

Ergonomic Study of Work Posture Using the RULA Method in the Yellow Tofu Production Process at Pabuaran Village SMEs

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ABSTRAK

Telah dilakukan penelitian tentang “Analisis Postur Kerja Produksi Tahu Kuning Menggunakan Metode RULA untuk Menurunkan Keluhan pada UKM Tahu Kuning di Kecamatan Gunung Sindur Desa Pabuaran”. Hal ini dilakukan karena banyaknya keluhan yang dialami oleh pekerja pada bagian perebusan dasar, yaitu sebanyak 13 (tiga belas) keluhan. Tingginya keluhan pada proses perebusan dasar diketahui dengan menggunakan kuesioner standar Nordic yang diisi oleh pekerja di UKM tersebut. Metode yang digunakan peneliti adalah Rapid Upper Limb Assessment (RULA) untuk mengetahui apakah postur kerja yang digunakan berada pada tingkat risiko tinggi atau tidak. Analisis dilakukan secara langsung pada pekerja pada proses perebusan dasar dengan menggunakan satu sampel pekerja dengan tiga aktivitas kerja, yaitu pada saat menuang sari kedelai, pada saat mengambil sari kedelai rebus, dan pada saat menuang sari kedelai rebus. Setelah dilakukan analisis postur kerja menggunakan metode Rapid Upper Limb Assessment (RULA), ketiga aktivitas tersebut mendapatkan skor akhir 7 (tujuh) yang berarti tingkat risikonya tinggi dan tindakan yang harus dilakukan adalah segera mengubah postur kerja. Hal ini disebabkan oleh postur kerja yang melibatkan leher menunduk, badan membungkuk, lengan dan bahu terlalu terangkat, penggunaan satu tumpuan kaki, dan mengangkat beban yang terlalu berat saat menuang sari kedelai. Oleh karena itu, langkah selanjutnya yang perlu dilakukan adalah segera mengubah postur kerja tersebut menjadi postur kerja dengan leher tegak, badan tegak, tangan dan bahu tidak terangkat, penggunaan dua tumpuan kaki, dan beban yang dikurangi, untuk mengurangi keluhan dan mencegah cedera pada pekerja di bagian perebusan bawah.

Kata Kunci: RULA, Kuesioner Nordic Standar, Postur Tubuh, Keluhan

ABSTRACT

A study was conducted on “Analysis of Work Posture in Yellow Tofu Production Using the RULA Method to Reduce Complaints in Yellow Tofu SMEs in Gunung Sindur District, Pabuaran Village”. This was done because of the high number of complaints experienced by workers in the basic boiling section, as many as 13 (thirteen) complaints. The high number of complaints in the basic boiling process was known by using a standard Nordic questionnaire filled out by workers in the SME. The method used by the researcher was the Rapid Upper Limb Assessment (RULA) to determine whether the work posture used was at a high risk level or not. The analysis was carried out directly on workers in the basic boiling process using one sample of workers with three work activities, namely when pouring soybean juice, when taking boiled soybean juice, and when pouring boiled soybean juice. After analyzing the work posture using the Rapid Upper Limb Assessment (RULA) method, the three activities had a final score of 7 (seven) which means the risk level is high and the action must be to change the work posture immediately. This is due to the work posture involving a lowered neck, a bent torso, excessively raised arms and shoulders, the use of one foot support, and the lifting of excessively heavy loads when pouring soybean juice. Therefore, the next step that needs to be taken is to immediately change this posture to one with an upright neck, an upright torso, hands and shoulders not raised, the use of two foot supports, and a reduced load, to reduce complaints and prevent injury to workers in the bottom boiling section.

Keywords: RULA, Standard Nordic Questionnaire , Body Posture, Complaints

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INTRODUCTION

Comfort in working is one of the One important factor in the production process. By paying attention to workplace comfort, companies can reduce the occurrence of physical complaints among workers, increase productivity, and minimize the risk of accidents. However, comfortable working conditions are often difficult to achieve due to work demands that force workers to be in certain positions or activities continuously.

Workplaces and conditions that are less than ergonomic can cause various losses, including work accidents and the emergence of musculoskeletal disorders (MSDs).. Unnatural working positions, such as standing continuously, squatting, bending, lifting and carrying loads for long periods, can cause discomfort, pain in certain parts of the body, premature fatigue and even work-related illnesses.

Implementation ergonomics in environment Work aim For adapt condition Work with capabilities and limitations man use increase comfort and efficiency work . Mismatch between posture work and load physical received worker can cause disturbance significant musculoskeletal disorders , particularly in the sector business small medium enterprises (SMEs) which are generally Not yet apply principles ergonomics optimally. Disturbance This known with the term Musculoskeletal Disorders (MSDs) which includes pain or discomfort in the part body like neck , back , shoulders, and extremities on. A study by Istighfaniar and Mulyono shows that worker pharmacy that has posture static work in long time to have prevalence complaint high musculoskeletal.

Rapid Upper Limb Assessment (RULA) **Method** developed by McAtamney and Corlett for evaluate posture body part on in a way fast and simple . RULA is used in a way wide Because capable identify areas of the body at risk tall experience injury consequence activity Work repetitive or posture No experience. Research by Oesman et al. states that high RULA score in a way significant relate with need intervention ergonomic immediately to workers manufacturing . In addition , research by Bintang and Dewi compared RULA and OWAS methods in evaluate risk work , and conclude that RULA is more appropriate in evaluate dominant activity in the body part on. RULA assessment carried out in the work process physical in SMEs such as manufacturing know yellow can help determine urgency repair posture Work in a way objective and systematic .

Various studies also prove that repair posture work and design repeat tool help can lower score risk ergonomic in a way significant . Research by Priyandi and Munawir show that repair posture and load work in industry garment lower risk injury. Ramdhani added that use combination RULA and Nordic Body Map methods are effective For identification beginning problem posture in the industry craft hand. Correction ergonomics in the pipe production process is successful lower MSDs complaints and improve operator comfort . Finally , Setiawan emphasized importance education ergonomics in training Work For reduce habit wrong posture since earl. Based on studies said , can concluded that integration RULA method and intervention ergonomic in a way appropriate can give impact significant

to improvement safety and health work in both the informal and formal sectors ergonomic working positions. Data on complaints experienced by workers can be seen in Table 1, which shows various physical complaints felt due to current working conditions which can ADDIN EN.CITE

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Table 1 Amount Complaints about the Tofu Making Process

No	Production process	Amount Worker	Type of Complaint	The number of Complaint
1	Washing	3	right forearm	7
			Pain in the left forearm	
			Pain in the left upper arm	
			Pain in the right upper arm	
			Pain in the waist	
			Pain in the back	
			Pain in the upper neck	
2	Basic Boiling	3	Pain in the neck on	13
			Pain in the left shoulder	
			Pain in the right shoulder	
			Pain in the arm on right	
			Pain in the arm on left	
			Pain in the arm lower right	
			Pain in the arm lower left	
			Pain in the right leg	
			Pain in the left leg	
			Pain in the waist	
			Pain in the back	
			Pain in the wrist hand left	
			Pain in the wrist hand right	
3	Final Boiling	3	Pain in the arm lower left	7

No	Production process	Amount Worker	Type of Complaint	The number of Complaint
			Pain in the arm lower right	
			Pain in the neck on	
			Pain in the wrist hand left	
			Pain in the wrist hand right	
			Pain in the arm on left	
			Pain in the arm on right	
4	Printing	4	Pain in the back	5

This study aims to identify and analyze ergonomic factors that influence work comfort and to evaluate musculoskeletal complaints in workers. Thus, this research is expected to provide a basis for improving working conditions.

The significant contribution of this research is to provide recommendations for improving more ergonomic working positions and conditions, thereby reducing musculoskeletal complaints in workers, increasing work comfort, and supporting safety and productivity in the work environment.

RESEARCH METHODS

Study This was carried out at the Yellow Tofu UKM located in Pabuaran Village , District Mountain Sindur , Bogor Regency , West Java. **Research** This scheduled ongoing from month July 2020 to finished . This UKM chosen as location study Because have a production process that involves activity potential physical cause problem ergonomic for workers . **Research** This aim For identify problem ergonomics that can influence comfort and health the work of the workers .

Data used in study This consists of from primary data and secondary data . Primary data is obtained through observation field work carried out For observe posture work and conditions physique worker during the production process manufacturing know . **Observation** This aim For documenting various position body received by the worker , who can relate with complaint health issues experienced . In addition , interviews with owners and workers are also carried out For dig information more carry on about complaints felt related comfort and well-being they during Work .

Secondary data obtained through studies library , with access books , articles journals and publications relevant scientific with topic research , as well as information the latest available on the internet regarding ergonomics Workplace and musculoskeletal disorders (MSDs). **Literature study** This used For delve into concepts related theories with posture body and its impact to health workers , as well as For enrich analysis conducted in study This .

Instruments used in study This including cameras , the Nordic Body Map (NBM) questionnaire , and the Rapid Upper Limb Assessment (RULA) method . Cameras are used For documenting posture Work worker during the production process . **Documentation Photo** This will become material analysis in evaluate whether position body worker in accordance with principles ergonomics or rather potential

cause musculoskeletal problems . The NBM questionnaire was used For obtain data regarding complaint physical experiences workers , with ask about pain or discomfort in the part body certain , such as neck , back , or member body others . Meanwhile RULA method is applied For evaluate posture and movement body workers , especially those involving arm top , arms bottom , wrist hands , neck , trunk body , and legs. RULA also takes into account factors like the load lifted and the activities carried out by the worker evaluate potential risk injury musculoskeletal .

Data obtained through observation , interviews , and instruments other will analyzed in a way qualitative and quantitative analysis qualitative done with evaluate results interviews and observations related condition existing work , as well as For identify musculoskeletal complaints experienced by workers . Analysis quantitative use RULA method for determine level risk injury and potential problem ergonomics in workers . Research This will implemented during month July 2020, covering stage data collection , analysis , and compilation report research that will be published .

RESULTS AND DISCUSSION

Evaluation Posture Body Pouring Peanut Juice Soya bean

The following is the scoring work posture activities of employees assigned to the boiling section moment pouring peanut juice soybeans . Activities can be seen in Figure 2 .



Figure 2 Calculation Activity Pouring Peanut Juice Soya bean

1. Posture group A body consists of on arm above (which is given sign letter A), arm below (which is given sign letter B), wrist hand (which is given sign letter C), and rotation wrist hand . Here This evaluation to posture body group A, namely :
 - a. Evaluation to arm upper arm : $4+1 = 5$
 - b. Evaluation to arm lower arm : $1+1 = 2$
 - c. Evaluation to wrist Wrist : $3+1 = 4$
 - d. Evaluation to round wrist Wrist Twist = 2

Result of total score on posture body arm upper arm , arm lower arm , wrist hand (*wrist*) and rotation wrist hand (*wrist twist*) then entered into the to in Table 10 .

Table 2 Group A Assessment Scores for Pouring Peanut Juice Soya bean

Upper arm	Forearm	Wrist							
		1		2		3		4	
		Wrist twist		Wrist twist		Wrist twist		Wrist twist	
		1	2	1	2	1	2	1	2
1	1	1	2	2	2	2	3	3	3
	2	2	2	2	2	3	3	3	3
	3	2	3	3	3	3	3	4	4
2	1	2	3	3	3	3	4	4	4
	2	3	3	3	3	3	4	4	4
	3	3	4	4	4	4	4	5	5
3	1	3	3	4	4	4	4	5	5
	2	3	4	4	4	4	4	5	5
	3	4	4	4	4	4	5	5	5
4	1	4	4	4	4	4	5	5	5
	2	4	4	4	4	4	5	5	5
	3	4	4	4	5	5	5	6	6
5	1	5	5	5	5	5	6	6	7
	2	5	6	6	6	6	7	7	7
	3	6	6	6	7	7	7	7	8
6	1	7	7	7	7	7	8	8	9
	2	8	8	8	8	8	9	9	9
	3	9	9	9	9	9	9	9	9

Based on Table 10 , the scores for body posture in group A were obtained. is 7 (seven) . The score is obtained from evaluation arm on with score 5 (five), arm lower with score 2 (two), wrist hand with score 4 (four) and round wrist 2 (two) hands .

After that , the resulting score is added to the activity score and load score . The following is an assessment of the activity and load scores:

- a. *Activity* Score = 1
- b. Load Score (*Load/ Force*) = 3

Based on results obtained from Table 2 namely 7 (seven) plus score activity 1 (one) and score load 3 (three) then The total score of group A is 11 (eleven). The result of The total score of group A will later be entered into group C (*Grand Score Table*) in Table 12 .

2. Group B body posture consists of the neck (which is given sign letter D), torso (which is given sign letter E) and feet. The following are assessments of group B's body posture, namely:

- a. Assessment of the neck (*neck*) $1+1 = 2$
- b. Assessment of the *trunk* = 2
- c. Assessment of legs = 2

The results of the posture of the neck , *trunk* and legs *are* then entered into Table 11 .

Table 2 Group B Assessment Scores for Pouring Peanut Juice Soya bean

Neck	Body Score											
	1		2		3		4		5		6	
	Foot		Foot		Foot		Foot		Foot		Foot	
	1	2	1	2	1	2	1	2	1	2	1	2
1	1	3	2	3	3	4	5	5	6	6	7	7
2	2	3	2	3	4	5	5	5	6	7	7	7
3	3	3	3	4	4	5	5	6	6	7	7	7
4	5	5	5	6	6	7	7	7	7	7	8	8
5	7	7	7	7	7	8	8	8	8	8	8	8
6	8	8	8	8	8	8	8	9	9	9	9	9

Based on Table 2 obtained scores for body posture group B is 3 (three) . The score is obtained from evaluation stem neck with score 2 (two), bar body with score 2 (two) and foot position 2 (two).

After that , the resulting score is added to the activity score and load score. The following is an assessment of the activity and load scores:

- Activity Score = 1
- Load Score (*Load/ Force*) = 3

Based on results obtained from Table 11 is 3 (three) plus score activity 1 (one) and score load 3 (three) then the total score for group B is 7 (seven) . Result of The total score of group B will later be entered into group C (*Grand Score Table*) in Table 12 .

Table 3 *Grand Score Table* On Pouring Peanut Juice Soya bean

Group A Score	Group B Scores						
	1	2	3	4	5	6	7
1	1	2	3	3	4	5	5
2	2	2	3	4	4	5	5
3	3	3	3	4	4	5	6
4	3	3	3	4	5	6	6
5	4	4	4	5	6	7	7
6	4	4	5	6	6	7	7
7	5	5	6	6	7	7	7
8 +	5	5	6	7	7	7	7

From Table 3 obtained Group C score results (*grand score table*) namely 7. The score obtained from total group score A with score 11 (eleven) and total score of group B with score 7 (seven). Then the results are classified into several risk level categories . Can seen in Table 13 .

Table 4 Risk Levels in Pouring Peanut Juice Soya bean

Score	Risk Level	Action
1-2	Minimum	Safe
3-4	Small	It will take some time to come
5-6	Currently	Actions in the near future
7	Tall	Take action now

peanut juice pouring activity soya bean with a bent posture with hands lifting the bucket of peanut juice. The soybean score in Table 13 is 7 (seven). Therefore, the risk level is high, and corrective action is needed immediately.

Evaluation Posture Body Retrieval Boiled Peanut Juice Soya bean

The following is the scoring work posture activities of employees assigned to the boiling section moment pouring peanut juice soybeans. The activities can be seen in **Figure 3**.



Figure 3 Calculation Activity Extracting Bean Extract Soya bean Ripe

1. Posture group A body consists of on arm above (which is given sign letter A), arm below (which is given sign letter B), wrist hand (which is given sign letter C), and rotation wrist hand. Here This evaluation to posture body group A, namely :
 - a. Evaluation to arm upper arm : = 3
 - b. Evaluation to arm lower arm : $2+1 = 3$
 - c. Evaluation to wrist Wrist : = 2
 - d. Evaluation to round wrist Wrist Twist = 2

Result of total score on posture body arm upper arm , arm lower arm , wrist hand (*wrist*) and rotation wrist hand (*wrist twist*) then entered into the to in Table 5 .

Table 5 Group A Assessment Score on Peanut Extraction Soya bean Ripe

Upper arm	Forearm	Wrist							
		1		2		3		4	
		Wrist twist		Wrist twist		Wrist twist		Wrist twist	
		1	2	1	2	1	2	1	2
1	1	1	2	2	2	2	3	3	3
	2	2	2	2	2	3	3	3	3
	3	2	3	3	3	3	3	4	4
2	1	2	3	3	3	3	4	4	4
	2	3	3	3	3	3	4	4	4
	3	3	4	4	4	4	4	5	5
3	1	3	3	4	4	4	4	5	5
	2	3	4	4	4	4	4	5	5
	3	4	4	4	4	4	5	5	5
4	1	4	4	4	4	4	5	5	5
	2	4	4	4	4	4	5	5	5
	3	4	4	4	5	5	5	6	6

Upper arm	Forearm	Wrist							
		1		2		3		4	
		Wrist twist		Wrist twist		Wrist twist		Wrist twist	
		1	2	1	2	1	2	1	2
5	1	5	5	5	5	5	6	6	7
	2	5	6	6	6	6	7	7	7
	3	6	6	6	7	7	7	7	8
6	1	7	7	7	7	7	8	8	9
	2	8	8	8	8	8	9	9	9
	3	9	9	9	9	9	9	9	9

Based on Table 5 , the scores for body posture in group A were obtained. is 4 (four) . The score is obtained from evaluation arm on with score 3 (three), arm lower with score 3 (three), wrist hand with score 2 (two) and round wrist 2 (two) hands .

After that, the results of the score are added to the activity score and load score , namely:

- Activity* Score = 1
- Load Score (*Load/ Force*) = 2

Based on results obtained from Table 14 is 4 (four) plus score activity 1 (one) and score load 2 (two), then The total score of group A is 7 (seven). The result of The total score for group A will later be entered into group C (*Grand Score Table*) in Table 6 .

2. Group B body posture consists of the neck (which is given sign letter D), torso (which is given letter E) and feet. The following are assessments of group B's body posture, namely:

- Assessment of the neck (*neck*) $2+1 = 3$
- Assessment of the *trunk* $3 + 1 = 4$
- Assessment of legs = 2

The results of the posture of the neck , *trunk* and legs *are* then entered into Table 6.

Table 6 Group B Assessment Scores for Extracting Peanut Extract Soya bean Ripe

Neck	Body Score											
	1		2		3		4		5		6	
	Foot		Foot		Foot		Foot		Foot		Foot	
	1	2	1	2	1	2	1	2	1	2	1	2
1	1	3	2	3	3	4	5	5	6	6	7	7
2	2	3	2	3	4	5	5	5	6	7	7	7
3	3	3	3	4	4	5	5	6	6	7	7	7
4	5	5	5	6	6	7	7	7	7	7	8	8
5	7	7	7	7	7	8	8	8	8	8	8	8
6	8	8	8	8	8	8	8	9	9	9	9	9

Based on Table 6 obtained scores for body posture group B is 6 (six) . The score is obtained from evaluation stem neck with score 3 (three), bar body with score 4 (four) and score leg position 2 (two).

After that , the resulting score is added to the activity score and load score . The following is an assessment of the activity and load scores:

- Activity* Score = 1

b. Load Score (*Load/ Force*) = 2

Based on results obtained from Table 15 is 6 (six) plus score activity 1 (one) and score load 2 (two), then obtained The total score of group B is 9 (nine). The result of The total score of group B will later be included in group C (*Grand Score Table*). This can be seen in Table 7 .

Table 7 *Grand Score Table* on Extracting Bean Extract Soya bean Ripe

Group A Score	Group B Scores						
	1	2	3	4	5	6	7
1	1	2	3	3	4	5	5
2	2	2	3	4	4	5	5
3	3	3	3	4	4	5	6
4	3	3	3	4	5	6	6
5	4	4	4	5	6	7	7
6	4	4	5	6	6	7	7
7	5	5	6	6	7	7	7
8 +	5	5	6	7	7	7	7

From Table 7 obtained Group C score results (*grand score table*) namely 7 (seven). The score is obtained from total group score A with score 7 (seven) and total score of group B with score 9 (nine). Then the results are classified into several risk level categories in Table 8

Table 8 Risk Levels in Taking Peanut Extract Soya bean Ripe

<i>Score</i>	<i>Risk Level</i>	<i>Action</i>
1-2	Minimum	Safe
3-4	Small	It will take some time to come
5-6	Currently	Actions in the near future
7	Tall	Take action now

Final score of the taking activity boiled peanut juice soybeans with a bent posture with hands down based on Table 17 is 7 (seven). So the risk level is high, and corrective action is needed immediately .

Evaluation Posture Body During Pouring Boiled Peanut Juice Soya bean

The following is the scoring work posture activities of employees assigned to the boiling section moment pouring boiled peanut juice soybeans . The activities can be seen in Figure 4 .



Figure 4 Calculation Activity Pouring Peanut Juice Soya bean Ripe

1. Posture group A body consists of on arm above (which is given mark letter A), arm below (which is given sign letter B), wrist hand (which is given sign letter C), and rotation wrist hand . Here This evaluation to posture body group A, namely :

- a. Evaluation to arm upper arm : $1+1 = 2$
- b. Evaluation to arm lower arm : $1 = 1$
- c. Evaluation to wrist Wrist : $= 2$
- d. Evaluation to round wrist Wrist Twist = 1 .

Result of total score on posture body arm upper arm , arm lower arm , wrist hand (*wrist*) and rotation wrist hand (*wrist twist*) then entered into the to in Table 9 .

Table 9 Group A Assessment Scores for Pouring Peanut Juice Soya bean Ripe

Upper arm	Forearm	Wrist							
		1		2		3		4	
		Wrist twist		Wrist twist		Wrist twist		Wrist twist	
		1	2	1	2	1	2	1	2
1	1	1	2	2	2	2	3	3	3
	2	2	2	2	2	3	3	3	3
	3	2	3	3	3	3	3	4	4
2	1	2	3	3	3	3	4	4	4
	2	3	3	3	3	3	4	4	4
	3	3	4	4	4	4	4	5	5
3	1	3	3	4	4	4	4	5	5
	2	3	4	4	4	4	4	5	5
	3	4	4	4	4	4	5	5	5
4	1	4	4	4	4	4	5	5	5
	2	4	4	4	4	4	5	5	5
	3	4	4	4	5	5	5	6	6
5	1	5	5	5	5	5	6	6	7
	2	5	6	6	6	6	7	7	7
	3	6	6	6	7	7	7	7	8
6	1	7	7	7	7	7	8	8	9
	2	8	8	8	8	8	9	9	9
	3	9	9	9	9	9	9	9	9

Based on Table 9 , the scores for body posture in group A were obtained. is 3 (three) . The score is obtained from evaluation arm on with score 2 (two), arm lower with score 1 (one), wrist hand with score 2 (two) and round wrist hand 1 (one).

After that, the results of the score are added to the activity score and load score , namely:

- a. *Activity* Score = 1
- b. Load Score (*Load/ Force*) = 2

Based on results obtained from Table 18 namely 3 (three) plus score activity 1 (one) and score load 2 (two) then The total score of group A is 6 (six). The result of The total score of group A will later be entered into group C (*Grand Score Table*). This can be seen in Table 11 .

2. Group B body posture consists of the neck (which is given sign letter D), torso (which is given sign letter E) and feet. The following are assessments of group B's body posture, namely:

- a. Assessment of the neck (*neck*) $3+1 = 4$
- b. Assessment of the *trunk* $3 + 1 = 4$

c. Assessment of legs = 2

The results of the posture of the neck , *trunk* and legs *are* then entered into Table 10 .

Table -10 Group B Assessment Score On Pouring Boiled Peanut Juice Soya bean

Neck	Body Score											
	1		2		3		4		5		6	
	Foot		Foot		Foot		Foot		Foot		Foot	
	1	2	1	2	1	2	1	2	1	2	1	2
1	1	3	2	3	3	4	5	5	6	6	7	7
2	2	3	2	3	4	5	5	5	6	7	7	7
3	3	3	3	4	4	5	5	6	6	7	7	7
4	5	5	5	6	6	7	7	7	7	7	8	8
5	7	7	7	7	7	8	8	8	8	8	8	8
6	8	8	8	8	8	8	8	9	9	9	9	9

Based on Table 10 obtained scores for body posture group B is 7 (seven) . The score is obtained from evaluation stem neck with score 4 (four), bar body with score 4 (four) and foot position 2 (two) .

After that , the resulting score is added to the activity score and load score . The following is an assessment of the activity and load scores:

a. *Activity* Score = 1

b. Load Score (*Load/ Force*) = 2

Based on results obtained from Table 19 is 7 (seven) plus score activity 1 (one) and score load 2 (two) then the total score for group B is 10 (ten) . Result of The total score of group B will later be entered into group C (*Grand Score Table*) in Table 11 .

Table 11 *Grand Score Table* On Pouring Peanut Juice Soya bean

Group A Score	Group B Scores						
	1	2	3	4	5	6	7
1	1	2	3	3	4	5	5
2	2	2	3	4	4	5	5
3	3	3	3	4	4	5	6
4	3	3	3	4	5	6	6
5	4	4	4	5	6	7	7
6	4	4	5	6	6	7	7
7	5	5	6	6	7	7	7
8 +	5	5	6	7	7	7	7

From Table 11 obtained Group C score results (*grand score table*) namely 6 (six) . The score is obtained from total group score A with score 7 (seven) and total score of group B with score 10 (ten) . Then the results are classified into several risk level categories at 12 .

Table 21 Risk Levels in Pouring Peanut Juice Soya bean Ripe

Score	Risk Level	Action
1-2	Minimum	Safe
3-4	Small	It will take some time to come
5-6	Currently	Actions in the near future
7	Tall	Take action now

Final score of pouring activity boiled peanut juice soybeans with a bent posture with hands down based on Table 22 is 7 (seven). So the risk level is high, and corrective action is needed immediately .

Analysis Based on RULA Results

Based on analysis from results data processing using method *Rapid Upper Limb Assessment* (RULA) was obtained results RULA score in the section boiling basis at the time do pouring peanut juice soybeans , extraction boiled peanut juice soybeans and pouring boiled peanut juice soya bean have a risk level high , which means must do repair right now so as not to experience injury or persistent illness . Considered a high risk level due to from results analysis to worker part boiling base production know yellow moment do three activity said , has score end or *grand score* 7.

Posture Improvements to the Basic Boiling Process Section

Based on calculation posture Work previously , researchers provide suggestions for workers change posture his work For reduce complaints of pain experienced worker part boiling basic . Here repair posture work on workers part boiling basic , namely :

1. In the activity pouring peanut juice soya bean the repair that is position neck No bowing , arms on No too up, the load carried reduced , and using support two legs, as in **Figure 5** .



Figure 5 Posture Repair Pouring Peanut Juice Soya bean

2. In the activity taking boiled peanut juice soya bean the repair that is position stem body upright , neck No looking down / standing up straight and use support with two legs, as in Figure 6 .



Figure 6 Posture Repair Retrieval Soybean Extract Decoction

3. In the activity pouring boiled peanut juice soya bean the repair that is position arm on Don't too open neck No looking down , shoulders not raised and using support with two legs, like Figure 4.17 .



Figure 7 Posture Repair Pouring Soybean Extract Decoction

CONCLUSION

Based on research conducted at the Yellow Tofu UKM , Gunung Sindur District, Pabuaran Village results from data processing and data analysis then conclusions drawn that is as following :

1. Posture Work employees in the production process specifically part boiling own three activity work , which is the first moment pouring peanut juice soya bean with with posture Work position neck bowing , hands too up , the load carried too weight and use support with one leg. The second moment taking boiled peanut juice soya bean with posture Work stem body bend down , do activity repeat and use support with one leg. The third moment pouring boiled peanut juice soya bean with posture body position neck bow down , do activity repeat and use support one leg. Third Posture body This own score end of 7 (seven), where the risk level is high and must done repair posture body right now .
2. Repair For reduce complaint is replace that posture with a more correct posture both neck straight, torso straight, hands and shoulders not raised, using two foot supports and reducing the load, to reduce complaints and to prevent injury to workers in the basic boiling section in the section boiling base For reduce complaints that are felt and avoided from injury .

REFERENCES

- Kuswana, ws (2017). *Ergonomics and K3* . Bandu: PT Remaja Rosdakarya.
- Masitoh, D. (2016). *Body Posture Analysis Using the RULA Method on Welding Workers in the Sub-Assy Area of PT. Fuji Technica Indonesia Karawang* . Surakarta: Sebelas Maret University.
- Nurmutia, S. (2020). *Industrial Ergonomics Practicum* . South Tangerang: UMPAM PRESS.
- Pratomo, WS (2018). *Analysis of Painting Department Employees' Work Posture Using the Rapid Upper Limb Assessment Method* . South Tangerang: Pamulang University.
- Rahman, A. (2017). *Analysis of Work Posture and Factors Related to Musculoskeletal Disorders (MSDs) Complaints in Informal Sector Concrete Workers in Samata Subdistrict, Somba District, Gowa Regency* . Makassar: Alauddin State Islamic University, Makassar.

- Sinaga, R. (2017). Designing an Android-Based Application to Improve Physical Fitness and Reduce the Potential for Injury During Fitness Training . Surabaya: Sepuluh Nopember Institute of Technology.
- Yudhiansyah, SI (2017). Design and Construction of a Tofu Printing Machine Using an Anthropometric Approach to Reduce Workload and Increase Productivity . Surabaya: University of August 17, 1945.
- Yulianto, R. (2017). Analysis of Work Posture in Potato Chips Processing Using the RULA (Rapid Upper Limb Assessment) Method. Malang: Muhammadiyah University of Malang.
- Briansah, AO (2018). Analysis of Work Postures Occurring for Activities in Building Construction Projects Using the RULA Method at CV. BASANI (Case Study of CV. Basani in the Construction Sector, Yogyakarta).
- Rafiudarojat. (2018). Analysis of Worker Body Posture in the Loading Section Using the RULA and REBA Methods to Reduce the Risk of Musculoskeletal Disorders at PT Indomarco Prismatama . Journal of Ergonomics , 11.
- Sulaiman, F., & Sari, YP (2018). Analysis of Work Posture of Agate Stone Grinding Workers Using the Reba Method . Optimization Journal .
- Istighfaniar, K., & Mulyono, M. (2016). Evaluation of Work Posture and Musculoskeletal Complaints in Pharmaceutical Installation Workers. Indonesian Journal of Occupational Safety and Health , 5 (1), 81-90.
- Oesman, TI, Irawan, E., & Wisnubroto, P. (2019). Work Posture Analysis with RULA to Assess the Risk Level of Upper Extremity Work-Related Musculoskeletal Disorders. Case Study of PT. Mandiri Jogja Internasional. Indonesian Ergonomics Journal Vol , 5 (01).
- Bintang, AN, & Dewi, SK (2017). Analysis of work posture using the Owas and Rula methods. Journal of Industrial Engineering , 18 (1), 43-54.
- Priyandi, A., & Munawir, IH (2019). Ergonomic Evaluation of Work Load and Posture in Garment Production Process at PT. Dan Liris (Case Study of PT. Dan Liris Sukoharjo) (Doctoral dissertation, Muhammadiyah University of Surakarta).
- Ramdhani, D. (2018). Analysis of Handycraft Craftsmen's Work Posture Using the Nordic Body Map and the Rapid Upper Limb Assessment (RULA) Method (Doctoral dissertation, Faculty of Engineering).