Eduvest – Journal of Universal Studies
Volume 4 Number 07, July, 2024
p- ISSN 2775-3735- e-ISSN 2775-3727

WORKLOAD ANALYSIS OF THE MERCHANT SHIP DIVISION USING THE FULL TIME EQUIVALENT METHOD

Ambikka[1], Reny Nadlifatin[2]
[1] Program Studi Magister Manajemen Teknologi, Sekolah Interdisiplin Manajemen dan Teknologi, Indonesia
[2] Institut Teknologi Sepuluh Nopember, Indonesia
Email: ambikka.ikk@gmail.com, reny@its.ac.id

ABSTRACT

As a production division in a government-owned shipyard, the Commercial Ship Division has a direct workforce of 28% of PT PAL Indonesia's workforce. The revenue generated annually reaches 46% of the company's total revenue, with an increase in revenue reaching 50% each year. With the large number of direct labor, revenue targets and the complexity of the ship production process, workload analysis needs to be done to measure the workload of direct labor and the number of direct labor needed. Workload analysis is carried out using the Full Time Equivalent (FTE) method, where the FTE Index resulting from the calculation will be grouped into three categories namely underload, normal and overload. From the calculation of the FTE index of direct labor in the Commercial Ship Division, there are 5 people in the underload category, 27 people in the normal category and 134 people in the overload category. From the results of the calculation of direct labor requirements using the Full Time Equivalent method as well as optimization and efficiency of labor, the number of direct labor requirements for the Commercial Ship Division is 315 people.

KEYWORDS *Workload Analysis, Direct Labor, FTE*

INTRODUCTION

PT PAL Indonesia is one of the State-Owned Enterprises engaged in the Shipping and Floating Equipment Industry, Power Plant Equipment Industry, Oil and Gas Industry Equipment Industry, Turbine and Other Power Plant Equipment Industry, and Machinery Equipment Industry. In carrying out its business fields, PT PAL Indonesia has 4 Directorates, namely the Main Directorate, Marketing Directorate, Production Directorate, and Directorate of Finance, Risk Management and Human Resources.

How to cite: Ambikka, Reny Nadlifatin (2024). Workload Analysis Of The Merchant Ship Division Using The Full Time Equivalent Method. *Journal Eduvest. 4* (7): 5849-5855
E-ISSN: 2775-3727
Published by: https://greenpublisher.id/

The Production Directorate has 5 *Production* Divisions, and 1 *Production Management Office* Division. These production divisions include the Commercial Ship Division, Warship Division, Maintenance and Repair Division, General Engineering Division and Submarine Division. The Commercial Ship Division has a total direct workforce of 166 people (28% of the company's total direct workforce). In terms of revenue, the Commercial Ship Division annually contributes more than 46% of the company's total revenue with an increase in revenue reaching 50% each year. The shipbuilding process carried out in the Commercial Ship Division is a series of interrelated activities, where delays that occur in one process will cause delays in other processes. The Commercial Ship Division consists of 4 Production Departments, including the Hull Construction Department, Erection Department, MO&EO Department and HO&AO Department). The composition of Departments, executives and the number of direct labor in the Commercial Ship Division are listed in Table 1.

Table 1. Departments, executives and number of Direct Staff of the Commercial Ship Division

Department	Executive	Total TL
Hull Construction	Plate Fitter	25 people
	Crane Operator	3 people
	Rigger	2 people
	Welder	21 people
	Blaster/Painter	1 person
Erection	Plate Fitter	12 people
	Rigger	1 person
	Welder	25 people
MO & EO	Pipe Fitter	6 people
	Welder	5 people
	Plate Fitter	4 people
	Machine Operator	5 people
	Diesel Mechanics	7 people
	Propulsion Steering	2 people
	Electrician	7 people
HO & AO	Plate Fitter	15 people
	Pipe Fitter	2 people
	Diesel Mechanics	7 people
	Joiner	3 people
	Painter	7 people
	Welder	6 people
TOTAL		166 people

According to Pranoto (2021), that "workload analysis is an action that aims to determine the length of time required for employees to complete a job". Workload analysis is very important to calculate exactly how much labor is needed to

complete all tasks in a section or unit in the company (Anisa, 2019). *Full Time Equivalent* (FTE) is one of the methods used in the workload analysis process. (Ajitia, 2017) . *Full Time Equivalent* is a calculation process that uses work time as a reference basis in determining workload. The existing workload time is converted into the amount of manpower needed to complete a job. FTE is used to measure how much full-time labor is needed to complete a job (Dewi, 2020). The advantage of this FTE method in increasing company productivity is that "it can optimize the workforce needed by the company" (Hudaningsih, 2019). The FTE method can calculate the number of hours worked by one full-time direct labor during a fixed period of time which is considered as one month or one year (Tracy, 2015). (Tracy, 2015). *Overload* indicates that the number of workers employed is not in accordance with the workload received so that it can trigger physical and psychological fatigue which will have an impact on labor productivity. *Underload indicates that* the number of workers allocated is too much so that the company must allocate more costs for direct labor salaries which causes cost inefficiencies. (Wardanis, 2018).

In order to achieve maximum productivity and performance, a study is needed to calculate and evenly distribute the workload according to the competencies and responsibilities of each section. Departing from the large number of employees, the amount of revenue targets that must be met and the complexity of the ship production process in the Commercial Ship Division, an analytical study was conducted to identify, measure the direct labor burden and analyze the amount of direct labor needed in the Commercial Ship Division and with the title Workload Analysis of the Commercial Ship Division Using the *Full Time Equivalent Method*. This research is expected to be useful as a tool for knowing and analyzing workloads and planning personnel needs for company management, so as to add to the wealth of case studies on the use of *Full Time Equivalent* in shipyards.

RESEARCH METHOD

The method used in this research is Workload Analysis using Full Time Equivalent (FTE). FTE is used to identify and measure the direct labor load of the Commercial Ship Division and analyze the number of direct labor required. The stages used in this research include the preliminary stage, the data collection stage and the data processing stage. In the preliminary stage, literature studies and field studies are carried out to determine the problem, in the data collection stage, field data and secondary data are collected and in the data processing stage, data processing will be carried out using the FTE method to obtain conclusions and follow-up suggestions.

RESULT AND DISCUSSION

The ship production process in the Commercial Ship Division begins at the stages of material preparation, cutting plates and pipes, connecting plates into blocks along with their outitting installations, painting blocks, connecting blocks into a complete ship body on the *building berth*, followed by launching, *function*

tests and *sea trials* and finally delivery of the ship. In detail, the production process is shown in Figure 1.

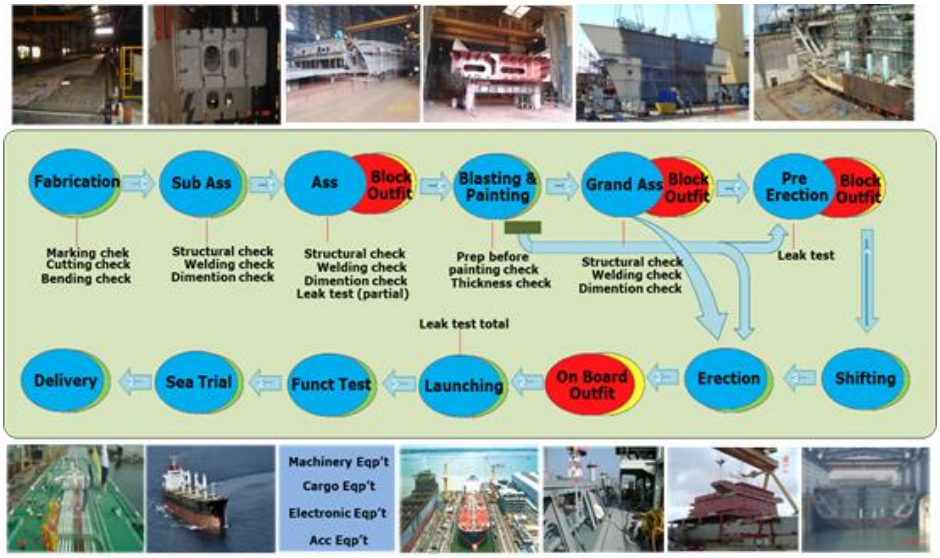

Figure 1. Ship Production Process in the Commercial Ship Division

Workload is defined as a set or number of activities that must be completed by an organizational unit or position holder within a certain period of time. (Kusdi, 2010). Another definition of workload is a state of work with several details of its tasks that must be completed by employees within a certain time. (Munandar, 2008).

Employee planning and management can be done through workload analysis. Workload analysis is the process of determining the number of *man-hours* required to complete a workload within a certain time. Workload analysis aims to determine how many workers are needed to complete a job and how much load is rightly delegated to one worker. (Marwansyah, 2010).

Workload calculation using the Full Time Equivalent (FTE) method is a calculation process that uses work time as a reference basis in determining workload. The existing workload time is converted into the number of manpower needed to complete a job. The steps to analyze workload with the FTE method are:

1. Determine the available working time in one year.

The working time of the Commercial Vessel Division in 2023 is shown in Table 2.

Table 2: Working time of the Commercial Ship Division in 2023

Total calendar days in 1 year		365 days
Holidays	Saturday & Sunday	Holidays
	National holiday	19 days
	Employee leave entitlement	4 days
Total effective days		237 days

Working hours per day: - Monday to Thursday - Friday	 8 hours 7 hours
Working hours in 1 year	1,847 hours

2. Determine the time allowance.

To determine the value of allowance, several categories are selected in accordance with job conditions, work locations based on International Labor Organization (ILO) standards and tables. An example of Allowance for Marking & Cutting work in the Hull Construction Department is in table 3.

Table 3. Allowance Marking & Cutting in Fabrication & SSH workshop

Personal Needs	Basic Fatique	Standing Allowance	Bad Light	Noise Level	Total
5	4	2	2	3	16

3. Setting the FTE index

FTE index calculation is done through calculation equation 1

$$FTE = \sum_{n=0}^{\infty} \frac{Waktu\ Penyelesaian\ Tugas + Allowance}{Waktu\ Kerja\ Efektif/tahun} \quad (1)$$

The following is an example of FTE index calculation for Plate Fitters in the Hull Construction Department:

Task Completion Time = (frequency x process time x working days a year)/60
= (5 x 147.5 x 228) / 60
= 2.802,5

Effective working time per year = Working hours per year - Absenteeism
= 1.847 - 38
= 1.809

FTE = (Task Completion Time + Allowance) / Effective Working Time per year
= (2.802,5 + 16) / 1.809
= 1,6

4. Categorize the FTE index

From the results of the FTE index calculation, further categorization is carried out based on the guidelines of the 2010 State Civil Service Agency into 3 parts, namely underload, normal and overload with a range of values contained in table 4.

Table 4. FTE index categorization

Index FTE	Workload	Category
< 0,09	Still lacking	Underload
1 - 1,28	Aligned	Normal
> 1,28	Too Much	Overload

Based on the results of the FTE index calculation, the workload category of the Direct Labor of the Commercial Ship Division for each Department is listed in Table 5.

Table 5. Direct Labor Workload Categories for each Department

Department	Total TL	Workload Category		
		Underload	Normal	Overload
Construction	52 people	1 person	12 people	39 people
Erection	38 people	1 person	3 people	34 people
MO & EO	36 people	3 people	2 people	31 people
HO & AO	40 people	-	10 people	30 people
TOTAL	166 people	5 people	27 people	134 people

5. Calculating labor requirements

The FTE index value is broken down into the additional labor required with an explanation in table 6.

Table 6. Labor addition

Index FTE	Description
FTE > 1.28	1 laborer must be added
FTE > 2.56	2 laborers must be added
FTE > 3.84	3 laborers must be added
FTE > 5.12	4 laborers must be added

Based on the results of the FTE index calculation, the addition and direct labor requirements of the Commercial Ship Division for each Department are listed in Table 7.

Table 7. Additions and direct labor requirements for each department

Department	Total TL	Overload	TL addition	TL requirements
Construction	52 people	39 people	51 people	103 people
Erection	38 people	34 people	34 people	72 people
MO & EO	36 people	31 people	34 people	70 people
HO & AO	40 people	30 people	30 people	70 people
TOTAL	166 people	134 people	149 people	315 people

CONCLUSION

The conclusion obtained from the research on the workload of direct labor in the Commercial Ship Division of 166 people consisting of 52 people in the Construction Department, 38 people in the Erection Department, 36 people in the MO & EO Department and 40 people in the HO & AO Department is : 1. From the FTE index calculated for each direct worker, there are 5 people in the underload category (FTE index < 0.99), 27 people in the Normal category (FTE index between 1 - 1.28) and 134 people in the Over Load category (FTE index > 1.28). 2. The direct labor required by the Commercial Ship Division after being calculated using

the Full Time Equvalent method is 315 people. For further research, workload equalization can be done by reviewing the existing job description.

REFERENCES

Ajitia, N. G. (2017). Efektivitas Manpower Planning Dengan Menggunakan Metode Analisis Beban Kerja (Work Load Analysis) Berdasarkan Pendekatan Full TIME Equivalent (Studi Pada Divisi Pengembangan Karir, Organisasi, Dan Kompetensi Di PT. Pupuk Kalimantan Timur Tbk.Bontang. Doctoral dissertation, Brawijaya University.

Dewi, U. d. (2012). Analisis Kebutuhan Tenaga Kerja Berdasarkan Beban Kerja Karyawan Pada PT PLN (Persero) Distribusi Jakarta Raya dan Tangerang Bidang Sumber Daya Manusia dan Organisasi. Depok: urusan Manajemen SDM Fakultas Ekonomi Universitas.

Dewi, W. C. (2020). Analisis Beban Kerja dengan Metode Full Time Equivalent (FTE) untuk Menentukan Kebutuhan Operator Proses Pengemasan Kosmetik PT. XYZ. IENACO. Industrial Engineering National Conference.

H. N. Anisa, a. H. (2019). ANALISIS BEBAN KERJA PEGAWAI DENGAN METODE FULL TIME EQUIVALENT (FTE) (Studi Kasus pada PT.PLN (Persero) Distribusi Jateng dan DIY). Industrial Engineering Online Journal, vol. 7, no. 4, .

Hudaningsih, N. &. (2019). Analisis Kebutuhan Karyawan Dengan Menggunakan Metode Full Time Equivalent (FTE) Pada Departemen Produksi Pt. Borsya Cipta Communica. urnal TAMBORA.

Kementerian Dalam Negeri. (2008). Pedoman Analisis Beban Kerja Di Lingkungan Departemen Dalam Negeri Dan Pemerintah Daerah (Nomor 12 tahun 2008). Jakarta: Kementerian Dalam Negeri.

Kusdi, S. &. (2010). Pengaruh Kepemimpinan, Kedisiplinan, Beban Kerja dan Motivasi Kerja terhadap Kinerja Guru Sekolah Dasar. Jurnal Manajemen Sumber Daya Manusia, Vol.4 No.1, 72-79.

Marwansyah. (2010). Manajemen Sumber Daya Manusia. Bandung: Alfabeta.

Munandar, A. S. (2008). Psikologi Industri dan Organisasi. Jakarta: Universitas Indonesia (UIPress).

Pranoto, L. H. (2021). Analisa Beban Kerja Sumber Daya Manusia. Jakarta: Gramedia.

Tracy, B. (2015). Full Time Equivalent (FTE) Calculation Tool .

Wardanis, D. T. (2018). Analisis Beban Kerja Tenaga Rekam Medis Rumah Sakit Bedah Surabaya Menggunakan Metode FTE. Indonesian Journal of Health Administration (Jurnal Administrasi Kesehatan Indonesia..