



Workload Analysis in Determining the Number of Employees of the Engineer Division and Development Division at Belawan Container Service Company

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Abstract. The purpose of this research is to analyze the working time of the employees using the Work Sampling method and balance the workload by analyzing the number of employee needs for the engineer division and development division with the Full-Time Equivalent method. The results of this research indicate that the effective working day for a year is 234 days and the effective working time is 1310 h for five working days per week. Through the Work Sampling method, it is known that for the engineer division, the total time for productive activities was 76.24%, unproductive activities were 5.68% and personal activities were 18.08% with a 30% allowance. Meanwhile, for the development division, the total time for productive activities was 76.63%, unproductive activities were 5.17% and personal activities were 18.20% with a 30% allowance. Based on the results of workload measurements in the engineering division using the Full-Time Equivalent method, there are employees with underload, unload, and overload workloads. Meanwhile, there are employees in the development division with an overload workload. Besides, the employee needs for the engineer division is 6 persons and for the development, the division is 5 persons.

Keywords: Employee Needs · Full-Time Equivalent · Work Sampling

1 Introduction

1.1 Background

According to Anisa & Heru [1], workload refers to the process through which an individual completes the duties and obligations of a job or group of tasks that are carried out under typical conditions or circumstances in a given length of time.

Consideration must be given to how well the company's mandated workload corresponds to the working conditions of the workforce. Workplace comfort levels for employees might be impacted by an excessive workload. In contrast, workloads that are excessively light might lead to labour inefficiencies that could result in business losses [2].

This research was conducted on companies engaged in container loading and unloading services. In an interview that has been conducted with the general manager, that the problem that exists in this company is the allocation of employees for each division was not based on workload. The overtime ratio of each division as the finance division is 164.67 h/person, the general division is 99.3 h/person, the engineer division is 254.6 h/person, the development division is 260.3 h/person and for operation, the division is 131.24 h/person.

As we can see, there was an imbalance in the overtime ratio which are two divisions with overtime ratio (hours/persons) higher than 200 h/person, such as the engineer and development divisions, while the other three divisions like the finance, general and operation divisions have overtime ratio that lower than 200 h/person.

Based on the description of the research background, it occurs that there are some divisions that have high overtime ratios and some are low, so the problem that needs to be done is to measure the workload of divisions that have relatively high overtime ratios and can be calculated the employee needs such as engineer and development divisions.

The purpose of this research is to analyze the working time of the employees using the Work Sampling method and balance the workload by analyzing the number of employee needs for the engineering division and development division with the Full-Time Equivalent method.

1.2 Literature Review

Human Resources Management

Human resource management is one of the strategic fields in an organization that should be seen as an extension of the traditional view of managing people effectively and managing human resources, it requires knowledge about human behaviour and the ability to manage it [3].

Human Resources management has undergone changes starting from the era of personnel management then human resource management which continues to be resources based on competence until finally the management of human resources as Human Capital. According to Nasution [4], human capital is defined as all the efforts that workers bring to be invested in the company in realizing a reliable company that provides the best service.

Human Resources Planning

Human resource planning is a process of anticipating and making tools for the movement of people into and out of an organization. Human resource planning is a guideline for organizational leaders and a series of hiring plan changes [5].

Job Analyze

Job analysis is a procedure that goes through to determine the responsibilities of those positions and the characteristics of the person working for the position [6]. Some terminology is about job analysis, one of which is job analysis which is the activity or process of collecting and compiling various information related to each job, its tasks, types of

work, and responsibilities operationally to realize the organizational or business goals of an enterprise.

Job Description

Is one of the main results presented by a systematic job analysis. The job description describes the duties, responsibilities, terms of employment, and main work activities. Job descriptions vary in terms of the degree of detail of the content [7].

Workload

Workload is the physical or mental demand of a job to a person when he performs work that is handled in a certain capacity. The workload may vary according to the number and combination of tasks performed, the grade of difficulty of the tasks, the characteristics of the work, etc. [8].

The workload of an employee has been determined in the form of company work standards based on the type of work. If employees work in accordance with the standards set by the company, there will be no problems. Meanwhile, if employees work below the company's work standards, the workload experienced employees will be excessive. So, to obtain human resources that are in accordance with the needs of the company, workload measurement is needed so that employees can carry out their work optimally.

Workload Analyze

This workload measurement analysis is carried out to measure and calculate the workload of each work unit/work division in achieving work effectiveness and efficiency at the time of their task implementation and increasing the capacity of a professional, transparent and rational organization.

Workload measurement has several benefits such as helping to prevent employee overload, optimizing employee performance, as a tool for management decision making, analyzing workload based on activities, discipline needs, and staff to deal with problems that will arise [9].

Work Sampling

Is a technique for calculating workload to make a number of observations on the work activities of employees. This method can be classified as a direct measurement of work due to the implementation of this measurement activity must be studied or observed directly at work [10].

In conducting work sampling, there are stages that must be prepared, namely as follows:

1. Determining the type of employee under study.
2. Conduct sample selection when the number of employees is large. Random sampling techniques are needed at this stage to obtain the percentage of the employee population to be observed.
3. Create a list form of employee activities that can be classified as productive and unproductive activities and also direct activities related to staffing functions and indirect activities.
4. Train implementing researchers on research activities.

5. Observing employee activities is carried out at intervals of 2–15 min depending on the needs of the researcher.
6. The work sampling method observed is the activity and use of time, without paying attention to the quality of the work.

Full-Time Equivalent

The Full-Time Equivalent (FTE) method is a method where the time required to complete various activities or work is compared with the existing effective work time [1]. According to Fetrina [11], FTE is the time base used to complete the work which will then be converted into the form of a value index.

Based on the workload analysis guidelines issued by the State Civil Service Agency in 2010, the FTE index value is divided into 3 categories, namely: underload, normal, and overload. Each of the ranges of values in the index is as follows:

1. Underload = FTE index value between 0–0.99
2. Normal = FTE index value between 1–1.28
3. Overload = FTE index value higher than 1.28

The purpose of measuring with the FTE method is to simplify the work that has been measured by converting workload hours into the number of employees needed to complete a certain job.

Calculation of Employee Needs

The calculation of the needs of employees of a company is needed in order to meet the needs of employees who have been planned appropriately both in terms of quantity, time, and quality. Employee needs can be calculated by determining the standard of the average ability to achieve time to complete the main work and the quantity of workload in one year so that the workload for each job is obtained [12].

1.3 Conceptual Framework

Based on the background of the research problem and the theoretical foundation, the conceptual framework of this research can be seen in Fig. 1.

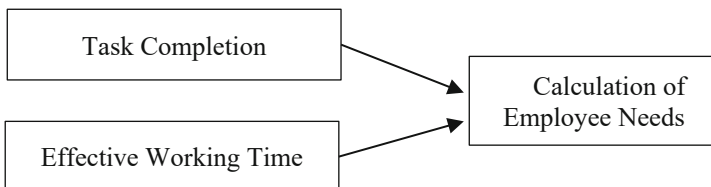


Fig. 1. Conceptual Framework

2 Methods

This research is qualitative and quantitative descriptive research. According to [13], descriptive research is a research method aimed at describing systematically, factually, and accurately the facts and properties of a particular object or population. This research aims to investigate in detail human activity and work in order to find facts obtained from the results of interviews and observations, but does not conduct a hypothesis analysis.

There are primary and secondary data that need to be collected. The primary data are data obtained through direct observation, interviews, and the dissemination of forms. The primary data taken are qualitative and quantitative. Qualitative data is in the form of information about the main tasks of employee work, while quantitative data is in the form of numbers of productive and unproductive work time usage, the average completion time of a basic task, and the cost of the main task or workload for a year. The secondary data is the data obtained through the collection from a company which is the data allowed by the company as reference material for this research.

The data analysis techniques in this research are using the work sampling method and the full-time equivalent method. The work sampling method is conducted by observing employees' activities and then categorizing their activities into three categories which are productive, unproductive, and personal activities. This observation was carried out for nine hours with a distance of observation time every two minutes which was carried out for two days for each employee. Secondly, the full-time equivalent method is carried out by collecting data on the average frequency of main tasks performed and the standard ability of the average time to complete the main tasks of employees into a formula to calculate employee needs based on workload. The workload obtained then becomes the basis for calculating the number of employee needs. Besides, the workload obtained also can be used to determine employee category by using the FTE index value.

3 Result and Discussion

3.1 Workload Analyze

The effective working day in this company is five days a week. Based on the 2021 Calendar, the effective working day for a year is 234 days. The details can be seen below in Table 1.

3.2 Calculating of Working Time of Engineer Division Employees

The Table 2 is the result of observing working time with the work sampling method for the engineer division.

Based on Table 2, the use of personal and non-productive time is still in accordance with the standards of the Kepmen PAN. No. 75 of 2004 and Kepmen Naker No. 128 of 2016 where the use of time allowance is 30% and for effective working time is 70%.

Table 1. The Effective Working Day in 2021

No	Month	Total days	Saturday & Sunday Holidays	National Holidays & Joint Leave	Annual Leave
1	January	31	10	1	12
2	February	28	8	1	
3	March	31	8	2	
4	April	30	8	1	
5	May	31	10	4	
6	June	30	8	1	
7	July	31	9	1	
8	August	31	9	2	
9	September	30	8	–	
10	October	31	10	1	
11	November	30	8	–	
12	December	31	8	1	
Total		365 Days	104 Days	15 Days	12 Days
Total Effective Working Days		234 Days			

Table 2. The Amount of Working Time Used by Engineer Division Employees

Employee	Total Observation (times)			Total (times)	Percentage (%)			Total Percentage (%)
	PRO	UPR	PER		PRO	UPR	PER	
E1	404	22	116	542	74.54	4.06	21.40	100
E2	386	32	124	542	71.22	5.90	22.88	100
E3	428	40	74	542	78.97	7.38	13.65	100
E4	440	36	66	542	81.18	6.64	12.18	100
E5	408	24	110	542	75.28	4.43	20.29	100
Total	2066	154	490	-	381.19	28.41	90.4	-
Average	413	30.8	98	542	76.24	5.68	18.08	-

Information:

- a. PRO: Productive Activities
- b. UPR: Unproductive Activities
- c. PER: Personal Activities
- d. E: Employee

Table 3. The Amount of Working Time Used by Development Division Employees

Employee	Total Observation (times)			Total (times)	Percentage (%)			Total Percentage (%)
	PRO	UPR	PER		PRO	UPR	PER	
E1	438	28	76	542	80.81	5.17	14.02	100
E2	408	20	114	542	75.28	3.69	21.03	100
E3	400	36	106	542	73.80	6.64	19.56	100
Total	1246	84	296	–	229.89	15.50	54.61	–
Average	415	28	99	542	76.63	5.17	18.20	–

Information:

- a. PRO: Productive Activities
- b. UPR: Unproductive Activities
- c. PER: Personal Activities
- d. E: Employee

3.3 Calculation of Working Time of Engineer Division Employees

The Table 3 is the result of observing working time with the work sampling method for the development division.

Based on Table 3, the use of personal and non-productive time is still in accordance with the standards of the Kepmen PAN. No. 75 of 2004 and Kepmen Naker No. 128 of 2016 where the use of time allowance is 30% and for effective working time is 70%.

3.4 Calculation of Employee Needs

Determination of Working Time

According to Kepmen.Naker No.128 of 2016, effective working hours are formal working hours reduced by work time lost due to non-work (allowance) such as going to the toilet, food breaks, and so on. The average allowance is about 30% of the number of formal working hours.

Total time of one day of work is $9 \text{ h} - 1 \text{ h (break time)} = 8 \text{ h}$ Effective time for one year = $70\% \times 8 \text{ h} = 5.6 \text{ h}$.

Productive time for one year = $234 \text{ days} \times 5.6 \text{ h} = 1310 \text{ h}$.

Time Required to Complete Works

Employee Needs Calculation for Engineer Division show by Table 4.

From the results of the calculations in Table 4, the employee needs in the engineer division is 6.67 employees, so that it is rounded up to 6 or 7 employees. If 6 employees, there will be overtime with overtime costs:

Overtime hours/year = $0.67 \times 1310 \text{ effective working hours/year} = 877.7 \text{ h/year}$

Average salary per month for engineer division employees = Rp. 6,150,623/month

So, the total wages that need to be issued by the company/year if 1 employee is added to a total of 6 employees and the remaining overtime (877.7 h/year) is:

Table 4. Employee Needs Calculation for Engineer Division

Employee	No.	Job description	WL (times/year)	ACS (hours/activity)	TCT (hours/year)
E1	1	Planning: Maintenance & Maintenance Schedule, Cost Plan and Amount of Materials needed for Terminal Tractor Maintenance	1	40	40
	2	Ensuring the quality of the work of the parties involved in maintaining the equipment in accordance with the standards and regulations that apply in the company	120	2	240
	3	Checking and verifying the terminal tractor fuel usage report	24	0.5	12
	4	Coordinate with the assistant manager regarding every progress of the terminal tractor maintenance work	52	2	104
	5	Identify, analyze, and find solutions to damage to terminal tractor tools	120	1	120
	6	Supervise refueling of terminal tractor tools	60	1	60
	7	Verifying fuel usage recapitulation	12	0.5	6
	8	Issuing a BBM purchase order (PO)	6	1	6
	9	Supervise the fuel bunker to the monthly tank	4	2	8
	10	Field Team Work Plan Analysis and Approval	144	1	144
	11	Coordinate related to the work schedule of the field team and the operational schedule of the operating division	12	1	12
	12	Conduct monthly meetings with maintenance vendors to review monthly work results	12	8	96
	13	Make a recapitulation of the performance report of the terminal tractor tool	12	8	96
	14	Create and verify the completeness of BBM vendor administration (billing basis)	6	1	6
	15	Verify any damage to the tool and approval of the initial repair plan	120	2	240
	16	Analyze and verify vendor maintenance monthly reports (billing basis)	84	2	168

(continued)

Table 4. (continued)

Employee	No.	Job description	WL (times/year)	ACS (hours/activity)	TCT (hours/year)
	17	Conduct a monthly review of the individual performance of the field team through briefings	12	0.5	6
	18	Planning and designing improvements to terminal tractor and chassis equipment	3	6	18
	19	Filling in the Monthly Work Plan and Realizing the Monthly Work Plan	12	1	12
	20	Monitor and analyze the condition of the Scada System	12	2	24
	Total Task Load				1418
E2	1	Receiving incoming letters and managing dispositions for the engineering division	60	0.5	30
	2	Make a letter out of the engineering division	72	0.5	36
	3	Make a recapitulation of the maintenance cost report and the engineering division's material costs	234	1	234
	4	Make a recapitulation of the technical division's investment cost report	12	2	24
	5	Manage the recapitulation of loading and unloading tool performance reports	12	8	96
	6	Sending maintenance and material costs reports, investment cost reports and performance reports to sub holdings	12	1	12
	7	Performing the payment process for the work in the engineering division	84	2	168
	8	Carry out budgeting control of the technical division's budget funds	12	1	12
	9	Making official notes for technical managers, operations and engineering directors	234	1	234
	10	Doing engineering division document archiving	234	1	234
	11	Recapitulating the results of the technical division meeting	52	1	52
	12	Sending payment documents from the engineering division to the finance division	48	1	48

(continued)

Table 4. (continued)

Employee	No.	Job description	WL (times/year)	ACS (hours/activity)	TCT (hours/year)
	13	Recapitulating the numbering of the technical manager's official note	234	0.25	58.5
Total Task Load					1238.5
E3	1	Coordinate with the Assistant Manager of Facilities related to the implementation of port infrastructure maintenance, preparation of facilities, installation of electricity/water and communication equipment Checking daily, weekly, and monthly reports	52	1	52
	2	regarding the progress of construction and maintenance of port facilities Make BOQ (Bill of Quality), RAB (Cost	12	1	12
	3	Budget Draft), and RKS (Work Plan and Conditions) for new maintenance work/additional items	12	40	480
	4	Prepare addendum related to employment contract	4	8	32
	5	Carry out periodic inspections and maintenance of terminal facilities	52	1	52
	6	Carry out vendor selection related to the facility maintenance process at the terminal according to the specified work value limits	12	32	192
	7	Ensuring the development process takes place effectively and efficiently	12	30	360
	8	Filling in the Monthly Work Plan and Realizing the Monthly Work Plan	12	1	12
Total Task Load					1192
	1	Planning: Maintenance & Maintenance Schedule, Cost Plan and Amount of Material Required for Maintenance of ARTG and STS Cranes and their Utilities	2	40	80
	2	Ensuring the quality of the work of the parties involved in maintaining the equipment in accordance with the standards and regulations that apply in the company	480	1	480
	3	Make a Report on the Electricity Consumption of ARTG and STS Crane	48	0.5	24
	4	Coordinate with assistant managers regarding each progress of the work of ARTG and STS Crane	104	4	416

(continued)

Table 4. (continued)

Employee	No.	Job description	WL (times/year)	ACS (hours/activity)	TCT (hours/year)
	5	Identify, analyze, and find solutions to damage to ARTG and STS Crane tools	240	1	240
	6	Field Team Work Plan Analysis and Approval	288	1	288
E4	7	Coordinate related to the work schedule of the field team and the operational schedule of the operating division	24	2	48
	8	Make a recapitulation of monthly ARTG and STS Crane performance reports	24	16	384
	9	Verify any damage to the tool and approval of the initial repair plan	240	4	960
	10	Analyze and verify monthly vendor maintenance reports (billing basis)	84	2	168
	11	Conduct a monthly review of the individual performance of the field team through briefings	12	0.5	6
	12	Planning and designing improvements to the ARTG and STS Crane tools	6	12	72
	13	Conduct monthly meetings with maintenance vendors to review monthly work results	12	8	96
	14	Filling in the Monthly Work Plan and Realizing the Monthly Work Plan	12	1	12
Total Task Load					3274
	1	Planning: Maintenance Schedule, Material Cost Plan Required for Maintenance of electricity and water installations	1	40	40
	2	Document all disturbances that occur and their solutions Ensuring the quality of the work of the parties	24	1	24
	3	involved in maintaining the equipment in accordance with the standards and regulations that apply in the company	240	1	240
	4	Make a report on the use of water, electricity, and generators	12	2	24
	5	Coordinate with assistant managers regarding any work progress and damage related to Electrical, Water and Generator Installations	52	2	104
	6	Verify any damage to the tool and approval of the initial repair plan	120	2	240

(continued)

Table 4. (continued)

Employee	No.	Job description	WL (times/year)	ACS (hours/activity)	TCT (hours/year)
E5	7	Identify, analyze, and find solutions to damage to generators, electricity, and water Make BOQ (Bill of Quality), RAB (Cost Budget	120	2	240
	8	Draft), and RKS (Work Plan and Conditions) for new maintenance work/additional items	12	40	480
	9	Filling in the Monthly Work Plan and Realizing the Monthly Work Plan	12	1	12
	10	Coordinate security in the area of Belawan Container Terminal Phase 2 Participate in supervising the implementation of	4	2	8
	11	QHSE within the company so that it runs well according to plan	234	0.5	117
	12	Make a summary of the generator performance report	12	1	12
	13	Supervise, maintain generator sets, electrical installations along with air conditioning (AC) and water installations	10	8	80
Total Task Load					1621
Total of TCT					8743.5
Number of Employees					6.67

$$= (12 \text{ months} \times 1 \text{ person} \times \text{Rp. } 6,150,623) + (877.7 \times 2 \times 1173 \times \text{Rp. } 6,150,623)$$

$$= \text{Rp. } 136,216,745/\text{year}$$

Meanwhile, if 2 employees are added to make a total of 7 employees, then there is no overtime but there is an excess (idle). So, the total wages that need to be issued by the company/year if 2 additional employees added are:

$$= 12 \text{ months/year} \times (2 \text{ people} \times \text{Rp. } 6,150,623/\text{person})/\text{month}$$

$$= \text{Rp. } 147,614,952/\text{year}$$

Based on the results of these calculations, the employee needs for the engineering division that is optimal and economical for the company is 6 persons.

Employee Needs Calculation for Development Division show by Table 5.

From the calculation results in Table 5, the employee needs in the development division are 4.94 employees so they are rounded up to 4 or 5 employees. If there are 4 employees, there will be overtime with overtime costs: Overtime hours/year = $0,94 \times 1310$ effective working hours/year DRD = 1231.4 h/year.

Average salary per month for development division employees = Rp. 5,371,943/month

So, the total wages that need to be issued by the company/year if 1 employee is added to a total of 4 employees and the remaining overtime (1231.4 h/year) is:

Table 5. Employee Needs Calculation for Development Division

Employee	No.	Job description	WL (times/year)	ACS (hours/activity)	TCT (hours/year)
E1	1	Collecting the data needed for the preparation of occupational safety and health programs	12	1	12
	2	Assist in measuring business risk for all work units by taking into account the magnitude of the impact and the possibility of risk opportunities	4	5	20
	3	Prepare reports by recording observations, information, events, and business risk monitoring activities	4	5	12
	4	Disseminate quality management guidelines and policies to all parts of the Company	234	0.5	117
	5	Assist in the formulation of strategies to encourage a business risk awareness culture at every level in the Company	4	2	8
	6	Participate in supervising the implementation of HSSE within the company so that it runs well according to plan	234	1.5	351
	7	Carry out continuous control over business risks that have high priority/significant risks for the sustainability of the Company	4	3	12
	8	Revise the work administration (official memorandum, minutes, SKB (Mutual Agreement), Work Agreement)	234	4	936
	9	Support and develop policies and guidelines related to the resolution of complaints of a technical nature, services addressed to the Company by service users, for matters relating to HSE and third parties	1	112	112
	10	Ensure that dangerous goods containers have been placed in accordance with the IMDG (International Maritime Dangerous Goods) Code peraturan	144	1	144
	11	Controlling/controlling and regulating traffic (people, vehicles and goods)	4	4	4
	12	Take note of the completeness of the Personal Protective Equipment (PPE) that is entered and that has been damaged, as well as the PPE needed for the future	234	0.5	117

(continued)

Table 5. (continued)

Employee	No.	Job description	WL (times/year)	ACS (hours/activity)	TCT (hours/year)
	13	Ensure that all documents (policies and procedures) both internal and external to the Company are stored and protected from damage and are easy to trace and control distribution	12	2	24
	14	Prepare the necessary documents for both QHSE internal audits and management reviews	12	32	384
	15	Make weekly/monthly reports related to inspection monitoring, work reports, documentation, etc. to be submitted to superiors	12	3	36
	16	Follow up emergency response management and recovery plans for abnormal events in accordance with applicable standards and regulations	24	5	120
	17	Assist in the preparation of the Risk Profile report by preparing all the required data	4	5	20
Total Task Load					2441
	1	Ensuring software products at the gate, workshop, and power house locations are in accordance with the required conditions	52	1	52
	2	Ensure TOS runs according to SOP	52	1	52
	3	Analyze problems that occur in software/applications	3	8	24
	4	Perform maintenance schedule planning	2	4	8
	5	Coordinate with the Assistant IT Manager regarding work progress related to software/applications	52	0.5	26
	6	Drafting a Budget/Work Plan and its Requirements related to software development	4	8	32
	7	Create and develop applications according to company needs	3	480	1440
	8	Ensure all applications can be implemented according to company needs	52	1	52
	9	Respond to customer complaints	960	0.25	240
	10	Making official notes	252	2	104
	11	Making outgoing letters	24	3	72
	12	Evaluating software maintenance	12	16	192

(continued)

Table 5. (continued)

Employee	No.	Job description	WL (times/year)	ACS (hours/activity)	TCT (hours/year)
Total Task Load					2294
E3	1	Planning and implementing hardware maintenance	52	1	52
	2	Ensure that CCTV is installed and functioning properly	2	1	2
	3	Ensure network and hardware availability at gates, workshops, power houses, access points, container yards, and GPS functions properly	52	6	312
	4	Coordinate with the IT Assistant Manager regarding work progress related to the network/hardware	52	1.5	78
	5	Manage IT Help desk work activities in performing troubleshooting	144	1	144
	6	Perform settings, planning, installation, configuration, monitoring, and mitigation on servers and data centers	243	3	702
	7	Making payment invoices for IT Support officers	12	2	24
	8	Making payment bills for CCTV officers	12	2	24
	9	Main line internet payment billing and backup	24	4	96
	10	Evaluate hardware maintenance reports	12	16	192
	11	Making official notes	52	2	104
Total Task Load					1730
Total of TCT					6465
Number of Employees					4.94

Information:

- a. E = Employee
- b. WL = Workload
- c. ACS = Average Capability Standards
- d. TCT = Task Completion Time

$$= (12 \text{ months} \times 1 \text{ person} \times \text{Rp. } 5,371,943) + (1231.4 \times 2 \times 1173 \times \text{Rp. } 5,371,943) \\ = \text{Rp. } 140,937,436/\text{year}$$

Meanwhile, if 2 employees are added to a total of 5 employees, then there is no overtime but there is an excess (idle). So, the total wages that need to be issued by the company/year if 2 additional employees added are:

$$= 12 \text{ months/year} \times (2 \text{ people} \times \text{Rp. } 5,371,943 \text{ people})/\text{month} \\ = \text{Rp. } 128,926,640/\text{year}$$

Table 6. Workload Calculation Based on FTE

Division	Employee	Workload	Effective Working Time	FTE	Category
Engineer	E1	1.418	1.310	1,08	Unload
Engineer	E2	1.238,5	1.310	0,95	Underload
Engineer	E3	1.192	1.310	0,91	Underload
Engineer	E4	3.274	1.310	2,49	Overload
Engineer	E5	1.621	1.310	1,24	Unload
Total		8.743,5	–	6,67	–
Average		1.748,7	1.310	1.33	Overload
Development	E1	2.441	1.310	1,86	Overload
Development	E2	2.294	1.310	1,75	Overload
Development	E3	1.730	1.310	1,32	Overload
Total		6.465	–	4,94	–
Average		2.155	1.310	1,65	Overload

Based on the results of these calculations, the employee needs for the development division that is optimal and economical for the company is 5 persons.

Calculate Total Employee Needs

The employee needs for the engineering division is 6 persons, while for the development division is 5 persons. So, the total employee needs for both divisions are 11 persons.

Workload Analyze Based on Full-Time Equivalent

Based on FTE calculation, the workload of the engineer division and development division can be seen in Table 6.

According to Table 6's calculation of employee workload using the FTE technique, there are two employees who are underloaded, two employees who are underloaded, and four employees who are overloading. The engineering and development divisions, when viewed from the work division, continue to have a workload that is above capacity.

4 Conclusion

The conclusion of this research is the effective working day for a year is 234 days and the effective working time is 1310 h for five working days per week. Through the Work Sampling method, it is known that for the engineer division, the total time for productive activities was 75.98%, unproductive activities were 5.94% and personal activities were 18.08% with a 30% allowance. Meanwhile, for the development division, the total time for productive activities was 76.27%, unproductive activities were 5.29% and personal activities were 18.44% with a 30% allowance. Based on the results of the calculation for the employee needs by the FTE method, it can be seen that in the engineer division,

the number of employees needed is obtained as many as 6.67 persons, whereas in terms of calculating expenses that are more optimal and economical for the company, the engineer division only 1 employee is added and the remaining workload can be done by adding employee working hours (overtime). Meanwhile, in the development division as many as 4.94 people, where calculations are carried out in considering the number of employees in the development division optimally and economically, the development division is recommended to add 2 employees.

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