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# Analysis of Personnel Needs for the TNI Maritime Task Force of the UNIFIL Garuda Contingent Based on Workload Analysis (Case Study of KRI Frans Kaisiepo-368)

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A R T I C L E I N F O

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A B S T R A C T

The efficient and effective use of human resources to accomplish the organization's vision, mission, and objectives is strongly linked to organizational burden. Many strategies are used to maximize the number of employees in a company so that all tasks can be carried out successfully and efficiently. Personnel of KRI Frans Kaisiepo-368 assigned to the Maritime Task Force of the Indonesian Garuda Contingent are not exempt from issues concerning the mismatch between workload and the existing personnel allocation. To address this issue, a measurement of workload analysis is required, This can then be utilized to calculate the proper number of employees required for each division. The NASA-TLX approach, which is based on PerMENPAN or PerPANG TNI standards, is used in this study to quantify mental and physical workload.. Both methods are then compared to evaluate the relationship between mental and physical workloads. The comparison results indicate that physical workload plays a highly significant role in completing tasks within each division. Following this comparison, personnel allocation was determined using a physical workload strategy based on the job descriptions of each division. The calculation results identify divisions experiencing either an excess or shortage of personnel. In general, the results of this investigation conclude that the total number of personnel in the maritime task force aboard KRI Frans Kaisiepo-368 is adequate; however, personnel allocation within each division still requires adjustment according to the existing workload

## INTRODUCTION

One of Indonesia's national objectives is to contribute to the establishment of world peace, according to the Republic of Indonesia's constitutional mandate found in the fourth paragraph of the Preamble to the 1945 Constitution. In order to establish a world that is safe, secure, and peaceful, this objective is pursued alongside other nations under the auspices of the United Nations (UN). Since the Garuda I contingent in 1957, Indonesia has sent military personnel as part of UN peacekeeping missions to accomplish this purposeThe military's involvement has great significance for the Indonesian people, both politically and militarily. This demonstrates to the world that Indonesia values a world that is just, peaceful, and harmonious. Article 9 of Law No. 34 governing the Indonesian National Armed Forces, which requires the Indonesian Navy to perform naval diplomacy duties in support of the government's foreign policy, is being implementedSince 2009, the Maritime Task Force (MTF) of the United Nations Interim Force in Lebanon (UNIFIL), which operates in the operational area and waters of Lebanon, has received naval personnel from the Indonesian Navy under PMPP TNI, including one KRI and one onboard BO-105 helicopter. It was the UNIFIL Maritime Task Force's seventh deployment by 2016.

Due to the historic confrontation between Israel and Lebanon in October 2006, the United Nations (UN) established MTF UNIFIL, a maritime task force. The MTF's role is to assist the Lebanese navy in keeping an eye on its territorial waterways, protecting the coastline, and keeping weapons and supplies out of Lebanese waters. The Lebanese government requested the creation of MTF under the jurisdiction of UN Security Council Resolution 1701 (2006). UNIFIL assigns MTF operations.

The MTF Commander, a two-star officer on the Flag Ship, is the person to whom the Force Commander answers. Bangladesh, Belgium, Brazil, Bulgaria, Denmark, France, Germany, Greece, Indonesia, Italy, the Netherlands, Norway, Spain, Sweden, and Turkey are the fifteen nations that have contributed to the MTF.

The UNIFIL Garuda Contingent's TNI Maritime Task Force's mission differs greatly from domestic operations and training (in Indonesia). Ten (10) months will be allotted to the task force, of which two (2) months will be spent traveling across the sea and eight (8) months will be spent in the Maritime Operation Area (AMO). To get to Lebanon, the task force must travel over 7,000 kilometers, making multiple stops en route. There are diplomatic operations at nearly every stop in a transit nation. Cocktail receptions, team sports, and visits to the transit countries' government buildings are examples of diplomatic activities. As a result, the crew and ship need to be ready. The ship must adhere to the UN's requirements. Technical manufacturing equipment, weaponry, sensors, navigation equipment, communication equipment, lodging, and fulfilling health regulations are the first. Following arrival in Lebanon, the MTF crew conducts inspections, briefings, and receptions. The first task starts as soon as Inchop is announced. A Daily Intention Message (DIM) including information and priorities from personnel, intelligence, operations, planning, logistics, communications, and training staff will be sent to the task force each day. The

situation and conditions in Lebanon are mentioned in the DIM, along with the sectors of the Area of Maritime Operation (AMO) that need to be guarded. Task elements designated as Helicopter Element Coordinator (HEC) and Maritime Interdiction Operation Commander (MIO) are also mentioned. Anti Air Warfare Commander (AAWC), as well as operational tasks and training exercises that need to be completed by both the Lebanon Armed Forces (LAF) and elements from other nations. The percentage of people that attend AMO and dock at the pier is 70/30. This indicates that the ship often spends five to six days at sea during a single on-task period and only has the opportunity to dock for one to two days in order to refuel.

When doing their jobs, task force members must deal with both physical and mental challenges. In addition to having to spend ten (10) months away from home and endure extremely lengthy operation times, each member must always uphold the nation's good reputation. Everyone is expected to carry out their responsibilities in a professional manner at all times. The task force operates in hazardous regions both on land and at sea. The task group must nevertheless conduct operations despite the erratic weather in AMO. The task force members are mentally burdened by them. In the meantime, the MTF commander's staff has established and decided on a number of missions and exercises that provide the physical strain.

Regarding the assignment of personnel as the TNI Maritime Task Force for Konga XXVIII-E/UNIFIL 2013, the TNI Commander's Order Number Sprin/521/III/2013, issued March 5, 2013, specifies that the UNIFIL MTF personnel totaled 100 people, including those outside the KRI Frans Kaisiepo-368 crew. According to the monthly report of KRI Frans Kaisiepo-368 personnel, in January 2013, the actual number of DSP was 102 people. Therefore, the enlisted/low-ranking personnel of KRI Frans Kaisiepo-368 need to be reduced by 20 people to carry out the task as UNIFIL MTF.

Seven members of the helicopter pilots and crew, one intelligence officer, one public affairs officer, one diver, one Kopaska member, one medic, one naval officer, and one Combat Information Center (CIC) officer make up the 14 individuals outside the KRI Frans Kaisiepo-368 crew. Because some employees have several responsibilities, each division's workload increases as a result of the staff reduction.

In this instance, the Commander of KRI Frans Kaisiepo-368, as the decision maker, must make the appropriate choices regarding the number of personnel for each division because the tasks and responsibilities assigned to task force personnel as previously mentioned are not light. To ensure that the tasks are completed correctly, the commander and staff must determine the appropriate number of employees for each division.

Based on the background above, this study will analyze the workload of task force personnel according to their division. This workload analysis will serve as the basis for determining proportional personnel allocation..

**Problem Formulation**

Based on the background explanation, the problem can be summarized as follows:

a. How heavy is the mental and physical workload of task force personnel when participating in activities on the ship?
b. How big is the difference in mental and physical workload between divisions?
c. How to allocate personnel based on workload calculations?

**Research Objectives**

a. To measure the mental and physical workload of task force personnel while participating in activities on the ship.
b. To find out the differences in mental and physical workload among division members while carrying out activities on the ship.
c. To determine the allocation of personnel for each division based on workload.

**Benefits of the Research**

a. For Researchers. This research will help researchers in understanding and applying the courses attended during college, especially the Human Resource Management (MSDM) course.
b. For the Indonesian Navy. It can help determine the right number of task force personnel, both for UNIFIL maritime task force assignments and other assignments.
**c.** For Academics. This research provides information for other researchers to apply in broader fields of knowledge**.**

## LITERATURE REVIEW

### Theoretical Foundations of Human Resource Management and Staffing Optimization

In organizational theory, Human Resource Management (HRM) serves as the primary strategic driver for optimizing operational efficiency, task execution, and goal attainment. As articulated by Hasibuan (2000), effective HRM relies on balancing organizational objectives with human capacity, ensuring that personnel deployment aligns perfectly with operational demands. When personnel allocation fails to reflect actual operational realities, organizations suffer from structural inefficiencies—manifesting either as underutilization (redundancy) or burnout (overwork). To prevent these imbalances, workload analysis has emerged as an essential empirical tool for manpower planning. Pranoto and Retnowati (2015) emphasize that systematically mapping workload against official job descriptions enables organizations to establish rational, proportion-based staffing patterns rather than relying on arbitrary force structures.

**Methodologies for Physical Workload Assessment and Time-Motion Analysis**

Physical workload measurement focuses on evaluating the required time, task frequencies, and operational durations necessary to accomplish specific duties.

- Motion and Time Studies: Wignjosoebroto (2008) provides the foundational ergonomic principles for measuring task completion times, asserting that work sampling and time-and-motion studies establish the baseline standard times needed for operational tasks.
- Work Sampling Applications: Building on these ergonomic principles, Rahadian evaluated task-level physical exertion by combining work sampling techniques with standard time calculations to determine precise operator capacity in industrial settings.
- Task-Driven Staffing Models: Arumsari (2013) demonstrated that calculating total effective working hours against task completion times yields the exact theoretical headcount required to maintain optimal workplace productivity. Similarly, Victor (2016) formulated optimization models demonstrating that labor allocation based on continuous workload tracking directly resolves operational bottlenecks and optimizes labor cost efficiency.

**Subjective Mental Workload Evaluation via NASA-TLX**

In high-stress, high-consequence operational environments—such as naval deployments, aviation, and emergency medicine—physical task completion time alone fails to capture the cognitive strain placed on operators. To address this dimension, Hart and Staveland (1988) developed the NASA Task Load Index (NASA-TLX), a multi-dimensional multidimensional assessment tool designed to quantify subjective mental workload across six distinct subscales:

1. Mental Demand (MD)
2. Physical Demand (PD)
3. Temporal Demand (TD)
4. Overall Performance (OP)
5. Frustration Level (FR)
6. Effort (EF)

Simanjuntak (2010) highlights that NASA-TLX is particularly effective in identifying hidden cognitive fatigue that does not immediately manifest in physical time logs. Broadening its application, Young and Zavelina (2008) established the reliability of NASA-TLX in critical, fast-paced care environments (such as perianesthesia nursing), showing that subjective cognitive load directly influences decision-making accuracy and operational safety. Integrating NASA-TLX into organizational studies allows researchers to evaluate whether high cognitive stress correlates with physical task burdens.

**Workload Analysis in Military and Public Sector Frameworks**

Within public administration and military command structures, workload analysis is governed by formal regulatory guidelines to maintain standardized personnel formations.

- Civil Administrative Standards: The Indonesian Ministry of Administrative and Bureaucratic Reform (MenPAN) established guidelines under Decision No. KEP/75/M.PAN/7/2004 to standardize civil service headcount calculations.
- Defense and Naval Adaptation: Recognizing the distinct operational rhythm of military service, the Commander of the Indonesian National Armed Forces issued PerPANG TNI No. Perpang/93/XI/2011, establishing administrative guidelines tailored for evaluating physical and mental loads in defense environments.
- Naval Workload Optimization: Applying these principles to naval force structures, Endriyanto (2014) combined Factor Evaluation System (FES) job position analyses with physical workload assessments to optimize shore-based and fleet personnel allocations (Diskuarmatim)

## METHODS

The research steps are as follows:

1. Preparation Stage.
   a) Problem Identification.
   b) Literature Review.
   c) Problem Formulation.

2. Data Analysis and Discussion Stage.
   a) Data Collection.
   - Primary Data
   - Secondary Data

   b) Data Processing.
   - NASA-TLX Processing, for mental workload.
   - Task Load Processing per Job Task in Each Division, for physical workload.
   - Comparison of Mental and Physical Workload Values.

   c) Conclusion Drawing Stage.

## RESULTS AND DISCUSSION

Data collecting and data processing are the two (two) tasks involved in the data analysis stage. KRI Frans Kaisiepo-368 is the subject of the study. Each part's or work unit's workload and tasks will be processed using the collected data.

Table 1. Real NCO/Enlisted DSP and TNI Maritime Task Force Konga XXVIII/E UNIFIL 2013 KRI Diponegoro – 365

| No. | Divisi | DSP Riil | DSP Satgas |
|---|---|---|---|
| 1. | Divisi Komunikasi | 6 | 6 |
| 2. | Divisi Navigasi | 5 | 3 |
| 3. | Divisi PAA | 12 | 9 |
| 4. | Divisi PBA | 10 | 6 |
| 5. | Divisi Teksen | 7 | 6 |
| 6. | Divisi Detkom | 6 | 4 |
| 7. | Divisi MPK | 9 | 6 |
| 8. | Divisi MB | 7 | 6 |
| 9. | Divisi Listrol | 6 | 5 |
| 10. | Divisi Minlog | 14 | 11 |
| | **TOTAL** | **82** | **62** |

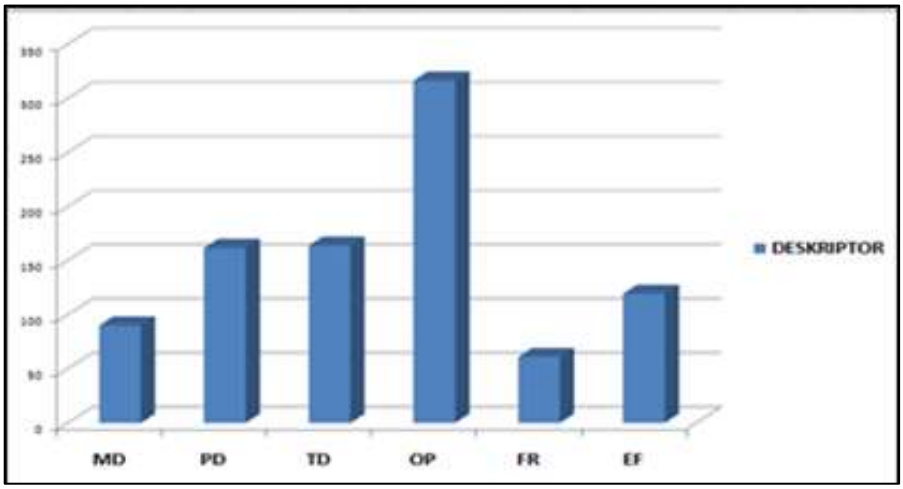


Figure 1. The Most Influential Descriptor on the overall Division

**Physical Workload Management (PerMENPAN and TNI Regulations)**

Finding each employee's active working days and working hours on KRI Frans Kaisiepo-368 during activities is the initial step in processing this task. Several secondary variables from the study object are required to determine the effective working time and working hours. The effective working time, effective working hours, and task completion time that become each employee's load are then obtained by processing this data.

The formula for personnel needs is as follows:

$$\text{Jumlah personil} = \frac{\sum \text{Waktu Penyelesaian Tugas}}{\sum \text{Waktu Kerja Efektif}}$$

The summary of the Task Completion Time Calculation results for all divisions can be seen in the following table 2:

Table 2. Comparison of Mental and Physical Workload Values

| No | Divisi | Total Task Completion Time (minutes) | Number of Personnel That Should Be Needed (people) | Rounded Number of Personnel |
|---|---|---|---|---|
| 1 | COMMUNICATION | 16.470 | 6,127 | 7 |
| 2 | NAVIGATION | 7.030 | 2,615 | 3 |
| 3 | PBA | 19.455 | 7,237 | 8 |
| 4 | PAA | 19.155 | 7,126 | 8 |
| 5 | TEKSEN | 13.560 | 5,044 | 5 |
| 6 | DETKOM | 10.560 | 3,958 | 4 |
| 7 | MPK | 17.271 | 6,473 | 7 |
| 8 | MB | 16.715 | 6,218 | 7 |
| 9 | LISTROL | 11.155 | 4,181 | 5 |
| 10 | MINLOG | 22.275 | 8,348 | 9 |

NASA-TLX, which is separated into four categories—low, medium, high, and extremely high—is used in this comparison to modify the physical workload category for mental workload. By calculating the quartile points from the lowest and greatest values of the total job completion time for each division, the categories for physical workload are divided into multiple ranges..

Table 3. Physical Workload Values

| Physical Workload Range | Workload Categories | Physical Workload Value (y) |
|---|---|---|
| ≤ 11.154 | Low | 1 |
| 11.155 – 16.591 | Medium | 2 |
| 16.592 – 19.154 | Height | 3 |
| ≥ 19.155 | Very High | 4 |

Table 3. Physical Workload Values

| Mental Workload Range | Workload Categories | Mental Workload Value (x) |
|---|---|---|
| 0 – 29 | Low | 1 |
| 30 – 49 | Medium | 2 |
| 50 – 79 | Height | 3 |
| 80 – 100 | Very High | 4 |

The formula for the mean workload value derived from both approaches:

$$Z = \frac{x + y}{2}$$

Table 5. Average Workload Values Between Mental Workload and Physical Workload Values.

| Workload Coefficient Value (z) | Workload Categories | Remarks |
|---|---|---|
| ≤1.9 | Low | No Need for Personnel Addition/Reduction |
| 2 – 2,74 | Medium | Possible for Personnel Addition/Reduction |
| 2,75 – 2,99 | Height | Need for additional personnel |
| ≥ 3 | Very High | Must Be Added Personnel |

Table 6. Results of Personnel Count Consideration.

| No. | Divided | Mental Workload Value (x) | Physical Workload Value (y) | Average Workload Value (z) | Category | Remarks |
|---|---|---|---|---|---|---|
| 1. | COM | 4 | 2 | 3 | Very high | Must Be Added Personnel |
| 2. | NONE | 2 | 1 | 1,5 | Low | Staff Addition/Reduction Possible |
| 3. | PBA | 3 | 3 | 3 | Very high | Must Be Added Personnel |
| 4. | PAA | 3 | 3 | 3 | Very high | Must Be Added Personnel |
| 5. | TEK | 2 | 2 | 2 | moderate | Staff Addition/Reduction Possible |
| 6. | DETKOM | 2 | 1 | 1,5 | moderate | Staff Addition/Reduction Possible |
| 7. | MPK | 3 | 3 | 3 | Very high | Must Be Added Personnel |
| 8. | MB | 3 | 3 | 3 | Very high | Must Be Added Personnel |
| 9. | LISTROL | 3 | 2 | 2,5 | Medium | Staff Addition/Reduction Possible |
| 10. | MINLOG | 1 | 4 | 2,5 | Medium | Staff Addition/Reduction Possible |

**Determining the Optimal Number of Personnel**

The KEP/75/M.PAN/7/2004 approach serves as the foundation for the basic calculation of the number of personnel, which is subsequently modified in accordance with the factors listed in Table 6 to determine the ideal number of personnel. The ideal number of employees and the number of employees based on the task force's DSP will next be contrasted in Table 11..

Table 11. A Comparison Between the Number of Personnel Recommended by the Task Force DSP and the Ideal Number.

| No. | Divided | Optimal Number of Personnel | Number of DSP Task Force Personnel | Conclusion |
|---|---|---|---|---|
| 1. | COMMUNICATION | 7 | 6 | 1 additional personnel |
| 2. | NAVIGATION | 3 | 3 | No need for personnel additions and reductions |
| 3. | PAA | 8 | 9 | Reduced by 1 personnel |
| 4. | PBA | 8 | 6 | 2 additional personnel |
| 5. | TEKSEN | 5 | 6 | Reduced by 1 personnel |
| 6. | DETKOM | 4 | 4 | No need for personnel additions and reductions |
| 7. | MPK | 7 | 6 | 1 additional personnel |
| 8. | MB | 7 | 6 | 1 additional personnel |
| 9. | LISTROL | 5 | 5 | No need for personnel additions and reductions |
| 10. | MINLOG | 9 | 11 | Reduced by 2 personnel |

**CONCLUSIONS AND RECOMMENDATIONS**

a. Employees' workloads when doing their tasks as MTF Unifil show that each individual in their different divisions experiences both excesses and shortages of workload.According to calculations using the mental workload approach, namely NASA-TLX, it was found that the highest mental workload was experienced by the MPK division with an average WWL score of 75.889, while the lowest mental workload was experienced by the Detkom

division with an average WWL score of 45.556. Meanwhile, calculations according to the job workload approach, based on PerMENPAN or perPANG TNI physically, showed that the Minlog division had the highest total task completion time, which was 22,275 minutes.

b. Comparison of workload calculation results using the NASA-TLX method (mental) with the PerMENPAN or PerPANG TNI approach (physical). It was found that the mental workload values in all divisions are rated 3, which falls into the high category, except for the Navigation, Teksen, and Detkom divisions, which have a workload value of 2 or a medium category. Meanwhile, the physical workload value for the Minlog division is the highest at 4, which is in the very high category. The PBA, PAA, MPK, and MB divisions have a physical workload value of 3 or high category. The Communication, Teksen, and Listrol divisions have a physical workload value of 2 or medium category. The physical workload value for the Navigation and Detkom divisions is 1, which falls into the low category. Therefore, it may be said that in this task, cerebral workload predominates over physical workload..
c. The PerMENPAN regulation KEP/75/M.PAN/7/2004 states that the ideal number of employees for each division is determined by the physical workload. In other words, seven employees are required for the Communication division, three for Navigation, eight for PBA, eight for PAA, four for Detkom, five for Teksen, seven for MPK, seven for MB, five for Listrol, and nine for Minlog. Therefore, 63 employees is the ideal amount for non-commissioned officers and enlisted men..

## FURTHER STUDY

This study still has limitations, so further research on Analysis of Personnel Needs for the TNI Maritime Task Force of the UNIFIL Garuda Contingent Based on Workload Analysis is needed to refine this study and enhance the insights of readers and the authors.

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