

Measurement of Employee Workload at the Loading Ramp Station Using the CVL (Cardiovascular Load) Method at PT. Socfindo Seunagan

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ABSTRACT

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PT. Socfindo is a company that has many employees, should pay more attention to how much workload is given to its employees so they can carry out their work optimally. Workload that can be measured on employees includes physical workload and mental workload. The measurement method used is the Cardiovascular Load (CVL) for physical workload. Cardiovascular load is a method to determine the level of work fatigue. Data collection for physical workload was carried out by measuring the pulse using the 10 pulse method, and determining the %CVL results. The average working heart rate/minute for employee A is 105 while employee B's average working heart rate/minute is 106, based on the results of the calculation analysis for %CVL between 34% - 36%, so that the risk of work fatigue occurs and is in the moderate category. It can be concluded that the workload of employees needs improvement so that work fatigue does not occur so there is no risk of injury to the employee's body parts.

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I. Introduction

Indonesia is a country dominated by the plantation sector as a mainstay of livelihoods from oil palm plantations, Indonesia has a superior commodity, namely palm oil. The processed product of palm oil is palm oil or what is called Crude Palm Oil (CPO). PT. Socfindo Seunagan is a company engaged in the palm oil industry. Crude Palm Oil (CPO) production. Due to the large number of requests from the world market, companies must be able to optimize the available workforce to meet demand.

Human resources are one of the company's assets that must be managed properly because it greatly influences the performance of a company, it is very necessary to have human resources in any company, including PT. Socfindo is a company engaged in the palm oil industry. Due to the large number of requests from the world market, companies must be able to optimize the available workforce to meet demand [1]. Good management means that what is produced by each employee can fulfill what has been targeted by the company so that the goals or vision and mission set by the company are achieved.

Human activity can be classified into physical work (muscles) and mental work (brain). Even though they cannot be separated, one can still distinguish between work dominated by physical activity and work dominated by mental activity [2]. All of these physical and mental activities can have a consequence, namely workload can arise. Workload can be interpreted as the difference between the ability of workers and job demands. Workload is a task given to a workforce or employee to be completed at a predetermined time with their potential or skills. The workload is not only physical but can also be mental, therefore it must be balanced between the physical capabilities and the mentality of the workforce/employees. This workload is not only physical but also mental. Thus, the workload received must be balanced between physical abilities and the ability of the recipient of the load. Each person has a different level of loading so it is necessary to seek the



optimum level of intensity of loading [3]. Workload is something that arises due to the demands of tasks, the influence of work environment factors, skills, behavior and perceptions of workers. This workload is not only physical but also mental. Thus, the workload received must be balanced between the physical abilities and cognitive abilities of the recipient of the load. Each person has a different level of loading so it is necessary to seek the optimum level of intensity of loading [4].

Workload aims to determine how many employees are needed to complete a job and how much responsibility or workload can be delegated to an employee, or it can also be argued that workload analysis is a process for determining the number of working hours people use or need to complete the workload within a certain time.

PT. Socfindo is an industrial company engaged in the processing of palm oil and its derivatives. The main raw material used is palm oil in the management of Crude Palm Oil (CPO) which is then processed in the production section. This section has 4 sections, among others: Separation of loose lollipops from bunches, Mincing and pulverizing the meat, Pressing, Refining the oil.

Table 1. Working Hours

Working days	Working hours	Rest	Information
Monday to Saturday	07.00 – 18.00	12.00 – 14.00	–

The purpose of this study was to determine the percentage of employee workload seen from the pulse workload in lifting FFB using the CVL method whether it is in accordance with the ergonomic approach. Where what is meant by ergonomics is a comfort that can be felt in the workforce or employees at work including work equipment, work procedures, work processes or systems and work environment with the physical, physiological and psychological conditions of the workforce or employees.

II. Research methods

The type of research used is descriptive quantitative research, which is a study that aims to describe or provide a more detailed picture of a symptom and turn it into data in the form of numbers. This research was conducted at PT. Socfindo engaged in the production of palm oil. This research was conducted at a loading ramp.

First, the researchers observed and measured the pulse directly on the workers on the loading ramp. Then the researcher will measure the pulse using the 10 pulse method. Then calculate the Cardiovascular Load (CVL) to determine the workload category.

A. Determining workload using the cardiovascular load (CVL) method

One of the methods used before calculating Cardiovascular Load (CVL) is measurement with the 10 pulse method. Namely by detecting the radial artery in the left wrist so that it can calculate the pulse rate. The following is the formula for calculating the pulse before and after work:

$$\text{Pulse / menit} = \frac{10 \text{ pulse}}{\text{calculation time(seconds)}} \times 60$$

Determine the classification of workload based on the increase in working heart rate compared to the maximum heart rate expressed in cardiovascular load. This cardiovascular load (%CVL) is calculated by the formula:

$$\%CVL = \frac{(\text{working pulse} - \text{resting pulse})}{(\text{maximum heart rate} - \text{resting pulse})} \times 100\%$$

Where the maximum pulse rate is (220-age) for men and (200-age) for women. From the calculation of %CVL after that it is compared with the classification that has been determined as follows:

1. <30%= No fatigue occurs

2. 30 sd <60%= Repair needed
3. 60 to <80 = Work in a short time
4. 80 to <100%= Immediate action is needed
5. 100% = Not allowed to move

B. Ergonomically analyzing employee work positions

Analyze the work position of employees in lifting FFB to the loading ramp, with the following steps:

1. Take one sample of employees on the loading ramp.
2. Identify employee data, where by knowing the age of each employee.
3. Seeing how employees work in lifting FFB into the loading ramp.
4. Asking the complaints felt by employees after lifting FFB into the loading ramp until it was finished.
5. Provide conclusions and suggestions.

III. Results and Discussion

A. Determining workload using the cardiovascular load (CVL) method

In this study the data collected were the results of measuring the employee's pulse at the Loading Ramp station as shown in table 2 below:

Table 2. Loading Ramp Station Employee Data

No	Station	Name	Work Type	Gender	Age (years)
1	Loading Ramp	Rahmat	Sorting	Man	34
2	Loading ramp	Abdul	Sorting	Man	37

After seeing table 2. Above, the pulse data was collected using the 10 pulse method for 2 employees, namely in table 3 below:

Table 3. Measurement data for 10 pulses

No	Name	Age (years)	DNI average (second)	Average DNK (seconds)
1.	Rahmat	34	9,72	5.69
2.	Abdul	37	9,74	5,76

Source: Measurement Results

The calculation of the pulse using the 10 pulse method is as follows:

Pulse rate (beats/minute) =

$$\frac{10 \text{ denyut}}{9,74} \times 60 = 62$$

Table 4. Calculation results of the 10 beats method

No	Name	Age (years)	DNI (beats/minute)	DNK average (beats/minute)
1.	Rahmat	34	62	105
2.	Abdul	37	62	106

Source: Data Processing

From the results of calculating the heart rate of all employees using the 10-beat method, the maximum heart rate for each sample can be calculated as follows:

1. Age of Rahmat

$$DNM = 220 - 34 = 186$$

Clarification of workload based on the increase in employee heart rate (%CVL) as follows:

Employee 1 (Rahmat):

$$\% CVL = \frac{100 (\text{beats/minute} - \text{beats/minute})}{186 - 62 \text{ beats/minute}} = 34\%$$

The recapitulation results from calculating the cardiovascular load (CVL) for each employee can be seen in table 5 below

Table 5. Recapitulation of data processing using cardiovascular load (CVL)

No	Name	Age	DNK	Average DNK	DNI (beats/minute)	DNMax	%CVL	Exp
1	Rahmat	34	96 103 115	105	62	186	34%	Needs repair
2	Abdul	37	96 104 117	106	62	183	36%	Needs repair

Source: Data Processing

B. Units Ergonomically analyzing employee work positions

An exception would be the use of English units as identifiers in trade, such as “3.5-inch disk drive.” In the appointment of FFB (Fresh Fruit Bunches) to the loading ramp, the body anatomy of the employees directly involved in lifting the FFB (Fresh Fruit Bunches) includes:

- Palm

The palms of the hands are used to hold a tool called a toyak to lift FFB to the loading ramp, by holding the toyak long enough and carrying a heavy load, the palms become rough and will blister and then swell.

- Wrist

In anatomy, the wrist is flexible and narrow. employees lift FFB onto the loading ramp using a tool called a toyak. This tool is held by the hand, to move this tool assisted by the wrist will adjust to the condition of the equipment, where the wrist will rotate left, right, up and down. Often the wrist will rotate and not be in a natural position, over time the wrist will experience pain which will eventually sprain.

- Arm

The arm is the limb from the wrist to the shoulder, in lifting FFB the arm has an important function in the process of lifting FFB to the loading ramp, where the arm is the main source of strength to drive the FFB into the FFB as well as the strength to lift FFB to the loading ramp later.

- Shoulder

After the FFB is lifted with strength in the arms, the employee's shoulders are assisted to hold the weight of the FFB. Where the shoulder is used to support the FFB stalk and after the employee's body position is stable enough the arm returns to function throwing FFB into the loading ramp so that FFB will be released from the tear and enter the loading ramp.

- Back

The back plays an important role when the strength of the arm drives the tear into the TBS, where the back bends following the movement of the stick stuck into the TBS. back will return to an upright position when FFB will be thrown into the loading ramp.

- Waist

The waist serves as a pedestal to hold the weight of the FFB load and the waist will also adjust the back in adjusting the position of the stick in sticking it into the FFB.

The appointment of FFB (Fresh Fruit Bunches) into the loading ramp can be seen in the following figure 1.



Fig. 1. Loading ramp

IV. Conclusion

Based on the discussion regarding the measurement of employee workload in lifting FFB at PT Socfindo, the following conclusions can be drawn:

1. From the calculation of the %CVL obtained from the two employees, which is between 34% - 36%, it is included in the moderate category, which is between 30% - 60%, which means that they are still allowed to work and need to be repaired.
2. Based on the results of the subjective analysis of the employee's work position in lifting the FFB to the loading ramp, it is not ergonomic, there are several complaints felt by the employees

during and after lifting the FFB (Fresh Fruit Bunches). Complaints that are most felt by employees on the shoulders and waist.

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