AN ANALYSIS USING OWAS METHOD FOR IMPROVING EMPLOYEE WORK POSTURE IN OMAH KANDANG SMES

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ABSTRACT

Omah Kandang SMEs is a SMEs in Surakarta that produce handmade cat cages. The customer of Omah Kandang SMEs scattered in several cities in Indonesia. Unfortunately, the booming demand is still difficult for producer to provide these, it caused by unproductive employee because of poor working postures. This research aims to determine the level of work risk for the employee using OWAS Method and providing suggestions of ergonomics work posture for improving employee productivity. OWAS Method is a method used for body measurement with dividing work activities in several time interval to avoid musculoskeletal disorder risk. The codes in this method includes back, arms, legs and load/use factor. In this research is known that employee work posture in weaving station fall into the category 2. It means unsafe for musculoskeletal system and need an improvement in the future. It is recommended to provide table for ergonomics work posture, so the employee become more productive.

KEYWORDS Work Posture, Ergonomics, OWAS, SMEs

INTRODUCTION

Ergonomics is the ability to apply information regarding human characters, capacities, and limitations to the design of human tasks, machine systems, living spaces, and environment so that people can live work and play safely, comfortably and efficiently (Annis & McConville, 1996). Ergonomics is an interdisciplinary science which examines interaction between human and the object they use (Imron, 2019). In general definition, ergonomics is the study that concern about the problems among man, tasks and object design that their uses. This study is applied everytime, everywhere, everyone and every condition in social interaction for increasing productivity, comfort, health and safety in industry. The rules of ergonomics that implemented early on all aspects will not waste cost for redesigning (Diansari, 2022).

A system consists of four main components, there are people, materials, machines/tools and work environment. The system can't regardless of human influence, because of human as a planner, designer and controller to build the work system. The work system that uses man as a main labor have to aware in work posture. Work posture is a position that rises as a result of a person activity (Falah et al., 2023). Both posture and work attitude of man as an operator when doing production work needs to be observed to know the suitability of the interaction between work and equipment (Hidjrawan and Aman, 2018). It's caused by man who has advantages and limitations for doing their jobs. The condition of inappropriate operator and machine build an unnatural posture and work attitude. This operator condition causes musculoskeletal disorder.

Musculoskeletal disorders are complaints on the skeletal muscles felt by someone who starts from light to heavy. When man receive a static load repeatedly in a long time, it will be able to cause joints, ligaments and tendons complaints damage. It's called musculoskeletal disorder or injury to the musculoskeletal system (Fitri et al., 2017). This complaint can be decreased by doing manual material handling in a right way. No more bending and twisting activities in the work place. On the other side, ergonomics work posture made a worker felt comfort and health either standing or sitting (Novianto, 2017). Poor working posture have a 33% risk of musculoskeletal disorder (Anggraini & Anda, 2012).

Omah Kandang SMEs is a SMEs in Surakarta that produces handmade cat cages. The customers of Omah Kandang SMEs scattered in several cities in Indonesia. All process of this SMEs is straightening, welding, weaving and painting. Unfortunately, the booming demand is still difficult for producer to provide these, it caused by unproductive workers because of poor working posture. The worker in weaving station doing the job in poor working posture. The worker bend over and nerd neck while doing his job daily, it can be seen in figure 1. His complaints while doing this poor working posture are pain in the back and neck.

Figure 1. Work Posture's The Worker in Weaving Station

In ergonomics, one of several methods that can be used to analyze work posture is OWAS (Ovako Work Posture Analysis System). The OWAS Method is a method used for body measurement with dividing work activities in several time interval (Santoso, 2013). Not only for body measurement but also analyze working postures that cause musculoskeletal disorder. The section of body measurement includes the movement of the back, arms and legs. So, this method is appropriate to be applied for company production analysis, especially for the lack of safety and comfort workers in the company.

RESEARCH METHOD

This research is included in quantitative research. Data was obtained directly by observing and filling out questionnaires at weaving station of Omah Kandang SMEs in August 2023. The OWAS Method was applied with postures coding process. It means the process of dividing the working posture of the recording results according to the four digits code of work posture. The codes include back, arms, legs and load/use factor (Fitri et al., 2017). Work postures code by OWAS Method are shown in the images below:

a. Assessment on back is given value criterion of 1 to 4

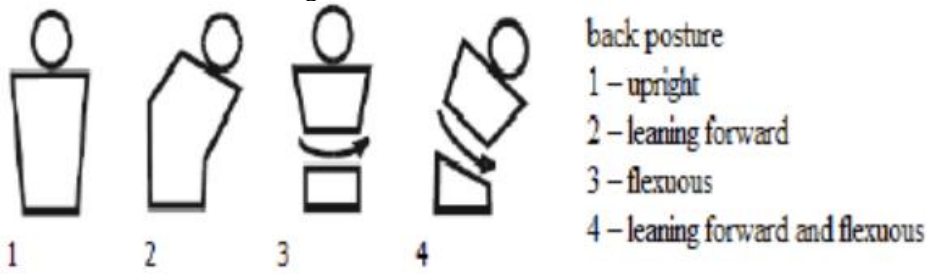

Figure 2. Classification of Back Posture

b. Assessment on arms is given value criterion of 1 to 3

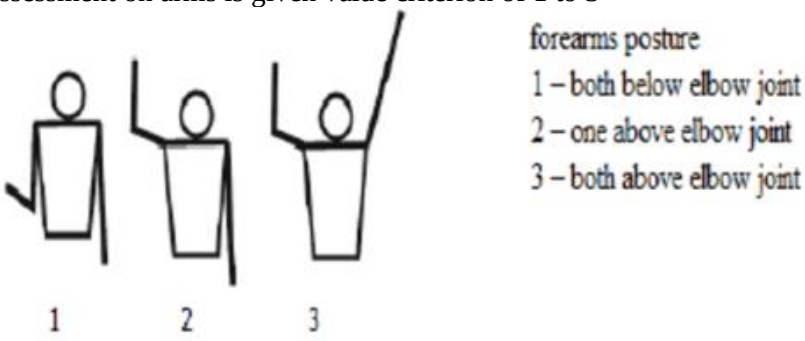

Figure 3. Classification of Arms Posture

c. Assessment on legs is given value criterion of 1 to 7

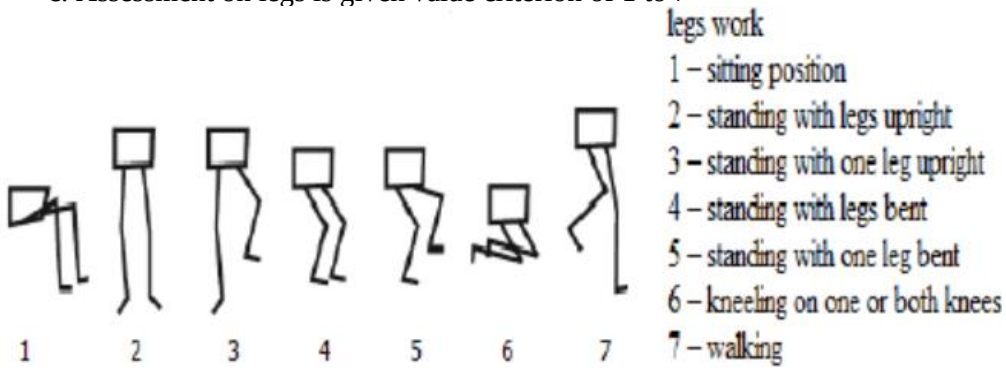

Figure 4. Classification of Legs Posture

d. Assessment on load/use factor is given value criterion of 1 to 3

external load volume for men [kg]
1 – below 10
2 – within the range 10-20
3 – above 20

Figure 5. Classification of Load/Use Factor

e. Assessment of Work Postures by OWAS Method

BACK	ARMS	1			2			3			4			5			6			7			LEGS
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	USE OF FORCE
1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	
	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	
	3	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	
2	1	2	2	3	2	2	3	2	2	3	3	3	3	3	3	3	2	2	2	2	3	3	
	2	2	2	3	2	2	3	2	3	3	3	4	4	3	4	4	3	3	4	2	3	4	
	3	3	3	4	2	2	3	3	3	3	3	4	4	4	4	4	4	4	4	2	3	4	
3	1	1	1	1	1	1	1	1	1	2	3	3	3	4	4	4	1	1	1	1	1	1	
	2	2	2	3	1	1	1	1	1	2	4	4	4	4	4	4	3	3	3	1	1	1	
	3	2	2	3	1	1	1	2	3	3	4	4	4	4	4	4	4	4	4	1	1	1	
4	1	2	3	3	2	2	3	2	2	3	4	4	4	4	4	4	4	4	4	2	3	4	
	2	3	3	4	2	3	4	3	3	4	4	4	4	4	4	4	4	4	4	2	3	4	
	3	4	4	4	2	3	4	3	3	4	4	4	4	4	4	4	4	4	4	2	3	4	

Figure 6. Assessment of Work Postures by OWAS Method

The results of work postures analysis using OWAS consists of four levels of dangerous attitude work.

Category 1: There are no problem with the musculoskeletal system and no improvement needed.

Category 2: There are unsafe on musculoskeletal system (work posture caused a significant tension) and need an improvement in the future.

Category 3: There are unsafe on musculoskeletal system (work posture caused a very significant tension) and need an improvement as soon as possible.

Category 4: There are unsafe on musculoskeletal system (work posture caused a higher risk) and need an improvement right now.

RESULT AND DISCUSSION

The worker at weaving station did his job more than 8 hours a day with the work posture that can be seen in figure 1. The poor working posture caused musculoskeletal disorder risk. Based on working posture assessment using OWAS method was obtained assessment code 2-1-1-1. Number 2 (first digit) means leaning forward on his back. Number 1 (second digit) means both below elbow joint on his arms. Number 1 (third digit)

means sitting position on his legs. Number 1 (fourth digit) means below 10 kg for the load/use factor.

BACK	ARMS	1			2			3			4			5			6			7			LEGS
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	USE OF FORCE
1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	
	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	
	3	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	
2	1	2	2	3	2	2	3	2	2	3	3	3	3	3	3	3	2	2	2	2	3	3	
	2	2	2	3	2	2	3	2	3	3	3	4	4	3	4	4	3	3	4	2	3	4	
	3	3	3	4	2	2	3	3	3	3	3	4	4	4	4	4	4	4	4	2	3	4	
3	1	1	1	1	1	1	1	1	1	2	3	3	3	4	4	4	1	1	1	1	1	1	
	2	2	2	3	1	1	1	1	1	2	4	4	4	4	4	4	3	3	3	1	1	1	
	3	2	2	3	1	1	1	2	3	3	4	4	4	4	4	4	4	4	4	1	1	1	
4	1	2	3	3	2	2	3	2	2	3	4	4	4	4	4	4	4	4	4	2	3	4	
	2	3	3	4	2	3	4	3	3	4	4	4	4	4	4	4	4	4	4	2	3	4	
	3	4	4	4	2	3	4	3	3	4	4	4	4	4	4	4	4	4	4	2	3	4	

Figure 7. The Calculation Results of Work Postures by OWAS Method

Based on OWAS method assessment, the researcher knows that body measurements of work posture for the worker in weaving station is obtained category 2 (it can be shown in figure 7). It means unsafe for musculoskeletal system (work posture caused a significant tension) and need an improvement in the future. It happens because of poor working posture in weaving station's worker. He felt back pain all this time. It would be musculoskeletal disorder if this condition is allowed continuously.

Work posture assessment of iron pipe cutting's worker who works with leaning forward and squats is obtained category 3 (Fauzi and Budiady, 2020). However, this research is safer because obtaining category 2. The improvement is needed in the future. The recommendation is provided a table to put the object higher than before (it can be shown in figure 8). The dimension of the table height is adjusted by the antropometry data of the user. A table with an anthropometry data of the worker makes the worker no need to leaning forward during the job. So, he doesn't feel back and neck pain anaymore and become more productive. It can avoid the musculoskeletal disorder and provide all customer demand.

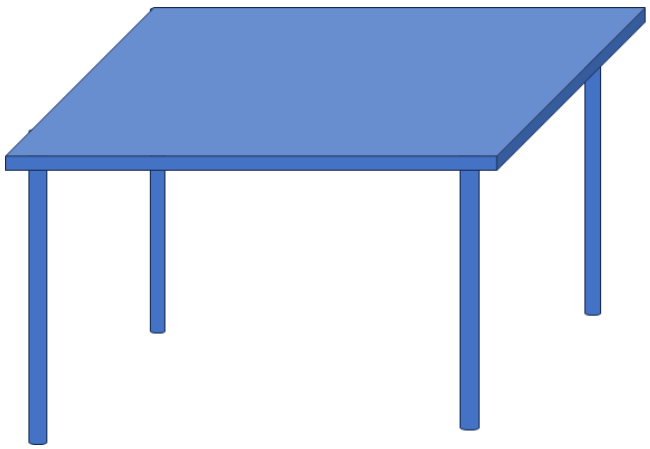

Figure 8. Recommendation Table

CONCLUSION

The results of measuring work postures using OWAS Method in weaving station of Omah Kandang SMEs is category 2. So, it's unsafe for musculoskeletal system (work posture caused a significant tension) and need an improvement in the future. OWAS Method is appropriate to be applied to fix of poor work postures in work environment. It can be generated from this research to add work facilities such as table to achieve ergonomics work postures for reducing the level of work risk. Every company needs to pay attention to their workers while doing the job, the aim is the workers don't feel fatigue or complaints in their bodies that can cause work accidents risk and applied ergonomics work station.

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