International Journal of ASRO
Volume 12, Number 04, pp.136-144
Des 2021

MENTAL WORKLOAD OF ELECTRICAL WORKSHOP PERSONNEL AS CONSIDERATIONS FOR EVALUATION OF FASHARKAN SURABAYA PERSONNEL NEEDS BASED ON COMPETENCE

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ABSTRACT

The Indonesian National Army (TNI) in general and the Navy in particular as a national defense tool, according to the government's program, has taken policies, one of which is the Modernization of the KRI. This policy demands balance from the point of view of the KRI maintenance system. Maintenance and repair facilities in Surabaya are based on Kep Kasal Number kep/1059/2016 concerning the Instruction Manual for Ship Platform Material Development within the Indonesian Navy (PU-7.08) regarding the duties and authorities of Fasharkan as an agency and unit for providing maintenance assistance in the field of platforms. The electrical workshop is one of the elements that need to be prepared to welcome the KRI modernization program at the Indonesian Armada II Command Headquarters. In line with the results of the maintenance and repair processes that have not been maximized, it is necessary to measure the physical and mental workload of all electrical workshop personnel so that they are able to solve the problems faced. The measurement results show that technology and personnel factors according to the needs of KRI maintenance are dominant in influencing excessive workload. Physical measurement results require the addition of 1 (one) personnel for each type of job position. Using the NASA TLX approach method produces mental indicators In line with the results of the maintenance and repair processes that have not been maximized, it is necessary to measure the physical and mental workload of all electrical workshop personnel so that they are able to solve the problems faced.

Keywords: *Electrical Workshop, workload factor, Nasa TLX.*

1. INTRODUCTION

1.1 Background

The development of technology in the digital era as it is now growing faster from day to day, month to month to the year ahead. Indirectly, the development of this technology has increased sharply. Technology is a means or system that functions to provide comfort and convenience for humans in living life. Therefore technology is very important in the current era, especially with digital technology that is growing rapidly every day.The fourth industrial revolution (Industry 4.0) has been widely discussed at this time as a description of the technological changes that have occurred, starting from the industrial revolution 1.0 to 4.0, which have an impact on the processes and activities that have been carried out so far. Currently, a system is starting to form that creates seamless connectivity and interaction between humans, machines, and other resources to create maximum efficiency and optimization.The TNI and the Challenges of the Industrial Revolution 4.0 Tuesday, October 9 2018 at 09:06 WIB By Bimo Joga Sasongko The commemoration of the 73rd anniversary of the Indonesian National Army (TNI) was carried out in a simple but meaningful way. Currently, the TNI Commander is also focusing on developing human resources (HR) in accordance with the challenges of the Industrial Revolution 4.0 era. One of the efforts to follow up is through regular and tiered education and courses for TNI units to follow and master developments in the technology sector which is the pillar of Industry 4.0.

Moreover, President Joko Widodo has also launched policies that have been formulated in the term "Making Indonesia 4.0 strategy including "Improving the Quality of Human Resources, Implementing Technology Investment Incentives and Formation of Innovative Ecosystems, which have become guidelines for all ministries and state institutions. The TNI, which is one of the State's tools, certainly has the authority and responsibility to anticipate quickly and precisely as well as carefully about global developments related to Industry 4.0. The condition of all TNI defense equipment is now fully advanced in operation and controlled digitally. The TNI plans its readiness to face the development of the new world order towards the Industrial Revolution 4.0 era. The condition of all TNI defense equipment is now fully advanced in operation and controlled digitally. The TNI plans its readiness to face the development of the new world order towards the Industrial Revolution 4.0 era. The condition of all TNI defense equipment is now fully advanced in operation and controlled digitally. The TNI plans its readiness to face the development of the new world order towards the Industrial Revolution 4.0 era.

The Chief of Naval Staff (Kasal) Admiral TNI Yudo Margono, SE, MM, following up on the above,

conveyed several policies, namely nine priority programs in increasing and developing strength and power. development of the capabilities of the Navy, including the development of Indonesian Navy human resources; modernization of the KRI and development and improvement of facilities and infrastructure (Sarpras) of the Indonesian Navy (Rassa, AYKL, & Lestari, A., 2021)

Figure 1. Map of the Koarmada II . area

Surabaya's maintenance and repair facilities are located in the Mako Koarmada II area, which is centered in Surabaya.Based on the Regulation of the Chief of Naval Staff Number Perkasal / 41 / V / 2010 dated May 18, 2010 concerning the Implementation Manual for the Preparation of Organizational Principles and Procedures as well as Organization and Procedures within the Indonesian Navy, Fasharkan Surabaya is part ofthe organization of the Main Base of the Indonesian Navy V. In accordance with the Chief of Kasal Number kep/1059/2015 concerning the Administration Manual for the Development of Ship Platform Materials within the Indonesian Navy (PU-7.08) concerning the duties and authorities of Fasharkan as an agency and unit providing maintenance assistance in the field of platforms.Fasharkan Surabaya has the main task of carrying out maintenance and repairs (HarKan) in the field of shipbuilding, machinery, electricity, shipping navigation equipment, weapons, electronics and docking for Indonesian Navy/KRI ships as well as fostering the potential for maritime services in the Lantamal V work area.Furthermore, the electrical workshop in carrying out maintenance and repair work for the Republic of Indonesia Warship (HarKan KRI) includes:

a Electric motors and generators
b Electrical installation
c Settings and instruments

The table below is the data that shows the competence of the HarKan electrical workshop personnel starting 2018 – 2020

Table 1. Harkan Activities 2018 – 2020 .

Item	2018	2019	2020
Self-management	39	14	62
put	65	64	74
Third party	100	122	159
Other Pt	9	39	44
Spk Harmen	25	15	7
Spk Hardepo	42	110	77
Number of Personnel	24	22	21
Total Kri Harmen	16	9	7
Total Kri Hardepo	2	5	5
Number of LK	213	239	339

(source: HarKan Electrical Workshop Report, 2021)

The delay and unresolved maintenance and repair of the KRI were not only due to infrastructure, but also to the environment due to human error. This human error can occur because the excessive workload affects the mentality of the personnel so that the workload received by the personnel is very significant both physically and mentally. To be able to reduce the risk of accidents and optimal results due to Human Error. So we need a study to measure mental workload. The competence of the personnel is very influential in the implementation of the main tasks of the electrical workshop. Below you can see some competency data from electrical workshop personnel according to the duties of authority and responsibility.

Table 2. Electrical workshop personnel experiencing mental burden.

No	Personnel Name	Position	Mental Symptoms
1	Abdillah	Pgs. Kabeng list	Stress Symptoms
2	Basari	Ur Motor	Symptoms of vertigo
3	Imam Mahmuji	Mt Motor 2	Symptoms of vertigo
4	Legino	Ur Generator	Stress Symptoms
5	Indra Bayu Heri Wibowo	Mt Generator 1	Stress Symptoms
6	Wagiono	Mt Generator 3	Symptoms of vertigo
7	Nur Parzaman	Ur Installation	Stress Symptoms
8	Edy Awanto	Mt Installation 2	Symptoms of vertigo
9	Imam Gazali	Mt Installation 3	Stress Symptoms
10	June Anniversary	Ur Instrument	Stress Symptoms
11	Susanto	Mt Instrument 3	Symptoms of vertigo

(source: HarKan Electrical Workshop Report, 2021

Several studies on mental workloads have been carried out, including "Measurement of Mental Workload Operator Control Room" at PT. Krakatau Steel (Persero) Tbk with the SWAT Method (subjective workload assessment Technique) by Erni Krisnaningsih, Khaerul Anwar, Saleh Dwiyatno (2019). In this study, we compared the workload while sailing with the workload at the base. Measurement of Mental Workload of Employees at PT Pindo Deli with the title "Measurement of Mental Workload of the Marketing Section of PT. Pindo Deli in the Covid-19 Period with the NASA TLX Method "The initial conditions of the Covid-19 pandemic of course also had a very significant impact on the marketing and sales of paper, namely a decrease in the number of requests from the export and domestic markets..This condition certainly greatly affects the marketing department because it is still required to still be able to sell paper to the market.

From the several studies above, there are differences in our research process including subjective and objective data collection from the problem identification process and data processing so that the research results are more acceptable.

2. LITERATURE REVIEW

2.1 Motive

Something that people constantly think about or want that causes action. The motive in this case has the meaning of encouraging, directing, and choosing behavior towards certain actions or goals.

2.2 Characteristic

Physical characteristics and consistent response in dealing with situations or conditions that are not bound by time. The speed of reaction in carrying out work that comes suddenly.

2.3 Self Concept

A person's attitude, personality values, or self-image. Self-confidence is a capital that they must be effective in dealing with every situation is part of a person's self-concept.

2.4 Knowledge and Skill

This is something very specific. Knowledge is a complex competency. Skills is the ability to perform certain physical or mental tasks. Mental competence or cognitive skills include analytical and conceptual thinking.

2.5 Workload

Workload is a number of processes or activities that must be completed by a worker within a certain period of time. If a worker is able to complete and adapt to a number of assigned tasks, then it does not become a workload. However, if the worker is not successful then the tasks and activities become a workload. Illustratively it can be interpreted that the workload is something that is felt beyond the ability of the worker to do his job. The capacity of a person required to perform a task in accordance with expectations (performance expectations) is different from the capacity available at the time (actual performance). The difference between the two shows the level of task difficulty that reflects the workload.

According to Health Law No. 36 of 2009, the definition of workload is the amount of work that must be carried out by a position/organizational unit and is the product of the number of jobs and time. Every worker can work in a healthy manner without endangering himself and the surrounding community, for this reason it is necessary to make efforts to harmonize work capacity, workload and work environment in order to obtain optimal work productivity. Workload can be divided into two categories, namely physical workload and workload. mental work. Meanwhile, based on the conditions, the workload is divided into 3 conditions, namely the workload according to standards, the workload is too high (over capacity) and the workload is too low (undercapacity).

2.6 NASA TLX

The NASA-TLX method is a method used to analyze the mental workload faced by workers who have to perform various activities in their work. This method was developed by Sandra G. Hart of NASA-Ames Research Center and Lowell E. Staveland of San Jose State University in 1981 based on the

emergence of subjective measurement needs consisting of a nine-factor scale (task difficulty, time pressure, type of activity, physical effort, mental effort, performance, frustration, stress and fatigue). Of these nine factors, it is further simplified into 6, namely Mental demand (MD), Physical demand (PD), Temporal demand (TD), Performance (P), Effort (E), Frustation level (FR). In the implementation of combining subjective and objective assessments. Work-related factors:

a. Mental demands (MD) Mental activities and perceptions needed in thinking, deciding, calculating, remembering, paying attention, looking for work. Whether it is easy or difficult to do, simple or complex, requires precision or not.

b. Physical demands (PD) Physical activities needed to push, pull, rotate, control, operate when carrying out work. Whether the task is easy or difficult, the movement required is fast or slow, tiring or not.

c. Temporal demands (TD). Time pressure given by superior personnel to complete tasks. Do the work done sooner or later.

Factors related to the subject/worker

a. Own performance (OP) How successful a worker is in completing the work assigned by the worker's supervisor. Is the worker satisfied with his performance when doing his job?

b. Effort (EF). How hard the effort workers must work to achieve the level of performance when carrying out the work.

c. Frustrated (FR). The level of security, lack of enthusiasm, feeling disturbed, and stress of workers when compared to feeling safe and relaxed during workers' work.

NASA-TLX (Nasa Task Load Index) is a subjective method of measuring mental workload. The measurement of the NASA-TLX method is divided into two stages, namely the comparison of each scale (Paired Comparison) and the assignment of values to the work (Event Scoring). The steps of measurement using NASA TLX are as follows (Hancock and Meshkati, 1989):

a. Weighting

In this section, respondents are asked to choose one of the two indicators that are felt to be more dominant in causing mental workload on the job. The NASA-TLX questionnaire given is in the form of pairwise comparisons. From this questionnaire, the tally of each indicator that is felt to be the most influential is calculated. The number of tallies as weights for each indicator of mental load is the sum of all the factors selected by the correspondent according to their influence in carrying out the work. The following table compares the NASA TLX indicators:

Table 2. Comparison of Indicators

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

(source: Hancock, 1989)

b. Rating

In this section, respondents are asked to rate the six indicators of mental load. The rating given is subjective depending on the mental burden felt by the respondent. To get the NASA TLX mental load score, the weights and ratings for each indicator are multiplied and then added and divided by 15 (the number of pairwise comparisons). The following is the rating scale from NASA TLX:

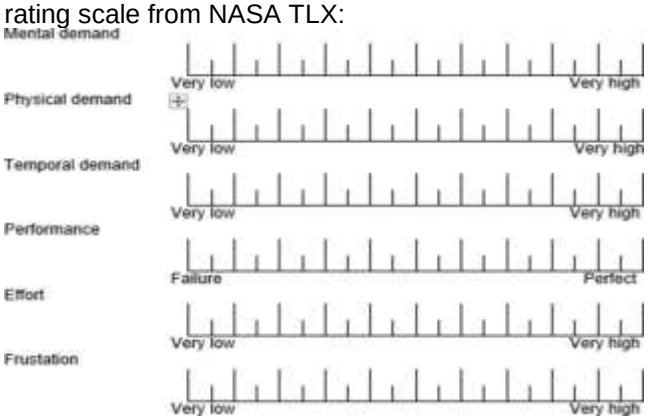

Figure 2. NASA TLX Dimension Scale

c. Calculating product value

It is obtained by multiplying the rating by the factor weight for each descriptor. This results in 6 product values for 6 indicators (MD, PD, TD, OP, FR, EF):

Product = rating x weight factor.....(1)

d. Calculating Weighted Workload (WWL)

Obtained by adding up the six product values WWL =.....(2)

e. Calculating the average WWL

Obtained by dividing WWL by the total weight

Average WWL = WWL/ 15..... (3)

f. Score Interpretation

Based on the explanation of Hart and Staveland (1981) in the NASA TLX method, the workload score obtained is divided into three parts, namely a value > 80 which indicates a rather heavy workload, a value of 50 – 80 indicates a moderate workload and a value < 50 indicates a rather light workload. . However, in its

development, according to several experts, including Simanjuntak, from the average WWL value, it will be known the value of a worker's workload and in which category the workload is. The workload categories are classified into 5 (five) categories, according to table 2.3

Table 3. Categorization of Workload

No	Range Average WWL	Workload Category
1	0 – 20	very low
2	21 – 40	Low
3	41 – 60	Currently
4	61 – 80	Tall
5	81 – 100	Lofty

3. ANALYSIS AND DISCUSSION

The data collection process was carried out at Fasharkan TNI AL V Surabaya Base. Fasharkan Surabaya is a class A KRI maintenance and repair facility. One of the task forces at Fasharkan Surabaya is an electrical repair shop in general and personnel in particular who carry out maintenance and repair of ships on water and underwater in the maintenance and repair of KRIs.

3.1 Research Result

This data collection process is carried out for all electrical workshop personnel together. The data collection process is divided into several stages by considering the objectives, including:

a Collecting data to find out the current conditions during the maintenance and repair of the KRI.
b Collecting data to determine the factors that affect the workload overload.
c Retrieval of physical workload data according to the implementing instructions according to the duties and authorities and responsibilities.
d Collecting data to determine the mental workload conditions of personnel during the process of maintaining and repairing the KRI.

Prior to filling out the questionnaire data, briefings were carried out to explain the procedures for filling out the questionnaire to all respondents, namely the personnel of the non-commissioned and enlisted electrician as well as the department head officers. Respondents for filling out the rating assessment questionnaire were 22 people, while the respondents for filling out the validation were 8 people. The form of statement validation and the factors that influence the occurrence of excessive workload can be seen in Appendix 1 of the statement validation, while the statement assessment and rating assessment questionnaire can be seen in Appendix 2 of the Assessment Statement and Appendix 3 of the Nasa TLX Rating Questionnaire.

3.2 General Description

Fasharkan Surabaya electrical workshop is one of the implementing units at Fasharkan Surabaya which consists of a machine shop, shipbuilding workshop, weapons workshop, navigation workshop and docking workshop. /28/I/1994 dated January 19, 1994.The Electrical Workshop has the task of carrying out maintenance and repairs in the ship's electrical field (electric motors, generators, electrical network systems, control systems) and producing distilled water. Equipment facilities owned are Motor Oven Tools, Electrical Tools, Forklifts, Overhead cranes. Electrical Workshop capabilities include Overhaul / new coils of generators up to 500 KVA, Overhaul / new coils of motors, repair of electrical installation systems, new installations of electrical installations, repair of control systems (GT, MPK, DG) and running systems, modifications and installations new control system & running system, production of Distilled Water / Crater Water. Other things that become a fairly heavy task include serving the needs of repair and maintenance of 4 submarines with different levels of maintenance.

a Zuisen Charging (Intermediate Charging)
b Filling of Tailadung (Charging at any time)
c Ausqlay Charging (Full Charging followed by the average voltage reaching maximum capacity.
d Full Ladung Filling (Full Charging)
e Charging batteries in parallel 2 submarines.
f Submarine battery replacement and activation.

3.3 Data Collections

The evaluation stage of KRI Maintenance and repair activities with the following criteria:

a. Implementation of maintenance and repair is in accordance with the position of the organization (item 1)

b. Implementation of maintenance and repairs are in accordance with working hours.(item 2)

c. Implementation of maintenance and repair often exceeds working hours in the service. (item 3)

d. Maintenance and repair implementation has exceeded the capabilities of the electrical workshop personnel. (item 4)

e. Implementation of maintenance and repair is in accordance with the procedure. (item 5)

The assessment of factors that affect the workload overload with the following criteria:

a. The level of difficulty of damage in terms of technology. (item 1)

b. The level of difficulty of the damage in terms of the repair process. (item 2)

c. The repair time is very relatively limited. (item 3)

d. Limited personnel who have expertise in the required field. (item 4)

e. The safety factor is always the main factor in every harkan activity. (item 5)

f. The communication factor during the implementation of Harkan was not optimal. (item 6)

g. The difficulty factor for spare parts in supporting harkan activities. (item 7)

h. Factors supporting the implementation of harkan infrastructure is not optimal. (items 8)

i. The age factor of the equipment that must be repaired. (items 9)

j. The age factor of the personnel during the implementation of the harkan was not optimal. (item 10)

k. Activity factors outside the main task activities. (item 11)

3.4 Data Processing

The measurement process through the validation and questionnaire stages involved all electrical workshop personnel by displaying several statements during the implementation process. The assessment uses the following clarification:

Table 4. Rating Rating

No	Code	Code Name	Mark
1	SS	Strongly agree	81 – 100
2	S	Agree	61 – 80
3	N	Neutral	41 – 60
4	TS	Do not agree	21 – 40
5	STS	Strongly Disagree	0 – 20

From the results of the questionnaire, the statements that currently occur and dominate the KRI's harkan activities are as follows:

Table 5. Results of the Assessment Questionnaire

No	Value statement					Total
	tem 1	tem 2	tem 3	tem 4	tem 5	
	71.55	71.32	57.77	87.45	72.82	360.91
%	19.82	19.76	16.01	24.23	20.18	100

a. Overload Factor Statement

Furthermore, the assessment of the factors that influence the occurrence of excessive workload can be seen according to the table and graph below.

Table 6. Results of the Assessment Questionnaire

Keterangan	Nilai Pernyataan											Total
	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	
Rata Rata Nilai	89,95	74,86	66,64	87,55	66,59	51,59	64,64	75,91	67,36	61,91	47,95	754,95
Prosentase	11,92	9,92	8,83	11,60	8,82	6,83	8,56	10,05	8,92	8,20	6,35	100,00
Perangkingan	1	4	5	2	6	10	7	3	9	8	11	

b. Physical Workload

The process of measuring the physical workload of personnel in this study includes several stages, namely determining the effective working time, determining the average capability standard (SKR) and calculating the workload using the task officer approach method. For the standard of ability - the average soldier has been set in the TNI Perpang Number Perpang/93/X/2011, both for operating units and supporting units.

Table 7. Physical Workload

No	Type of work (Section)	Total Workload	Effective working time	Personnel need	Present condition
1	Head of electrical workshop	2,822.5	1,414,7	1.9	1
2	Head of MotGen	2,438.1	1,414,7	1.7	1
3	Head of Installation	2.401.5	1,414,7	1.6	1
4	Kaur Motgen	2,297.1	1,414,7	1.7	1
5	Ur.Tu	185.0	1,414,7	1.3	1
6	Ur.Equipment	1,958.5	1,414,7	1.3	1
7	Ur. Motorcycle	1,872.0	1,414,7	1.3	1
8	MT.Motor 1	1,868.5	1,414,7	1.3	1
9	MT.Motor 2	1,969.5	1,414,7	1.3	1
10	MT.Motor 3	1959.0	1,414,7	1.3	1
11	Ur.Generator	1,837.5	1,414,7	1.2	1
12	MT.Generator 1	1,926.0	1,414,7	1.3	1
13	MT.Generator 2	1,984.5	1,414,7	1.4	1
14	MT.Generator 3	1,946.5	1,414,7	1.3	1
15	Ur. Installation	1737.0	1,414,7	1.2	1
16	MT. 1 Installation	1,748.5	1,414,7	1.3	1
17	MT. Installation 2	1,782.0	1,414,7	1.2	1

No	Type of work (Section)	Total Workload	Effective working time	Personnel need	Present condiition
18	MT. 3 Installation	1,795.2	1,414,7	1.2	1
19	Ur.Instrument	1,855.5	1,414,7	1.3	1
20	MT. .Instrument 1	1,802.5	1,414,7	1.2	1
21	MT. .Instrument 2	1,808.5	1,414,7	1.2	1
22	MT. .Instrument 3	1,858.5	1,414,7	1.3	1

c. Mental Workload

Nasa TLX data processing is carried out based on two factors, namely the results of the Nasa TLX rating questionnaire and the results of the comparison criteria weighting questionnaire and Nasa TLX data processing. The stages of mental workload data processing in this study went through 3 main stages, namely calculating the product value, calculating the Weighted Workload (WWL) value and calculating the average Weighted Workload (WWL).

1) Product Value Calculation

The product results of all departments on the indicators of the mental workload of personnel in completing their work assignments show that the Mental Demand (MD) indicator is the dominant indicator with a percentage of 28.09%, followed by the Physical Demand (PD) and Temporal Demand (TD) indicators with the percentage is 15.84%, then Frustration (FR) is 14% and Effort (EF) is 11%, while the Performance (P) indicator has the smallest effect, which is 9%. For more details, the results of indicator products for the instrument department can be seen in the table and figure below.

Table 8. Results of Data Processing for All Departments

Keterangan	MD	PD	TD	OP	EF
Rata Rata Kreteria	278,86	201,92	157,19	97,32	111,14
Prosentase	28,09	20,35	15,84	9,81	11,19

2) Calculation of Weigted Workload (WWL) Value

The calculation of the WWL value is done by adding up the entire product value obtained previously. The results of the calculation of WWL from each department are shown in the table and figure below.

Table 9. Total Product Assessment Results

Produk	Staf	Manajemen	Motor	Generator	Instalasi	Instrumen
Total	940,138	981,354	985,86	982,465	1024,51	992,951
%	15,914	16,612	16,689	16,631	17,343	16,808
	6	5	3	4	1	2

3.5 Discussions

After all the data has been validated, the researcher then conducts a discussion of all the data obtained, several things including:

a Currently, there has been a situation that requires attention and immediate resolution of the excessive workload felt by the electrical workshop personnel in carrying out maintenance and repair activities of the KRI.

b The dominance of factors that influence the occurrence of excessive mental workloads, including when carrying out Harkan's activities, when faced with the object of improvement, has a fairly high technology and personnel needs that are in accordance with the knowledge needs that are not directly proportional to the technology when implemented by Harkan.

c The physical workload of all personnel has been measured, indicating that the occurrence of excessive physical workload is not directly proportional to the volume of daily activities which are the duties and authorities of the electrical workshop.

d The results of the measurement and processing of the mental workload of electrical workshop personnel produce factors that dominate the workload, including mental, physical and time pressure. The dominant mental factor occurs when the personnel's efforts or processes in analyzing, identifying, planning and implementing the maintenance and repair of the KRI.

4. CONCLUSSIONS AND SUGGESTIONS

4.1 Conclussions

Based on data processing and analysis in the previous chapter, we conclude several things that can be related to this research, including:

a Researchers have carried out identification through interviews, validation and assessment of statements and indications of excessive workload on benglist personnel. Among these factors –Factors that affect the excessive mental workload in carrying out the HarKan process include the use of increasingly developing technology transfer in the context of modernizing the KRI which is felt to have exceeded the personnel capability limit by 24%, especially with regard to personnel competence in the field of knowledge of the old and latest KRI electrical defense equipment technology and the limitations of personnel who able to have expertise as needed by 12% so that it causes its own level of difficulty in the event of damage to the KRI.

b The calculation of the physical workload of all electrical workshop personnel based on the work volume of the KRI Harkan activities has exceeded the physical capabilities of the personnel along with the addition of the KRI defense equipment at the Mako Koarmada II. Furthermore, the measurement of mental workload using the Nasa TLX method approach obtained an excessive mental load when the personnel carried out identifying, analyzing and planning the activities of the KRI Harkan contained in the measurement category.*Mental Demand*(MD) is especially dominant in the Instrument and installation department by 30% and 33%, respectively. But overall, the total product of excessive mental workload is found in the installation department by 17.34%.

c Evaluation of the needs of electrical workshop personnel based on the results of processing mental workload products including;

1) The need for gradual and gradual improvements internally and externally through training to increase the knowledge of electrical workshop personnel in particular and Fasharkan Surabaya personnel in terms of basic knowledge of the Republic of Indonesia Warship electrical installation system.
2) The need to pay attention to the needs of the physical condition of the electrical workshop personnel in the maintenance and repair process because it is related to the average age of 49 years.
3) There needs to be an increase in speed ability training in deciding important things both physically and non-physically so that time can be efficient in supporting timely repairs.
4) It is necessary to increase individual and organizational understanding that all electrical repair problems in resolving KRI damage can be resolved appropriately according to the duties of authority and responsibility so as to reduce the level of stress caused.
5) The need to maintain performance requirements*(P)*and business needs(Effort / EF) which is already pretty good.

4.2 Suggestions

Based on the results of this study, several suggestions can be given, including:

a For personnel administration services in carrying out their duties in terms of coaching and procuring personnel, we hope that there will be a policy in submitting to appropriate needs based on the competence of Surabaya Fasharkan personnel.

b For the service responsible for this research and development of Fasharkan Surabaya based on the competence of personnel, we hope that this will be a priority in stages and stages in analyzing the problems that occur in the KRI.

c For services related to the maintenance and repair of KRI Koarmada II, we hope that we remain optimistic that Fasharkan Surabaya, the more problems that are given to electrical workshops in particular, the more capable they are in analyzing and able to give the best contribution in terms of maintenance and repair of the KRI, especially in the area of Koarmada II and the TNI. AL in general .

d It is necessary to measure the mental workload in stages to determine the condition of the electrical workshop personnel related to the development of KRI defense equipment technology in Koarmada II.

ACKNOWLEDGEMENTS

The authors greatly acknowledge the support from Indonesia Naval Technology College STTAL Surabaya Indonesia for providing the necessary resources to carry out this research work. The authors are also grateful to the anonymous reviewers and journal editorial board for their many insightful comments, which have significantly improved this article.

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