

WORKLOAD ANALYSIS FOR DETERMINING THE NUMBER OF  
EMPLOYEES AT BANKING COMPANIES

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**Abstract**

At recent times, some companies have made some improvements in workforce planning, including in banking company. This study is aimed to determine the workload at the banking companies in Special Region of Yogyakarta. The result of the workload calculation was used to determine the number of employee. The method used to determining the workload was based on the Standard Time calculation (ST) using a stopwatch. Such calculations were conducted in each element on the activities of a cash deposit, bank clearing, cash withdrawal and withdrawal with cheque. The result of standard time in each activity showed 8.48 minutes/activity for the cash deposit, 2.79 minutes/activity for the bank clearing, 8.65 minutes/activity for cash withdrawal, 8.16 minutes/activity for the withdrawal by cheque and 1.04 for workload calculation indicated the abnormality of the workload. By contrast, the result of workload calculation was at the tolerance without any need to hire employee.

*Keywords: Workload, Banking, Number of employee, Standard time*

## 1. Introduction

The company is currently being faced with employment issues related to workforce planning. It has a difficulty to determine the number of employees with the existing workload. Frequently, the company never precisely determines the labor number. On one side, the number is excessive but on the other side, it is scarce. This issue then proves how the work volume does not correspond to the labor number owned. Thus, the analysis of the workload can be used as a base for workforce planning in which one of them acts as a tool to determine the labor number. Workload is defined as the volume of work carried out by workers in a particular period or a number of activities that must be completed by the worker to complete a particular job. Workload is a management technique systematically performed to obtain information about the effectiveness and efficiency of the organization based on the work volume (Depkeu, 2006). Workload is also defined as the number of job targets or target outcomes to be achieved within a certain time unit (Menpan, 2004). The determination of workload is based on the employee's ability to perform any standard tasks. The standards of employees average ability refers to the standard capabilities showing the size of the average energy given by an employee or group to obtain a unit of outcome (Menpan, 2004).

The workload issue on banking companies needs an attention since the bank's employees must be provided an excellent service. An imbalance issue with labor work volume is often found with the grievances by the workers. Another thing deals with the frequent occurrence of overtime until late night. This condition indicates an imbalance between the duties performed by the

workforce. The excessive number of working hours can emerge the discomfort of work which later affects the high pressure jobs. Permaitiyas (2013) in his research showed that the job pressure of a bank teller was quite high in which it caused many customers complaint and poor office facilities.

Related research to the workload has been carried out through various methods, for example the study of mental workload for industrial employees conducted Susetyo et al (2012) using NASA-Task Load Index (TLX). Meanwhile, the study of mental workload with the Subjective Workload Assessment Technique method (SWAT) has been carried out in universities and industries (Purwaningsih and Sugiyanto 2007; Simanjuntak and Situmorang, 2010). Myny et al., (2010) conducted a study in a hospital that showed the ineffectiveness of nurses in Belgium accounted for only 70% burdened of the patient care. In this study, the determination of workload was based on the time measurement using a stopwatch on banking companies in Yogyakarta. Those method was chosen because several studies have been carried out more likely to determine the workload with mental method, while the ones based on time more determine the workload with WISN or FTE. Research using WISN has been conducted by some researchers to determine the optimum staff as the real needs (Musau, 2008; Aini and Sugiarsi, 2010; Ernawati et al, 2011). Standard time measurement method with a stopwatch can result in an accurate time with some activities if it is followed by a clear working order (Purnomo, 2014). Thus, the results of the standard time in each element will be the basis to determine the workload and can also be applied as a reference in workload planning.

## 2. Methods

### 2.1 Research Location

This study was conducted in seven banking companies in Yogyakarta including four national banks and three private banks.

### 2.2 Object and Subject of the study

Research was conducted at the front office with a variety job including cash deposit, bank clearing, cash withdrawal, cash withdrawal by cheque. While in each bank two employees have been selected in accordance with some criteria including male and female, aged between 22 years to 35 years old, with a minimum term of one year. Meanwhile, employees were selected based on the section head recommendation in consideration to the skills and effort.

### 2.3 Research Procedures

Procedures were divided into the following phases:

#### 2.3.1 Preparation Phase

The research preparation was an early stage prior to the study. Here, it dealt with the preparation of (1) determining the observation location; (2) setting the standard time measurement form; (3) preparing the tools used as a stopwatch and recording devices; and (4) preparing the workforce to be observed.

#### 2.3.2 Implementation Phase

At this stage the measures included as follows: (1) performing the measurement cycle time of each elements of the activity with a stopwatch; (2) measurement of the labor factor rating for each element; (2) determination of allowances carried out by labor; (3) Determination of standard time on

each element; and (4) the determination of the workload.

#### 2.3.3 Steps of standard time calculation

##### 2.3.3.1 Number of observation

Number of observation was formulated as follows (Barnes, 1968):

$$N' = \left[ \frac{k / s \sqrt{N \sum X^2 - (\sum X)^2}}{\sum X} \right]^2$$

Note:

k : Confidence level (assuming k=95% ≈ 2)

s : Precision (assuming 0,05)

x : Data

##### 2.3.3.2 Control chart analysis

Control chart can be used to determined uniformity data. Control chart using the following formulas (Montgomery, 1985):

$$UCL = \bar{X} + k. SD$$

$$LCL = \bar{X} - k. SD$$

$$SD = \sqrt{\frac{\sum (x - \bar{x})^2}{N - 1}}$$

Note:

UCL : Upper Control Limit

LCL : Lower Control Limit

$\bar{X}$  : Average value

SD : Standard deviation

k : Confidence level

##### 2.3.3.3 Standard time calculation

ST calculations with stopwatch was formulated below (Barnes, 1968):

$$ST = NT \times \frac{100}{100 - All}$$

Note:

NT = Normal time

ST = Standard time

RF = Rating factor  
All = Allowance  
Tc = Cycle time

The calculation of the workload was the ratio between the Total Standard Time (TST) and Total Time Available (TTA) as defined as follows:

$$\text{Workload} = \text{TST}/\text{TTA}$$

Rating factor using Westinghouse was performed by considering four factors: skill, effort, conditions, and consistency. Meanwhile, allowances included three aspects: personal allowance, fatigue allowance and delay allowance (Barnes, 1968).

### 3. Results

Before the calculation of standard time conducted a discussion to determine the elements of the activity. The distribution of the elements was as follows:

#### 2.3.3.4 Workload calculation

Table 1. Cash deposit elements

No	Elements	Symbol
1	Greet the customers and introduce themselves	A1
2	Offer help and check the deposit form	B1
3	Calculate and check the money	C1
4	Incorporate the money and post the customer deposit transaction	D1
5	Show the post result and offer a help	E1

Table 2. Bank clearing elements

No	Elements	Symbol
1	Greet the customers and introduce themselves	A2
2	Offer help and check the clearing form	B2
3	Post clearing appropriated to due date	C2
4	Submit the clearing form in the bank clearing department	D2
5	Show the post result and offer a help	E2

Table 3. Cash withdrawal elements

No	Elements	Symbol
1	Greet the customers and introduce themselves	A3
2	Offer help and check the withdrawal form	B3
3	Post transaction, swipe the card and enter the PIN number	C3
4	Count the money	D3
5	Hand the money and offer a help	E3

Table 4. Cash withdrawal by cheque elements

No	Elements	Symbol
1	Greet the customers and introduce themselves	A4
2	Offer help and check the cheque and identity	B4
3	Check and post the cheque	C4

4	Count the money	D4
5	Hand the money and offer a help	E4

The determination of the workload in this study used a calculation of standard time with a stopwatch. The calculation of the workload with a stopwatch method was performed only on the teller for the cash deposit, bank clearing, cash withdrawal, cash withdrawal by cheque. Observational data with a stopwatch method is shown in Tables 5, 6, 7 and 8.

Table 5. Cash deposit observation time (minutes)

Element	Number of observations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A1	0.25	0.22	0.27	0.23	0.27	0.22	0.26	0.25	0.22	0.26	0.28	0.23	0.25	0.27	0.30
B1	0.72	0.80	0.75	0.82	0.65	0.75	0.80	0.80	0.80	0.75	0.70	0.75	0.82	0.80	0.80
C1	3.20	2.80	3.30	3.50	3.00	3.00	3.30	3.50	3.00	2.80	3.20	3.00	2.80	3.30	3.50
D1	1.81	1.78	1.80	1.85	1.90	2.00	1.85	1.65	1.80	1.94	2.00	2.00	1.84	1.75	1.80
E1	0.35	0.37	0.36	0.39	0.40	0.33	0.36	0.37	0.40	0.32	0.38	0.36	0.30	0.30	0.30

Table 6. Bank clearing observation time (minutes)

Element	Number of observations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A2	0.26	0.25	0.22	0.20	0.30	0.25	0.22	0.24	0.25	0.25	0.22	0.24	0.26	0.24	0.25
B2	0.72	0.75	0.65	0.75	0.70	0.70	0.80	0.85	0.72	0.78	0.72	0.75	0.72	0.75	0.70
C2	0.55	0.45	0.50	0.50	0.50	0.45	0.50	0.50	0.60	0.60	0.55	0.45	0.55	0.45	0.50
D2	0.28	0.30	0.32	0.35	0.30	0.26	0.30	0.30	0.30	0.25	0.28	0.28	0.30	0.25	0.26
E2	0.28	0.32	0.35	0.32	0.30	0.30	0.35	0.38	0.30	0.30	0.30	0.40	0.30	0.30	0.30

Table 7. Cash withdrawal observation time (minutes)

Element	Number of observations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A3	0.32	0.30	0.30	0.34	0.32	0.32	0.30	0.32	0.28	0.32	0.24	0.30	0.38	0.34	0.30
B3	0.92	0.98	0.90	0.94	0.90	0.90	0.90	0.90	1.20	0.90	1.10	0.94	0.90	1.10	1.00
C3	0.62	0.60	0.58	0.60	0.52	0.56	0.60	0.50	0.52	0.58	0.60	0.62	0.60	0.64	0.58
D3	4.20	4.10	3.80	3.80	4.30	4.60	4.80	4.80	3.80	3.50	4.80	3.80	4.10	4.40	4.20

E3	0.45	0.48	0.45	0.45	0.50	0.40	0.35	0.42	0.46	0.40	0.42	0.50	0.42	0.50	0.40
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Table 8. Cash withdrawal by cheque (minutes)

Element	Number of observations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A4	0.24	0.28	0.30	0.25	0.24	0.25	0.30	0.24	0.30	0.26	0.30	0.28	0.30	0.25	0.30
B4	0.82	0.78	0.84	0.86	0.75	0.82	0.70	0.88	0.78	0.82	0.80	0.84	0.80	0.90	0.78
C4	0.52	0.56	0.60	0.52	0.54	0.60	0.60	0.56	0.52	0.56	0.64	0.68	0.55	0.50	0.52
D4	4.20	4.15	4.30	3.98	3.80	4.20	4.10	4.85	4.10	4.00	4.10	4.00	4.00	3.85	3.90
E4	0.34	0.38	0.40	0.40	0.38	0.37	0.36	0.40	0.40	0.34	0.30	0.45	0.40	0.40	0.38

Based on the tables above, number of observation and control chart were performed at the first calculation to determine adequacy and uniformity data. The results of these calculations then showed that the data was stated enough and uniform. Determining rating factor using the Westinghouse system consisted of skill, effort, consistency and condition. Skill with good category (C1) with a value of + 0.06, effort with average category (D) with a value of 0.0, consistency with good category (C) with a value of + 0.01, condition with excellent category (B) with a value of +0.04. Thus, it could obtain the total value

+0.11. Then, the rating factor (RF) was  $1 + 0.11 = 1.11$ . On the other hand, the allowances required by the workforce were composed of personal allowance for 30 minutes, fatigue allowances for 30 minutes and delay allowances for 10 minutes with a total allowance given for 70 minutes. The values of allowances were in accordance with the agreement of the employee and management. Thus, allowance given to employees was to 7 hours (420 minutes) of 16.6%. NT and ST calculation results with the stopwatch method are shown in Table 9.10, 11 and 12 below.

Table 9. Cash deposit ST calculation

Element	Average	RF	All	NT (minute)	ST (minute)
A1	0.25	1.11	16.6	0.28	0.34
B1	0.77	1.11	16.6	0.85	1.02
C1	3.15	1.11	16.6	3.49	4.19
D1	1.85	1.11	16.6	2.05	2.46
E1	0.35	1.11	16.6	0.39	0.47
ST					8,48

Table 10. Bank clearing ST calculation

<b>Element</b>	<b>Average</b>	<b>RF</b>	<b>All</b>	<b>NT (minute)</b>	<b>ST (minute)</b>
A2	0.24	1.11	16.6	0.27	0.32
B2	0.74	1.11	16.6	0.82	0.98
C2	0.51	1.11	16.6	0.57	0.68
D2	0.29	1.11	16.6	0.32	0.38
E2	0.32	1.11	16.6	0.36	0.43
ST					2,79

Table 11. Cash withdrawal ST calculation

<b>Element</b>	<b>Average</b>	<b>RF</b>	<b>All</b>	<b>NT (minute)</b>	<b>ST (minute)</b>
A3	0.31	1.11	16.6	0.35	0.42
B3	0.97	1.11	16.6	1.07	1.28
C3	0.58	1.11	16.6	0.65	0.77
D3	4.20	1.11	16.6	4.66	5.59
E3	0.44	1.11	16.6	0.49	0.59
ST					8,65

Table 12. Cash withdrawal by cheque calculation

<b>Element</b>	<b>Average</b>	<b>RF</b>	<b>All</b>	<b>NT (minute)</b>	<b>ST (minute)</b>
A4	0.27	1.11	16.6	0.30	0.36
B4	0.81	1.11	16.6	0.90	1.08
C4	0.56	1.11	16.6	0.63	0.75
D4	4.10	1.11	16.6	4.55	5.46
E4	0.38	1.11	16.6	0.42	0.51
ST					816

ST calculation results at the activities above, then performed the calculation of the TST and workload as shown in Table 13.

Table 13 Workload Calculation

	ST/ activity	Number of Customers	Total ST/ activity
Cash deposit	8.48	25	211.95
Bank clearing	2.79	5	13.97
Cash withdrawal	8.65	15	129.74
Cash withdrawal by cheque	8.16	10	81.60
TST			437.26
TTA (7 hours/day)			420
Workload			1.04

From ST calculation with a stopwatch, it can be explained that the teller for cash deposit obtained 8.48 minutes/activity, bank clearing within 2.79 minutes/activity, cash withdrawal within 8.65 minutes/activity and withdrawal by cheque by 8.16 minutes/activity. It also showed that the bank clearing operations were faster compared to other activity. This was because of the limited number of clearing transactions in a day. In addition, clearing activity was limited by the transaction time from 08:00 to 9:30. While, the TST for each employee was within 437.26 minutes/day with the number of customers, 55 customers each day with the activities details service: 25 cash deposit transactions, 5 bank clearing transactions, 15 cash withdrawal transactions, and 10 transactions for withdrawal by cheque. The work hours provided by the company were within 420 minutes for each employee, and workload for each employee was 1.04 meaning that employees worked over the normal workload conditions. However, the value of the workload was at 1.04 within tolerances. Thus, the employees were not burdened and did not need to hire labor. Based on the provision, it is stated that the

workload from 1.1 to 1.3 did not need to add workers because it could be handled by the mechanism of overtime.

#### 4. Conclusions

Based on the ST calculation and workload results, it can be concluded that the standard time for cash deposit activity in teller was within 8.48 minutes/activity, bank clearing activity amounted 2.79 minutes/activity, cash withdrawal activity amounted 8.65 minutes/activity and withdrawal by cheque of 8.16 minutes/activity. The total standard time on all activities was within 437.26 minutes in each day with a workload of 1.04. The results of the work load calculation showed that the workloads in the abnormal condition but within the tolerance limits. Therefore, the number of employees are fixed and it can be handled by the overtime mechanism.



## 5. References

- Aini, N., N dan Sugiarsi., S. 2010. Analisis Kebutuhan Tenaga Kerja Berdasarkan Beban Kerja *Work Load Indicator Staff Need* Atau Wisn Bagian TPPRJ RSUD Kabupaten Sragen. *Jurnal Kesehatan*, Vol. IV. NO.1. Hal. 93-98
- Barnes, R.M., 1968, *Motion and Time Study, Design and Measurement of Work*, John Wiley & Sons, INC, New York.
- Depkeu, 2006. Pedoman Pelaksanaan Analisis Beban kerja di Lingkungan Departemen Keuangan. RI
- Ernawati, N., L., A., K., Nursalam, Djuari, L. 2011. Kebutuhan Riil Tenaga Perawat Dengan Metode *Workload Indicator Staff Need* (WISN). *Jurnal Ners*. Vol. 6 No. pp. 86-93
- Menpan. 2004. Pedoman Perhitungan Kebutuhan pegawai berdasarkan Beban kerja dalam rangka Penyusunan formasi Pegawai negeri sipil. Kementerian pendayagunaan aparatur negara Republik Indonesia
- Montgomery, D., C. 1985. *Introduction statistical quality control*. John Wiley & Sons, INC, New York.
- Myny D, Van Goubergen D, Limère V, Gobert M, Verhaeghe S, Defloor T. 2010. Determination of standard times of nursing activities based on a Nursing Minimum Dataset. Vol 66. No:1.pp 92-102.
- Permaitiyas, E. 2013. Stres kerja dan strategi  *coping* karyawan *frontliner* (teller) bank. *Jurnal online psikologi* . Vol. 01. No. 01.
- Purnomo, H. 2014. Metode Pengukuran Kerja. Yogyakarta : CV. Sigma.
- Purwaningsih., R dan Sugiyanto., A. 2007. Analisis Beban Kerja Mental Dosen Teknik Industri Undip dengan Metode  *Subjective Workload Assessment Technique* (SWAT) . JATI Undip, Vol II, No 2.
- Susetyo, J., Simanjuntak., R. A., dan Wibisono, R., C.. 2012. Pengaruh Beban Kerja Mental Dengan Menggunakan Metode *NASATASK LOAD INDEX (TLX)* Terhadap Stres Kerja. *Prosiding Seminar Nasional Aplikasi Sains & Teknologi (SNAST) Yogyakarta*.
- Simanjuntak, R., A. dan Situmorang, D., A. 2010. Analisis Pengaruh Shift Kerja Terhadap Beban Kerja Mental dengan Metode  *Subjective Workload Assessment Technique* (SWAT). *Jurnal Teknologi*, Vol.3. No 1.pp 53-60
- Musau, P, Nyongesa, P., Shikhule, A., Birech, E., Kirui, D., Njenga, M., Mbiti, D., Bett, A., Lagat L., and Kiilu. K., 2008. Workload indicators of staffing need method in determining optimal staffing levels at moi teaching and referral hospital. *East African Medical Journal*. Vol. 85 No. 5