http://infor.seaninstitute.org/index.php
JURNAL SCIENTIA, Volume 12 No 2, 2023 ISSN 2302-0059

ASSESSMENT OF WORK POSTURE WITH THE APPLICATION OF THE REBA (Rapid Entire Body Assessment) METHOD

M. Mishbachul Khoiri[1], Moh. Jufriyanto[2], Akhmad Wasiur Rizqi[3]
[1,2,3] Industrial Engineering Study Program, Faculty of Engineering, Universitas Muhammadiyah Gresik Indonesia
Email : kmisbachul@gmail.com[1], akhmad_wasiur@umg.ac.id[3]

Article Info
Received: 01/05/2023
Revised: 13/05/2023
Accepted: 16/05/2023

ABSTRACT

The REBA (Rapid Entire Body Assessment) method is developed in ergonomics. It can be used quickly to assess the working position or posture of an operator's neck, back, arms, wrists and legs. In accordance with the theory, namely REBA (Rapid Entire Body Assessment) is intended to analyze body shape and proper work position, using the REBA Map method you will see muscle complaints so that the company can control and maintain all operators, both in warehouses and production, so that The company can maintain the safety and health of its workers. Based on the results of observations made, it can be concluded that according to REBA calculations it was found that workers generally have a high level of risk, the highest value is 10, but there is 1 worker who has a low risk level with a value of 1.

Keywords: Working Posture, REBA Method.

1. INTRODUCTION

The increasing competition in the industrialization world determines every company to produce quality products and optimal services. Many companies use machines in their operational activities. Starting from simple machines to high-tech machines. On the other hand, it turns out that in various industries there is also still much work that must be done manually which requires physical demands and pressure that is very heavy. An industrial procedure is a work system that supports each other from each part in it. Work systems that are not ergonomic in a company often receive less attention from company management. One part of the system is workers whose attitude and work position could be more ergonomic. This consciously or unconsciously will affect workers' productivity, efficiency and effectiveness in completing (Aztanti, 2017).

Work posture is an action workers take in doing their work (Nurmianto, 2004). Work posture is closely related to ergonomics, where ergonomics studies how to improve physical and mental well-being through efforts to prevent injuries due to incorrect work posture and occupational diseases and reduce physical and mental workload. Good work posture must be carried out studies and have knowledge in the field of ergonomics, in order to analyze and evaluate the wrong work posture. If the work posture used by workers is wrong or not ergonomic, workers will get tired quickly, concentration and accuracy levels decrease, which can lead to work accidents, causing several muscle disorders such as musculoskeletal disorders (MSDs) and other disorders that can interfere with the work process (Andrian, 2013).

Viewed from an ergonomic point of view, every workload received by a person must be appropriate and balanced against the physical and psychological abilities of workers who receive the workload (Tarwaka et al, 2011). Workload is defined as the ability of the worker's body to accept work (Manuaba, 2012). The calculation of workload is carried out based on SNI 7269 of 2009 concerning Workload Assessment based on Calorie Level according to Energy Expenditure.

There are still many manual activities that do not pay attention to ergonomic aspects, this causes an increase in complaints and complaints from workers, such as: the occurrence of pain in the back and waist, tension in the neck, pain in the wrists, arms and legs, eye fatigue and many other complaints. With various psychological and physical complaints, it will reduce work performance which ultimately

reduces worker productivity. These complaints are complaints of the musculoskeletal system, complaints to this damage are usually termed complaints of Musculoskeletal Disorders (MSDs) or injuries to the muscles of the musculoskeletal system (Tarwaka, 2011).

The wrong work posture is often caused by the location of facilities that are not in accordance with labor anthropometry, thus affecting the performance of the workforce. Unnatural work postures such as work postures that are always standing, squatting, bending, transporting and lifting for a long time will cause discomfort and pain in one limb. Based on the description of the problem above, it is known that the company has not used the right method to analyze the appropriate body shape if the operator is directly facing the machine, planning a good work position estimate is expected to help regulate the operator's health in order to produce better products in the future. To answer the problem of how to work well so as to minimize muscle work errors, this final project will analyze using the REBA *(Rapid Entire Body Assessment)* method.

The REBA *(Rapid Entire Body Assessment)* method is a method developed in the field of ergonomics and can be used quickly to assess the work position or posture of an operator's neck, back, arms, wrists and feet. In accordance with the theory, namely REBA *(Rapid Entire Body Assessment)* is intended to analyze the appropriate body shape and work position, using the REBA Map method will see muscle complaints so that the company can control and maintain all operators, both in the warehouse and production, so that the company can maintain the safety and health of its workers.

2. METHODS

Research methodology describes all activities carried out in research. The steps taken in the research are shown in *the amber below*:

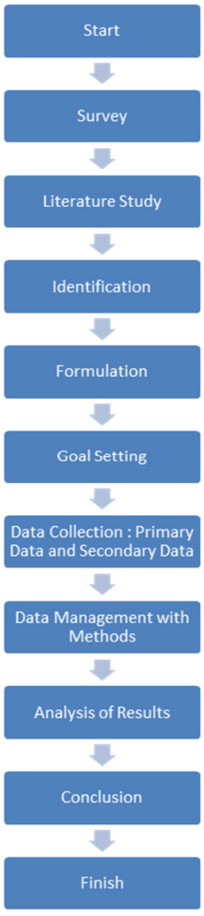

Figure 1. Research methodology

a. Understanding Ergonomics

Ergonomics is the application of scientific principles, methods, and data drawn from different disciplines to develop engineering systems in which the person/each individual plays a significant role. Among the basic disciplines of psychology, cognitive science, physiology, biomechanics, the application of physical anthropometry, and industrial systems engineering (Kroemer, 1994). Ergonomics is also concerned with optimization, efficiency, health, safety and human comfort at work, home, and recreational areas. In ergonomics, it takes the study of systems where humans, work facilities and their environment interact with each other to adjust the working atmosphere with humans (Nurmianto, 1996).

b. Understanding MSDs

Musculoskeletal complaints are complaints in parts of the skeletal muscles felt by a person ranging from very mild complaints to very painful. If the muscles receive static loads repeatedly and for a long time, it can cause complaints in the form of damage to joints, ligaments and tendons. Complaints to damage are usually termed complaints of musculoskeletal disorders (MSDs) or injuries to the musculoskeletal system ((Tarwaka, . Broadly speaking, muscle complaints can be grouped into two (Tarwaka, 2011):

1) Temporary complaints (reversible), namely muscle complaints that occur when the muscles receive static loads, but nevertheless these complaints will disappear immediately if the loading is stopped, and
2) Persistent complaints, namely complaints of sedentary muscles. Although the workload has been stopped, the pain in the muscles still continues.

c. Understanding REBA

REBA *(Rapid Entire Body Assessment)* is one method that can be used in work posture analysis. REBA was developed by Dr. Sue Hignett and Dr. Lynn Mc Atamney who are ergonomes from the University of Nottingham (University of Nottingham's Institute of Occuptaional Ergonomic). The REBA method in ergonomics is used quickly to assess the posture of a worker's neck, back, arms, wrists, and feet. REBA is more generally, in the summation of one of the new systems in the analysis which includes dynamic factors and static forms of loading interactions of individual loading, and a new concept related to consideration with the designation "The Gravity Attended" to prioritize the position of the most superior. (Wisanggeni, 2010). The REBA method has followed characteristics, which have been developed to provide answers to obtain equipment that can be used to measure the physical loading aspect of workers.

Analysis may be made before or after an interference to demonstrate the stopped risk of an injury arising. This gives a speed to the systematic assessment of the risk of body posture of the whole body that workers can get from their work. The development of the experimental REBA method is (Hignett and McAtemney, 2000):

1) To develop a system of body shape analysis appropriate for musculoskeletal risks at various tasks.
2) Describe the displacement plan to divide the body into parts for individual coding.
3) To support a system of assessing muscle activity in static positions (groups of parts, or parts of the body), dynamic (repetitive actions, e.g. superior repetition of veces/minute, except walking), is not suitable for rapid position changes.
4) Achieving interaction or connection between a person and a load is important in manual manipulation, but it can only sometimes be done by hand.
5) To provide a level of action through the final value with indications in a compelled state.
6) It only requires minimal equipment such as pen and paper methods.

The REBA method is also equipped with coupling factors, external loads of work activity. In this method, the body segments are divided into two groups, namely group A and group B. Group A consists of the back (torso), neck, and legs. While group B consists of the upper arm, forearm, and wrist.

3. RESULTS AND DISCUSSION

Data retrieval is carried out on inspection from 10 sampling points. The sampling method carried out in this practical work is random taking. The table of the calculation of the angle of rubber tappers can be seen in the table below.

Table 1. REBA Group A and B Results Table

No	Name	Group A			Group B		
		Trunk	Neck	Legs	Upper	Lower	Wrist
1.	Respondent 1	24°	>20° + crooked	Spread Evenly	28°	121.5°	> 15° + spin
2.	Respondent 2	24.4° + crooked	> 20° + crooked	Foot Not Balanced and knees buckled Among 30° - 60°	50.9°	121.9°	> 15° + Spinning
3.	Respondent 3	60.5° + crooked	18.9° + crooked	Stand and Spread not Evenly	60.5°	96°	> 15° + Spinning
4.	Respondent 4	0°	19.2°	Spread Evenly	17.1°	96.7°	> 15° + Spinning
5.	Respondent 5	31.3° + crooked	18.8° + crooked	Spread Not Evenly	65°	119.2°	> 15° + Spinning
6.	Respondent 6	39° + crooked	14.2°	Spread Evenly	82°	81°	> 15° + Spinning
7.	Respondent 7	85.5°	> 20° + crooked	Spread not Evenly	82.7°	121.6°	> 15° + Spinning
8.	Respondent 8	15.5° + Extension and crooked	> 20° Extension + crooked	Spread Evenly	70° + shoulder Elevated	91°	> 15° + Spinning
9.	Respondent 9	63.2°	>20°	Spread Evenly	81°	85.5°	> 15° + Spinning
10.	Respondent 10	84.4°	> 20° + crooked	Spread not Evenly	84.6°	67.1°	> 15° + Spinning

Table 2. REBA Calculation Table

No	Name	Group A				Group B			
		Trunk	Neck	Legs	Result	Upper	Lower	Wrist	Result
1.	Respondent 1	3	2+1	2	6	2	2	2+1	4
2.	Respondent 2	3+1	2+1	2+1	8	3	2	2+1	5
3.	Respondent 3	4+1	1+1	1	6	3	1	2+1	5
4.	Respondent 4	1	1	1	1	1	1	2+1	2
5.	Respondent 5	3+1	1+1	2	6	3	2	2+1	5
6.	Respondent 6	3+1	1	1	3	3	1	2+1	5
7.	Respondent 7	4	2+1	2	7	3	2	2+1	5
8.	Respondent 8	2+1	2+1	1	5	3+1	1	2+1	5
9.	Respondent 9	4	2	1	5	3	1	2+1	5
10.	Respondent 10	4	2+1	2	7	3	1	2+1	5

The results of the REBA calculation above, obtained Group C score values that can determine the risks accepted by workers are in Table 2. This Grand Score C can be seen in the Table below:

Table 3. Grand Score of Group A and B

Score A(scoreformtable A +load/forcescore)	Score, (table B value + coupling score)											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	11	12	12	12	12	12
11	11	11	11	11	11	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

Table 4. REBA risk results

No	Name	Score			Action Level			
		A	B	C	Action Level	Score REBA	Risk Level	Action
1.	Respondent 1	6	4	7	2	4-7	Keep	Need checks and changes
2.	Respondent 2	8	5	10	3	8-10	Tall	Danger conditions, by therefore necessary Inspection is carried out and changes with soon
3.	Respondent 3	6	5	8	3	8-10	Tall	Danger conditions, by therefore necessary Inspection is carried out and changes with soon
4.	Respondent 4	1	2	1	0	0-1	Very Low	The risk can still be accepted and unnecessary modified
5.	Respondent 5	6	5	8	3	8-10	Tall	Danger conditions, by therefore necessary Inspection is carried out and changes with soon
6.	Respondent 6	3	5	4	2	4-7	Keep	Need inspection and change
7.	Respondent 7	7	5	9	3	8-10	Tall	Danger conditions, by therefore necessary Inspection is carried out and changes with soon
8.	Respondent 8	5	5	6	2	4-7	Keep	Need inspection and Change
9.	Respondent 9	5	5	6	2	4-7	Keep	Need inspection and Change

10.	Respondent 10	7	5	9	3	8-10	Tall	Danger conditions, by therefore necessary Inspection is carried out and change soon

The discrepancy in work posture experienced by workers is caused by several factors, including:

1. Human
   Short-cycle repetitive work is a character of work and occupational diseases will be an important focus and discussion
2. Materials
   a. Position of work tools in the workstation
   b. At the height of the tapping device and the position of the tapping place on workers is convenient to use when working, but there is still a position where the height of the lead is still too high or too low, making it uncomfortable.

4. CONCLUSION

Based on the observations made, it can be concluded that according to REBA calculations it was found that workers generally have a high level of risk, the highest value is 10, but there is 1 worker who has a low level of risk with a value of 1.

REFERENCE

[1] Andrian, Deni. 2013. Pengukuran Tingkat Resiko Ergonomi Secara Biomekanika Pada Pekerja Pengangkutan Semen (Studi Kasus: PT. Semen Baturaja). *Laporan Kerja Praktek Fakultas Teknik Universitas Binadarma: Palembang.*
[2] Hignett, S., & McAtamney, L. 2000. *Rapid entire body assessment (REBA).* Applied Ergonomics, 31(2), 201–205.
[3] Kroemer, K.H.E., Kroemer, H.B., and Kroemer-Elbert, K.E., 2001. *"Ergonomics: How to Design for Ease & Efficiency"*. Prentice-Hall Inc., New Jersey.
[4] Manuaba I.B.G. 2012. *Kapita selekta penatalaksanaan rutin obstetri ginekologi dan kb*. Jakarta: EGC.
[5] Nurmianto, Eko. 2004. *Ergonomi: Konsep Dasar dan Aplikasinya*. Surabaya: Guna Widya
[6] Tarwaka, dkk. 2004. *Ergonomi Untuk Keselamatan, Kesehatan Kerja dan Produktivitas*. Surakarta : UNIBA PRESS.
[7] Tarwaka. 2011. *"ERGONOMI INDUSTRI Dasar-dasar pengetahuan ergonomi dan Aplikasi Di Tempat Kerja "* Edisi pertama. Surakarta: Harapan Press.
[8] Wisanggeni, Bambang. 2010. *REBA (Rapid Entire Body Assessment)*. Guna Widya: Surabaya.
[9] Yuni, Astanti. 2017. Pengaruh Range Of Motion terhadap perubahan nyeri pada pasien post op fraktur ekstremitas atas di Ruang Asoka RSUD Jombang. *Jurnal thesis*. STIKES Insan Cendekia Medika Jombang.