	80	240	240	150	0	790	52.67
Fino	120	120	180	120	160	40	740	49.33
Gina	120	40	120	120	240	100	740	49.33

BB: MD: Mental Demand, PD: Physical Demand, TD: Temporal Demand, P: Performance, E: Effort, F: Frustration

Based on the data in Table 4.6, it can be seen that in the Average WWL results, Karelin has the highest average value of 57.33, with the most dominant dimensions being Effort, Temporal Demand, and Performance. Then followed by Devia with an average value of 56.67, with the most dominant dimensions being Effort and Temporal Demand. While the lowest average value is Alisia with an average value of 25.33, with the most dominant dimension being Effort. Overall, the average WWL value is >50.00 with the most dominant indicator being Effort.

e. Step 6: NASA-TLX Category

The last step is to determine the mental workload category from the average WWL results as shown in Figure 4.6, here are the data results:

Table 4. 7 NASA-TLX Category

Name	Average WWL	NASA-TLX Category
Alif	30.67	Medium
Annisa	36.67	Medium
Pramudi	53.33	Hight
Devia	56.67	Hight
Daniel	52.67	Hight
Agoes	34.67	Medium
Juliana	54.67	Hight
Alisia	25.33	Low
Boby	36.67	Medium
Karelin	57.33	Hight
Dany	50.67	Hight
Emima	54.00	Hight
Fitra	51.33	Hight
Grace	27.33	Low
Hendry	52.67	Hight
Ivianti	50.00	Hight
Jakabudi	54.67	Hight
Kelly	45.33	Medium
Rahim	44.67	Medium
Mia	33.33	Medium
Dayat	52.00	Hight
Olivia	52.00	Hight
Budianto	50.67	Hight
Quena	44.67	Medium
Riyan	32.00	Medium
Sarah	46.00	Medium
Tomy	50.67	Hight
Yuma	50.67	Hight
Victor	53.33	Hight
Wendy	48.00	Medium
Safri	46.67	Medium
Yati	33.33	Medium
Eriko	45.33	Medium
Abhimayu	54.00	Hight
Beben	57.33	Hight
Siti	49.33	Medium

Sukri	38.67	Medium
Ella	52.67	Hight
Fino	49.33	Medium
Gina	49.33	Medium

Based on the data presented in Table 4.7 regarding the NASA-TLX categories, we can observe variations in the participants' perceptions of workload. Each participant has an average workload value (Average WWL) categorized into three levels: Low, Medium, and High. The participants with the highest average workload values are Karelin and Beben, each with a score of 57.33, placing them in the High category, indicating that they perceive a very high workload compared to other participants. Conversely, the participant with the lowest average workload value is Alisia, with a score of 25.33, placing her in the Low category, indicating that she perceives a relatively light workload. Most participants, such as Pramudi, Devia, and Juliana, fall into the High category, indicating that they perceive a significant workload. Meanwhile, some participants like Alif and Annisa are in the Medium category, indicating a moderate workload. Overall, this data shows significant variation in workload perception among participants, with some experiencing heavier workloads and others experiencing lighter ones. This can provide insights for task managers to adjust workloads to enhance participants' efficiency and well-being.

4.2.2 RSME Category

In this method, respondents only give a score from 0 – 150 and there are reference points with seven categories based on how much mental workload the respondent experiences in completing their task. The following are the seven reference points in this method:

1. Very Great Effort (Upaya Sangat Besar) 138
2. Very Effort (Upaya Sangat Besar) 113
3. Quite Large Effort (Upaya Cukup Besar) 85
4. Small Effort (Upaya Kecil) 57

5. Very Small Effort (Upaya Sangat Kecil) 38
6. Almost No Effort (Hampir Tidak Ada Upaya) 13
7. No Effort (Tidak Ada Upaya Sama Sekali) 0

The following result data was obtained:

Table 4. 8 RSME Calculation and Category

Nama	Score	Category
Alif	100	Quite Large effort
Annisa	112	Quite Large effort
Pramudi	120	Very effort
Devia	110	Quite Large effort
Daniel	115	Very effort
Agoes	145	Very Great Effort
Juliana	132	Very Great Effort
Alisia	120	Very Great Effort
Boby	110	Very Effort
Karelin	105	Very Effort
Dany	98	Very Effort
Emima	90	Very Effort
Fitra	85	Quite Large Effort
Grace	80	Quite Large Effort
Hendry	75	Quite Large Effort
Ivianti	70	Quite Large Effort
Jakabudi	65	Quite Large Effort
Kelly	60	Quite Large Effort
Rahim	55	Quite Large Effort
Mia	50	Small Effort
Dayat	45	Small Effort
Olivia	40	Small Effort
Budianto	35	Small Effort
Quena	30	Small Effort
Riyan	25	Small Effort
Sarah	20	Small Effort
Tomy	15	Small Effort
Yuma	10	Small Effort
Victor	5	Small Effort
Wendy	0	Small Effort
Safri	130	Very Great Effort

Yati	115	Very Effort
Eriko	100	Very Effort
Abbimayu	95	Very Effort
Beben	85	Quite Large Effort
Siti	75	Quite Large Effort
Sukri	65	Quite Large Effort
Ella	55	Quite Large Effort
Fino	45	Small Effort
Gina	35	Small Effort

Based on the data presented in Table 4.8 regarding the calculation results and RSME (Rating Scale Mental Effort) categories, we can observe variations in the level of mental effort perceived by the participants. Each participant has a score categorized into several effort levels: Small Effort, Quite Large Effort, Very Effort, and Very Great Effort. The participant with the highest score is Agoes, with a score of 145, placing him in the Very Great Effort category, indicating that Agoes perceives a very high mental effort in the given task. Juliana and Alisia are also in the same category, indicating significant mental effort levels. Conversely, the participant with the lowest score is Wendy, with a score of 0, placing her in the Small Effort category, indicating that Wendy perceives minimal mental effort. Other participants like Victor and Tomy are also in the Small Effort category, indicating that they find the task not very mentally demanding. Overall, this data shows significant variation in mental effort perception among participants, with some experiencing heavier effort and others experiencing lighter effort. This can provide insights for task managers to adjust mental workloads to enhance participants' efficiency and well-being.

CHAPTER V

DISCUSSION

5.1 NASA-TLX Category

Based on the research findings, the NASA-TLX can be explained as follows. NASA-TLX (Task Load Index) is a method used to measure an individual's mental workload by considering six main dimensions: Mental Demand (MD), Physical Demand (PD), Temporal Demand (TD), Performance (P), Effort (E), and Frustration (F). This method was developed to provide a more sensitive subjective assessment of mental workload compared to other more objective methods. Each of these dimensions represents different aspects of the workload perceived by individuals, such as mental and physical demands, time pressure, and the levels of effort and frustration experienced during specific tasks. In the assessment process using NASA-TLX, participants are asked to rate the extent of the workload they perceive based on these six dimensions. This assessment is typically conducted through a questionnaire that allows participants to score each dimension, which is then summed to obtain the total mental workload. This method has been used in various studies to measure mental workload across different work environments, such as in manufacturing and healthcare industries, with results showing variations in mental workload levels among workers. NASA-TLX is considered superior due to its ability to capture the nuances of mental workload that may not be apparent in purely physical measurements.

In the process of measuring mental workload using the NASA-TLX method, the first step is weighting. At this stage, respondents are asked to compare the two most dominant workload dimensions when they perform their tasks. There are six dimensions assessed: Mental Demand (MD), Physical Demand (PD), Temporal Demand (TD), Performance (P), Effort (E), and Frustration (F). From each comparison, weighting data is obtained and then processed for each participant. The next step is assessment, where respondents rate each dimension from 0 to 100 based on the questions provided. This assessment data shows variation in workload perception among participants, with indicators like Mental Demand and Temporal Demand often receiving higher ratings,

indicating that the tasks are more mentally and temporally demanding. After obtaining the weight values and assessments, the next step is calculating the product value for each respondent. This product value provides a clearer picture of which dimensions contribute the most to the perceived mental workload. The product values are then used to calculate WWL (Weighted Workload) and the average WWL. The results of these calculations help determine each respondent's mental workload category. In this study, the average WWL results show that most participants experience a high mental workload, with the Effort dimension being the most dominant. The final step is to determine the NASA-TLX category based on the average WWL results, which are divided into three main categories: Low, Medium, and High. The study results show variations in mental workload perception among participants. Some participants, like Karelin and Beben, have the highest average WWL and fall into the High category, indicating a very high mental workload. Meanwhile, participants like Alisia have the lowest average WWL and fall into the Low category, indicating a lighter mental workload. Overall, these results provide important insights for task managers at PT. Supernova Palapa Nusantara to adjust mental workloads to enhance employee efficiency and well-being. By identifying the most burdensome dimensions, management can take steps to reduce these burdens, especially in the mental and temporal aspects.

5.2 RSME Category

In the study at PT. Supernova Palapa Nusantara, the sub-section "RSME Category" delves into the assessment method known as RSME (Rating Scale Mental Effort). RSME is used to measure mental workload based on an individual's perception of the mental effort they experience while completing a task. In this study, respondents provided scores ranging from 0 to 150, which were then categorized into seven levels of mental effort: Very Great Effort with a score of 138, Very Effort with a score of 113, Quite Large Effort with a score of 85, Small Effort with a score of 57, Very Small Effort with a score of 38, Almost No Effort with a score of 13, and No Effort with a score of 0.

Based on the results outlined in Table 4.9, each participant has a score categorized

into four levels of effort: Small Effort, Quite Large Effort, Very Effort, and Very Great Effort. Participants with Very Great Effort, such as Agoes, who scored 145, indicate that they experience a very high mental effort in completing tasks. Juliana and Alisia are also in this category, indicating significant levels of mental effort. Meanwhile, the Very Effort category includes participants like Pramudi, Daniel, and Boby, suggesting they experience a high mental workload, though not as intense as the "Very Great Effort" category. Participants such as Alif, Annisa, and Fitra fall into the Quite Large Effort category, indicating a considerable mental workload, but not as high as the "Very Effort" category. Conversely, participants like Wendy, Victor, and Riyan, who are in the Small Effort category, experience minimal mental effort. Notably, Wendy, with a score of 0, is at the lowest level of mental effort, indicating that the task is not very mentally demanding for her.

Overall, this data reveals significant variation in the perception of mental effort among participants. Some participants experience a heavier effort compared to others. This variation provides insights for task managers at PT. Supernova Palapa Nusantara to adjust mental workloads to enhance employee efficiency and well-being. Understanding the level of mental effort perceived by employees can aid in designing more effective work management strategies, particularly in addressing tasks deemed mentally demanding by most participants.

5.3 Analysis of What Causes and Influences Mental Health to Run Well

Analysis of Causes and Effects on Mental Health from the study at PT. Supernova Palapa Nusantara identified several factors that can cause and affect employees' mental health. This study used the NASA-TLX and RSME methods to assess the mental workload and mental effort perceived by employees during their tasks. One of the main factors is Mental Demand, which refers to the level of concentration and information processing required. Employees reporting high mental demands, such as Pramudi and Devia, may experience mental fatigue that can lead to stress if not properly managed.

In addition, Temporal Demand is also a significant factor, with the perceived time

pressure potentially increasing stress and worsening mental health, especially if employees feel they lack sufficient time to complete tasks well. This indicator is often rated highly, indicating many employees feel burdened by tight deadlines. Effort, which measures how hard employees feel they must work, also indicates a heavy workload and can cause prolonged fatigue and stress. This dimension is the most dominant in the assessment results, illustrating a significant workload. Frustration, referring to feelings of discomfort or pressure during task completion, negatively impacts employees' mental well-being. Some participants, like Devia, gave high ratings on this indicator, indicating higher levels of frustration. Although Physical Demand tends to receive lower ratings, in some cases, high physical demands can contribute to both physical and mental fatigue.

Based on this analysis, several recommendations can be made to improve employees' mental health at PT. Supernova Palapa Nusantara. Adjusting workloads by reducing mental and temporal demands and offering more flexible schedules can help. Furthermore, providing stress management training programs and creating a supportive work environment where employees feel comfortable discussing the pressures they face is also important. Regular evaluations of employees' mental and physical workloads and constructive feedback can enhance work processes. With these measures, the company can help mitigate factors negatively impacting employees' mental health and improve overall productivity and well-being.

5.4 Analysis of Employee Mental Health at PT. Supernova Palapa Nusantara

Company Using NASA TLX and RSME Methods

The study was conducted at PT. Supernova Palapa Nusantara aims to analyze employees' mental workload using two main assessment methods: the NASA Task Load Index (NASA-TLX) and Rating Scale Mental Effort (RSME). These methods provide deep insights into how employees perceive their mental workload and the factors affecting their mental health. By understanding these factors, the company can take appropriate steps to enhance employees' mental well-being.

The analysis using NASA-TLX involves measuring mental workload through six

dimensions: Mental Demand, Physical Demand, Temporal Demand, Performance, Effort, and Frustration. In this study, respondents were asked to compare two dimensions to determine which was more dominant during their work. The results show that Mental Demand and Temporal Demand are often more dominant, indicating that tasks require high mental concentration and are performed under time pressure. Respondents then scored each dimension from 0 to 100, indicating variations in workload among employees.

Next, product values were calculated by combining weights and assessments for each dimension. For example, Juliana had the highest product value, indicating a significant workload in terms of physical, time, and effort. Calculations of Weighted Workload (WWL) and average WWL were conducted to determine the mental workload category. Participants like Karelin and Beben had the highest average WWL, indicating a high mental workload, while Alisia was in the "Low" category, indicating a lighter workload.

In addition to NASA-TLX, the RSME method was used to measure perceived mental effort on a scale from 0 to 150, categorized into seven levels of mental effort. Agoes had the highest score (145), placing him in the "Very Great Effort" category, indicating a very high mental effort. Conversely, Wendy had the lowest score (0), indicating minimal mental effort. There is significant variation in the perception of mental effort among participants, with some finding the tasks more mentally demanding than others.

The conclusion from this analysis indicates significant variation in the perception of mental workload and mental effort among employees at PT. Supernova Palapa Nusantara. High mental workload, particularly in the Mental Demand and Temporal Demand dimensions, can affect employees' mental health. Therefore, management needs to adjust workloads to improve employee well-being and efficiency, focusing on managing the mental and temporal aspects of their tasks.

Based on these findings, several recommendations can be made to improve employees' mental health. Adjusting workloads by reducing mental and temporal demands and offering more flexible schedules can help. Additionally, providing stress

management training programs and creating a supportive work environment where employees feel comfortable discussing the pressures they face is also important. Regular evaluations of employees' mental and physical workloads and constructive feedback can enhance work processes. With these measures, the company can help reduce factors negatively impacting employees' mental health and improve overall productivity and well-being.

5.5 Research Result Recommendations

Based on the research conducted, which utilized two methods, NASA-TLX and RSME, to assess the mental workload of employees at PT. Supernova Palapa Nusantara. Based on the analysis results, several recommendations are proposed to enhance employees' mental well-being and work efficiency. The following recommendations are suggested:

1. Management of Mental Workload:

- **Task Adjustment:** Given that the dimensions of Mental Demand and Temporal Demand are often rated high, it is recommended to review the tasks assigned to employees. Adjusting tasks that are mentally and temporally demanding can reduce stress levels and mental fatigue.
- **Flexible Timing:** Providing flexible timing to complete tasks can help reduce the time pressure felt by employees, especially those who feel pressured by Temporal Demand.

2. Employee Training and Development:

- **Stress Management Training:** Training programs for stress management can help employees develop coping strategies to handle work pressure, especially for those reporting high levels of Frustration.
- **Competency Development:** Enhancing employees' competencies through training and development can help reduce Mental Demand by increasing efficiency and skill in task completion.

3. Monitoring and Evaluation of Workload:

- Periodic Evaluation: Conducting regular workload evaluations can help identify areas requiring special attention and ensure that workloads remain balanced.
 - Employee Feedback: Encouraging employees to provide feedback on their workload can help management understand the challenges they face and adjust work policies as needed.
4. Creating a Supportive Work Environment:
- Social Support: Creating a supportive work culture where employees feel comfortable discussing the stress and pressure they face can enhance mental well-being.
 - Relaxation Facilities: Providing facilities such as relaxation rooms or recreational activities in the workplace can help employees manage stress and improve mental well-being.
5. Recognition and Rewards:
- Performance Recognition: Recognizing employees who successfully manage their workload can increase motivation and job satisfaction, helping reduce Frustration and enhance Performance.
 - Well-being Incentives: Offering incentives focused on mental well-being, such as additional holidays or mental health programs, can encourage employees to maintain work-life balance.

By implementing these recommendations, PT. Supernova Palapa Nusantara can significantly enhance employees' mental well-being. One approach that can be taken is creating a work environment that supports psychological safety, where employees feel safe to share thoughts and ideas without fear of negative consequences. This can boost their motivation and productivity, as well as have a long-term positive impact on the organization's success. Furthermore, the company can reduce the perceived workload on employees by providing psychological support and alleviating stress through flexible work policies and opportunities for rest. A proactive approach to managing mental workload can also enhance employee productivity and efficiency. By providing relevant training and tasks that match their skills, employees will feel more competent and motivated in their duties. Moreover, good employee well-being can increase job

satisfaction, which in turn will improve overall work productivity. Therefore, investing in employees' mental well-being not only benefits individuals but also provides long-term advantages for the company.

CHAPTER VI

CLOSING

6.1 Conclusion

Based on the research conducted, the following conclusions can be drawn:

1. NASA-TLX is a method used to measure mental workload based on six dimensions: Mental Demand, Physical Demand, Temporal Demand, Performance, Effort, and Frustration. This method provides a more sensitive subjective assessment and has been used in various studies to measure mental workload in different work environments. The research results show variations in mental workload among participants, with Effort being the most dominant dimension, providing important insights for PT. Supernova Palapa Nusantara to adjust mental workload to enhance employee efficiency and well-being.
2. RSME is an assessment method used to measure mental workload based on individuals' perceptions of the mental effort they experience while completing tasks, with scores ranging from 0 to 150. In the study at PT. Supernova Palapa Nusantara, participants were categorized into four levels of mental effort: Small Effort, Quite Large Effort, Very Effort, and Very Great Effort, with score variations indicating significant differences in perceptions of mental effort. These results provide insights for the company to adjust employees' mental workload to improve their efficiency and well-being.
3. The research at PT. Supernova Palapa Nusantara identified that high mental and temporal demands can cause stress and affect employees' mental health. The NASA-TLX and RSME methods indicate that factors such as Effort and Frustration also significantly contribute to mental workload. Recommendations to improve mental health include workload adjustments, flexible schedules, stress management programs, and supportive work environments.

4. The research at PT. Supernova Palapa Nusantara using NASA-TLX and RSME methods to analyze employees' mental workload shows that Mental Demand and Temporal Demand often dominate. The analysis results indicate significant variations in mental workload among employees, with some experiencing higher stress due to heavy mental demands. Recommendations include workload adjustments, flexible schedules, and stress management programs to improve employees' mental health and well-being.
5. The research at PT. Supernova Palapa Nusantara using NASA-TLX and RSME methods to assess employees' mental workload resulted in several recommendations to enhance mental well-being and work efficiency. These recommendations include task adjustments to reduce mental and temporal demands, stress management training, and creating a supportive work environment. By implementing these measures, the company can increase employee motivation and productivity, as well as provide long-term positive impacts for the organization.

6.2 Research Suggestions

Based on the research conducted on the mental workload of employees at PT. Supernova Palapa Nusantara using NASA-TLX and RSME methods, several recommendations can be proposed to improve employee mental well-being and work efficiency:

1. Optimization of Workload

- **Task Adjustment:** It is recommended that the company evaluate and adjust tasks with high mental workload levels. This can be done by distributing tasks more evenly and ensuring that each employee has a balanced workload.
- **Time Flexibility:** Providing time flexibility in task completion can help reduce the time pressure felt by employees, especially for those in the high mental workload category.

2. Improvement of Facilities and Work Environment

- **Supportive Facilities:** Providing adequate and comfortable work facilities can help reduce stress and increase productivity. Facilities such as comfortable break rooms and adequate work equipment can positively impact employees' mental health.
- **Positive Work Environment:** Creating a supportive and positive work environment, where employees feel valued and supported, can enhance motivation and mental well-being.

3. Training and Development Programs

- **Stress Management Training:** Offering stress management training programs can help employees develop skills to cope with work pressure. This training may include relaxation techniques, time management, and interpersonal skills development.
- **Competency Development:** Enhancing employee competencies through training and development can help them address mental demands more effectively, thus reducing mental workload.

4. Regular Monitoring and Evaluation

- **Workload Evaluation:** Conducting regular workload evaluations can help the company identify areas that require special attention and ensure that workloads remain balanced.
- **Employee Feedback:** Encouraging employees to provide feedback on their workload can help management understand the challenges they face and adjust work policies as needed.

5. Recognition and Rewards

- **Performance Recognition:** Recognizing employees who successfully manage their workload can increase motivation and job satisfaction, helping reduce frustration and enhance performance.
- **Well-being Incentives:** Offering incentives focused on mental well-being, such as additional leave or mental health programs, can encourage employees to maintain work-life balance.

By implementing these recommendations, PT. Supernova Palapa Nusantara is expected to significantly enhance employees' mental well-being. By reducing the

perceived workload, employees will be better able to manage stress and mental fatigue, which in turn will increase their happiness and job satisfaction. When employees feel more mentally well, they are likely to be more enthusiastic and motivated in completing their tasks, which can boost overall productivity. Additionally, a proactive approach to managing mental workload can have long-term positive effects for both employees and the company. By creating a supportive work environment and focusing on mental health, the company can build a more inclusive and harmonious work culture. This not only aids in employee retention but also attracts new talent who value work-life balance. Overall, these measures can enhance operational efficiency and strengthen the company's reputation as a workplace that cares about employee well-being.

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APPENDIX

**LEMBAR PENGAMATAN
BEBAN KERJA MENTAL**

Nama : *Don* Jenis Pekerjaan : *Administrasi*
 Umur/ jenis Kelamin : *29th/ Perempuan* Job Description :
 Total Jam Kerja : *9/1*
 Durasi Istirahat :

1. Perbandingan antar indikator

Tabel 1: Kuesioner Perbandingan antar indikator

	MD	PD	TD	OP	EF	ER
MD		MD	TD	OP	EF	ER
PD			TD	OP	EF	ER
TD				OP	EF	ER
OP					EF	ER
EF						ER
ER						

2. Rating indikator

1. Jumlah Durasi (MD)
 Skala: 0-100. Rating: 20

2. Kualitas Waktu (PD)
 Skala: 0-100. Rating: 20

3. Temporal Demand (TD)
 Skala: 0-100. Rating: 20

4. Over Performance (OP)
 Skala: 0-100. Rating: 20

5. Effort (EF)
 Skala: 0-100. Rating: 20

3. Rating indikator

1. Jumlah Durasi (MD)
 Skala: 0-100. Rating: 20

2. Kualitas Waktu (PD)
 Skala: 0-100. Rating: 20

3. Temporal Demand (TD)
 Skala: 0-100. Rating: 20

4. Over Performance (OP)
 Skala: 0-100. Rating: 20

5. Effort (EF)
 Skala: 0-100. Rating: 20

Gambar 1. Rating NNSA-TTX

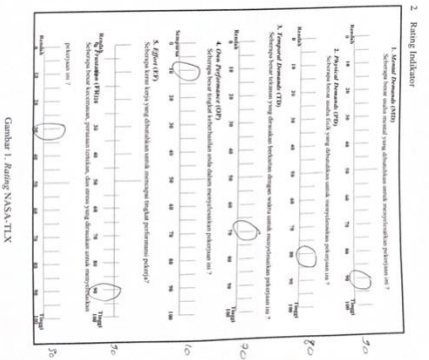
**LEMBAR PENGAMATAN
BEBAN KERJA MENTAL**

Nama : *Alif* Jenis Pekerjaan : *Marketing*
 Umur/ jenis Kelamin : *27th/ laki-laki* Job Description :
 Total Jam Kerja : *9/1*
 Durasi Istirahat :

1. Perbandingan antar indikator

Tabel 1: Kuesioner Perbandingan antar indikator

	MD	PD	TD	OP	EF	ER
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PD			TD	OP	EF	ER
TD				OP	EF	ER
OP					EF	ER
EF						ER
ER						



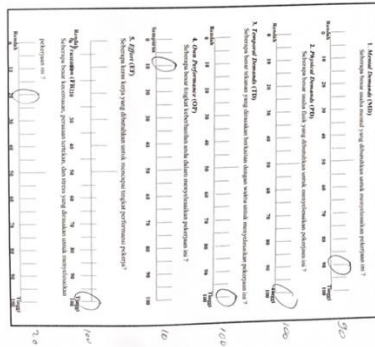
LEMBAR PENGAMATAN
BERBAN KERJA MENTAL

Nama : *Rena* Jenis Pekerjaan : *Reklamer*
 Umur/ Jenis Kelamin : *31 th/ L* Job Description :
 Total Jam Kerja : *9/1*
 Durasi Istirahat :

1. Perbandingan antar indikator
 Tabel 1. Kuesioner Perbandingan antar indikator

	MD	PD	TD	OP	EF	FR
MD		MD	TD	OP	EF	FR
PD			TD	OP	EF	FR
TD				OP	EF	FR
OP					EF	FR
EF						FR
FR						

2. Rating Indikator



Gambar 1. Rating NASKA-TX

LEMBAR PENGAMATAN
BERBAN KERJA MENTAL

Nama : *Rena* Jenis Pekerjaan : *Reklamer*
 Umur/ Jenis Kelamin : *31 th/ L* Job Description :
 Total Jam Kerja : *9/1*
 Durasi Istirahat :

1. Perbandingan antar indikator
 Tabel 1. Kuesioner Perbandingan antar indikator

	MD	PD	TD	OP	EF	FR
MD		MD	TD	OP	EF	FR
PD			TD	OP	EF	FR
TD				OP	EF	FR
OP					EF	FR
EF						FR
FR						



Gambar 1. Rating NASKA-TX

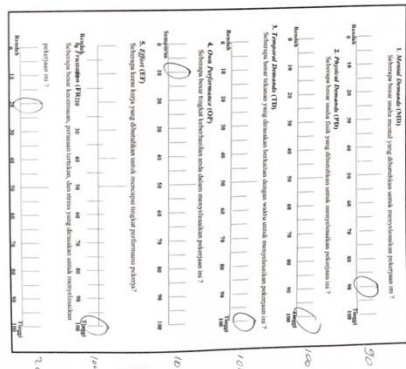
LEMBAR PENGAMATAN
BERBAN KERJA MENTAL

Nama : *Rena* Jenis Pekerjaan : *Reklamer*
 Umur/ Jenis Kelamin : *31 th/ L* Job Description :
 Total Jam Kerja : *9/1*
 Durasi Istirahat :

1. Perbandingan antar indikator
 Tabel 1. Kuesioner Perbandingan antar indikator

	MD	PD	TD	OP	EF	FR
MD		MD	TD	OP	EF	FR
PD			TD	OP	EF	FR
TD				OP	EF	FR
OP					EF	FR
EF						FR
FR						

2. Rating Indikator



Gambar 1. Rating NASKA-TX