



ANALYSIS OF WORKING POSTURE USING THE REBA METHOD TO EMPLOYEES OF THE POLYPROPYLENE PRODUCTION DIVISION AT PT HARAPAN SEJAHTERA KARYA UTAMA SIDOARJO

Jasur ¹, Akmal Suryadi ²

Program Studi Teknik Industri UPN Veteran Jawa Timur
Jl. Rungkut Madya No. 1, Surabaya, East Java, Indonesia 60294
E-mail: jasur2412@gmail.com ¹, akmal.suryadi65@gmail.com ²

ABSTRACT

PT Harapan Sejahtera Karya Utama is a company engaged in the plastic industry, especially polypropylene. This company has been distributed to companies in East Java. Four workstations still do not apply ergonomic work postures in the production process. This research aims to determine the action level value of the REBA score and design an ergonomic work posture. From the research that has been done, it was found from the NBM questionnaire that 58% of workers have pain on back, and 47% have pain on waist. Related the REBA scoring results, in the process of checking raw materials, the process cutting materials, and packaging, the REBA score of 5 was obtained, which's a medium risk with an action level of 2. the process of transfer materials obtains the REBA score of 11, which's a very high-risk with an action level value of 4. Based on the REBA score, a proposal was made to improve the working posture of workers in the polypropylene production division, the process of checking raw materials, the process cutting materials and packaging, and obtained a REBA score of 2 out of 5, where this value's better than initial work posture score. For the material transfer process, the REBA score is 3 out of 11, where this value's better than initial work posture score. Related to this, the company should pay attention to the safety and health of employees when doing a job, such as the optimal work posture at work.

Keywords: Ergonomics, Nordic Body Map, REBA, Work Posture ,

Article history:

Submitted 23 May 2023

Revised 2 February 2024

Accepted 20 April 2024

Available online 30 April 2024

Published By:

Fakultas Teknologi Industri
Universitas Muslim Indonesia

Address :

Jl. Urip Sumoharjo Km. 5 (Kampus II UMI)
Makassar Sulawesi Selatan.

Email :

Jiem@umi.ac.id

Phone :

+6281341717729

+6281247526640

Licensed by: <https://creativecommons.org/licenses/by-nc-sa/4.0/>

DOI : <http://dx.doi.org/10.33536/jiem.v9i1.1709>



1. INTRODUCTION

The industrial sector in Indonesia is experiencing rapid growth in all sectors. This growth encourages many industrial companies to improve performance to achieve targets. Success in achieving company targets depends on human productivity. The application of ergonomics to workers, especially humans, is a must because any activity or job that is not ergonomically done can result in discomfort, high costs, increased accidents, and work-related illnesses, a decreased performance that results in a decrease in work productivity, efficiency and workforce (Dewi, 2020). That is why the company needs to pay attention to the working conditions and comfort of the workers to perform their duties well. An assessment of ergonomic risks can aid in the identification of complaints like musculoskeletal disorders (MSDs), which encompass symptoms impacting muscles, nerves, tendons, ligaments, and cartilage. (Shobur, Maksuk and Sari, 2019). Ergonomic is a systematic branch of science to achieve practical, safe, healthy, and comfy work (Purbasari *et al.*, 2019). The goal of ergonomics is to enhance the functioning of the work system by enhancing the interaction between users and machines, allowing for improved performance. (Dewantari, 2020). The extent of ergonomics covers divides into three specialized domains that support ergonomics: physical ergonomics, cognitive ergonomics, and organizational ergonomics (Handayani *et al.*, 2023).

Ergonomic positions have a perspective from anthropometry. In general, anthropometry refers to a compilation of quantitative information pertaining to the physical attributes of the human body, encompassing aspects such as dimensions, form, and physical prowess. (Aras *et al.*, 2019). Anthropometry is divided into 28 parts from head to leg (Telaumbanua, Marbun, and Siboro, 2022). Anthropometry is related to the Nordic Body Map (NBM) questionnaire. This questionnaire can describes the pain score results in body parts experiencing musculoskeletal discomfort, which can serve as a basis for improving work posture (Geovania Azwar, 2020). The Nordic Body Map (NBM) identifies or determines complaints of skeletal muscle pain in specific body parts (Tamala Adelia, 2020). Muscle pain or discomfort can occur due to repetitive injuries when non-ergonomic work positions are continuously performed with excessive loads (Lubis *et al.*, 2021).

Improper working position causes muscle disorders and gives workload (Hasanah and Winarko, 2019). Training efforts on the risks and hazards of working in improper and non-ergonomic positions aim to minimize existing complaints (Mindhayani, 2021). A good working position refers to the body posture condition during work that aligns with suitable anatomy, thereby avoiding excessive deviations and reducing the risk of musculoskeletal disorders (Amaliah Usman *et al.*, 2022). Musculoskeletal complaints or musculoskeletal disorders (MSDs) are pain, discomfort, stiffness, and other issues in the musculoskeletal system, such as tendons, joints, and bones, caused by work activities (Widitia Rizka, Entianopa and Hapis Abul Ainin, 2020). In 2018, musculoskeletal conditions were identified as the second leading cause of global disability, with back pain being a significant contributor (Salcha and Arni Juliani, 2021). The posture analysis method's development began with the Rapid Entire Body Assessment (REBA) method. REBA is a systematic approach that assesses the complete bodily stance of the worker in order to recognize the likelihood of musculoskeletal disorders (MSDs) and other hazards associated with the job. (Tiogana and Hartono, 2020). The REBA method assesses the ergonomic risk level of the upper and lower body (Tambun, 2019). The REBA method is a system designed to evaluate muscle activity resulting from stationary body positions, moving postures, and unstable movements while also offering a recommended course of action with emergency indicators. (Pratiwi, Widyaningrum, and Jufriyanto, 2021). The REBA method can be aided by ErgoFellow 3.0 software, which includes 17 ergonomic methods, one of which is REBA. It evaluates, improves, and enhances the workplace's quality to reduce risks and increase productivity (Julian Firdaus and Angga Sujarno, 2023).

PT Harapan Sejahtera Karya Utama is a company engaged in plastic bag commodities with the specifications of the industrial group of sheet plastic goods, one of which is polypropylene. Polypropylene is a type of plastic that stands out due to its excellent mechanical characteristics, low density, heat and moisture resistance, and excellent dimensional stability (Anggono *et al.*, 2020). The company is located at Jl. Kutilang No. 25 Minggir Village, Larangan, District. Candi, Sidoarjo Regency, East Java, can

distribute various sheets of plastic bags to companies, especially in East Java. The polypropylene production process consists of 4 processes: raw material checking, material transfer, material cutting, and packaging. This company has eight working hours divided into 3 shifts: shift 1, which is 06.00 - 14.00, shift 2, which is from 14.00 - 22.00 and shift 3, which is from 22.00 - 06.00. The polypropylene production division workers are made in 3 shifts with 12 people/shifts.

To maximize the performance and productivity of workers, various factors can affect these two aspects, namely the physical condition and the workload placed on the worker (Lesmawati *et al.*, 2022). To achieve the maximum output, the worker must see if he is comfortable doing his job in his work position. In implementing production activities, some workers have not implemented ergonomic work positions. In the polypropylene production division process, extreme activities can cause workers to experience muscle disturbances. Derived from interviews and observations conducted with the HSE department's head and employees, There is a high occurrence of muscle fatigue, particularly in the arms, accompanied by frequent reports of pain, neck stiffness, back fatigue, and leg pain.. This occurs because the activity is performed repeatedly, and repetitive motion refers to movements repeated continuously for 8 hours (Teh *et al.*, 2022).

Related to the problem, the Rapid method is used Whole Body Assessment (WBA). The REBA method determines the risk level (risk level), the action level (action level), and operator's complaints highlight the required enhancements to minimize the risk of musculoskeletal disorders (MSDs) throughout the entire body. For REBA itself, perform calculations on the entire body, starting from the neck, back, arms, wrists, and feet (Haslindah *et al.*, 2021). The duration of work directly impacts the escalation of REBA scores. The longer the workers work in an improper posture, the greater the risk of musculoskeletal disorders (MSDs) (Utomo, Sulistiarini, and Putri, 2021). This REBA method is suitable for identifying the problems in polypropylene production division workers at PT Harapan Sejahtera Karya Utama Sidoarjo. With this research using the REBA method, it was possible to know and analyze the condition of workers' working posture and to

give recommendations for improvement related to appropriate and ergonomic working posture for polypropylene production division workers at PT Harapan Sejahtera Karya Utama Sidoarjo.

2. METHODS

Data were collected from February 2023 until the required data was fulfilled. The research was conducted from 4 workstations in the polypropylene production division using the REBA method with 19 workers.

The REBA analysis was performed by looking at the final result of the REBA score, which was obtained from the results of manual calculations and then validated using the Ergofellow 3.0 software. The value obtained on the REBA score will be classified into action level 0-4 values, each of which has a different level of risk as follows.

Table 1. REBA Score Classification

Action Level	REBA Score	Risk Level	Action
0	1	Negligible	None necessary
1	2-3	Low	May be necessary
2	4-7	Medium	Necessary
3	8-10	High	Necessary soon
4	11+	Very High	Necessary Now

(Anthony, 2020)

In order to decrease the risk level of work posture at the work stations, efforts are made, a proposal for improvement was designed using CATIA V5R20 software.

2.1 The Method of Data Collection

Data collection is done at 4 workstations where data collection techniques are performed with 2 data collected, namely:

- 1) Primary Data
 - a. Questionnaire

Data collection by giving a set of questions with the NBM questionnaire, as shown in Figure 1.

LEMBAR KUISIONER NORDIC BODY MAP

Nama Pekerja : _____
 Usia : _____ tahun
 Tinggi Badan : _____ cm
 Massa Badan : _____ kg
 Jenis pekerjaan : _____

Berikan tanda centang (+) pada bagian-bagian tubuh Anda yang mengalami keluhan atau bagian yang sering sakit (jika ada)

No	Jenis keluhan	Tingkat keluhan			
		Tidak ada	Ringan	Sedang	Sangat
1	Sakit pada leher bagian atas				
2	Sakit pada leher bagian bawah				
3	Sakit pada bahu bagian atas				
4	Sakit pada bahu bagian bawah				
5	Sakit pada punggung bagian atas				
6	Sakit pada punggung bagian bawah				
7	Sakit pada lengan bagian atas				
8	Sakit pada lengan bagian bawah				
9	Sakit pada pergelangan tangan bagian atas				
10	Sakit pada pergelangan tangan bagian bawah				
11	Sakit pada tungkai bagian atas				
12	Sakit pada tungkai bagian bawah				
13	Sakit pada mata bagian atas				
14	Sakit pada mata bagian bawah				
15	Sakit pada telinga bagian atas				
16	Sakit pada telinga bagian bawah				
17	Sakit pada hidung bagian atas				
18	Sakit pada hidung bagian bawah				
19	Sakit pada mulut bagian atas				
20	Sakit pada mulut bagian bawah				
21	Sakit pada gigi bagian atas				
22	Sakit pada gigi bagian bawah				
23	Sakit pada kepala bagian atas				
24	Sakit pada kepala bagian bawah				
25	Sakit pada leher bagian atas				
26	Sakit pada leher bagian bawah				
27	Sakit pada bahu bagian atas				
28	Sakit pada bahu bagian bawah				
29	Sakit pada punggung bagian atas				
30	Sakit pada punggung bagian bawah				
31	Sakit pada lengan bagian atas				
32	Sakit pada lengan bagian bawah				
33	Sakit pada pergelangan tangan bagian atas				
34	Sakit pada pergelangan tangan bagian bawah				
35	Sakit pada tungkai bagian atas				
36	Sakit pada tungkai bagian bawah				

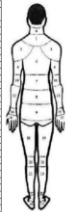


Figure 1. Nordic Body Map (NBM) Questionnaire

b. Interview

The data collection process by the question and answer method was conducted by interviewing HSE and workers directly.

c. Observation

The data collection was conducted through direct observation at the location of PT. Harapan Sejahtera Karya Utama in Sidoarjo.

2) Secondary Data

The data collected from diverse literature and references were compiled utilizing the Rapid Entire Body Assessment (REBA) method..

3. FINDINGS AND DISCUSSIONS

3.1 Findings

This research started using the Nordic Body Map (NBM) questionnaire, distributed to 19 workers in the polypropylene production division of PT Harapan Karya Sejahtera Utama. The results were obtained that the subjective assessment of the workers showed that there were complaints of the following illnesses.

- 11 workers feel pain in the back, so the percentage is 58%
- 9 workers felt pain in the waist, so the percentage was 47%

The polypropylene production division at PT HSKU research consists of 4 workstations, where direct observations were made regarding the working postures of the workers at each workstation. The following are photos of the worker working postures and their corresponding measurement angles at each workstation.



Figure 2. Worker at the 'Checking Raw Material'



Figure 3. Worker at 'Material Transfer '



Figure 4. Worker at the 'Material Cutting'



Figure 5. Worker at the 'Packaging'

3.2 Discussion

According on the research, the results of analysis data processing using the REBA method were obtained, namely:

Table 2. Recapitulation of REBA Score Before Improvement

Work station	Grand Score REBA	Risk Level	Action
Checking Raw Material	5	Medium	Necessary
Material Transfer	11	Very High	Necessary Now
Material Cutting	5	Medium	Necessary
Packaging	5	Medium	Necessary

Based on the results of the REBA scoring done manually, as in Table 2. The calculation of the REBA scoring was also done with the ErgoFellow 3.0 software, the following image results from the calculation with the ErgoFellow 3.0 software.

The screenshot shows the REBA-DATABASE software interface for the task 'Pemeriksaan pada Pengecekan Bahan Baku'. The worker is 'Pekerja pada Pengecekan Bahan Baku' from 'PT Harapan Sejahtera Karya Utama'. The task description is 'Melakukan pengecekan bahan baku'. The assessments for various body parts (Neck, Trunk, Legs, Load, Wrist, Upper Arm, Lower Arm) are all 'No' or 'Good', leading to a final result of 5.

Figure 6. Result score at the 'Checking Raw Materials' with Ergofellow 3.0

Based on the result of 'Checking Raw Material' with ergofellow 3.0, a grand score of 5 was obtained with a medium risk level according to the REBA (Rapid Entire Body Assessment) method. Further investigation is required, and corrective actions need to be taken.

The screenshot shows the REBA-DATABASE software interface for the task 'Pemeriksaan pada Pemindahan Bahan'. The worker is 'Pekerja pada Pemindahan Bahan' from 'PT Harapan Sejahtera Karya Utama'. The task description is 'Melakukan Pemindahan Gulungan Bahan Baku'. The assessments for various body parts (Neck, Trunk, Legs, Load, Wrist, Upper Arm, Lower Arm) are mostly 'No' or 'Good', but the final result is 11, indicating a very high risk level.

Figure 7. Result score at the 'Material Transfer' with Ergofellow 3.0

Based on the results of 'Material Transfer' with ergofellow 3.0, a grand score of 11 was obtained with a very high risk level according to the REBA (Rapid Entire Body Assessment) method. Further investigation is required, and corrective actions need to be taken as soon as possible.

The screenshot shows the REBA-DATABASE software interface for the task 'Pemeriksaan pada Pemotongan Bahan'. The worker is 'Pekerja pada Pemotongan Bahan' from 'PT Harapan Sejahtera Karya Utama'. The task description is 'Pengawasan terhadap pemotongan bahan'. The assessments for various body parts (Neck, Trunk, Legs, Load, Wrist, Upper Arm, Lower Arm) are mostly 'No' or 'Good', leading to a final result of 5.

Figure 8. Result score at the 'Material Cutting' with Ergofellow 3.0

Based on the result of 'Material Cutting' with ergofellow 3.0, a grand score of 5 was obtained with a medium risk level according to the REBA (Rapid Entire Body Assessment) method. Further investigation is required, and corrective actions need to be taken.

The screenshot shows the REBA-DATABASE software interface for the task 'Pemeriksaan pada Pengemasan'. The worker is 'Pekerja pada Pengemasan' from 'PT Harapan Sejahtera Karya Utama'. The task description is 'Melakukan pengemasan sebelum dipasarkan'. The assessments for various body parts (Neck, Trunk, Legs, Load, Wrist, Upper Arm, Lower Arm) are mostly 'No' or 'Good', leading to a final result of 5.

Figure 9. Result score at the 'Packaging' with Ergofellow 3.0

Based on the result of 'Packaging' with ergofellow 3.0, a grand score of 5 was obtained with a medium risk level according to the REBA (Rapid Entire Body Assessment) method. Further investigation is required, and corrective actions need to be taken.

From the REBA scoring manually and with the ErgoFellow 3.0 software, the following are the calculation results:

Table 3. Comparison of REBA Scoring and Ergofellow 3.0

Work Station	REBA Scoring Manual	Software Ergofellow 3.0
Checking Raw Material	5	5
Material Transfer	11	11
Material Cutting	5	5
Packaging	5	5

The results of manual calculations and Ergofellow 3.0 software showed no differences.

The calculation that has been done will be related to the recommendations of improvement proposals that PT Harapan Sejahtera Karya Utama can use to reduce the value of the action level on workers by using CATIA V5R20 software. The following is a proposal for improving work posture based on the REBA method with the help of CATIA V5R20 software.

1. Checking Raw Material



Figure 10. Suggested improvements 'Checking Raw Materials' with CATIA V5R20

2. Material Transfer



Figure 11. Suggested improvements 'Material Transfer' with CATIA V5R20

3. Material Cutting



Figure 12. Suggested improvements 'Material Cutting' with CATIA V5R20

4. Packaging



Figure 13. Suggested improvements 'Packaging' with CATIA V5R20

Based on the research, the results of the REBA grand score before the improvement and the REBA grand score after the improvement were obtained at the four workstations in the polypropylene production division of PT Harapan Sejahtera Karya Utama as follows.

Table 4. Recapitulation of REBA Score Before and After Improvement

Work station	REBA Score Before Improvement	REBA Score After Improvement	Explanation
Checking Raw Material	5	2	Reduction of the score by 3, resulting in action level from medium risk to low risk.
Material Transfer	11	3	Reduction of the score by 8, resulting in action level from very high risk to low risk
Material Cutting	5	2	Reduction of the score by 3, resulting in action level from medium risk to low risk.
Packaging	5	2	Reduction of the score by 3, resulting in action level from medium risk to low risk

4. CONCLUSION AND SUGGESTION

According to the calculations derived from the data processing of the Nordic Body Map (NBM) questionnaire, the predominant complaint among 19 workers in the polypropylene division is back pain, with a percentage of 58%, and waist of 47%, which is caused by unnatural work posture, and based on the results REBA scoring done manually and using Ergofellow 3.0 software didn't show any difference. The material transfer process has the highest REBA scoring value of 11 with a very high-risk level (action level) further investigation is needed, and improvements are needed now as

well. For the process of checking raw materials, cutting materials, and packaging, the risk value of the work posture is 5, where this value is the risk value (action level) of the posture, which is moderate and requires further investigation and immediate improvement. Then a proposal for improvement was made that obtained value from transfer materials, cutting materials, and packaging. The REBA score became 2 out of 5, so the risk level could change from the initial medium to a low-risk level. As for the material transfer process, where the REBA score becomes 3 out of 11 so the risk level can change from the initial very high-risk level to a low-risk level. Related to this, the company should pay attention to the safety and health of employees when doing a job, such as paying attention to the optimal work posture at work.

References

- Amaliah Usman, R. *et al.* (2022) 'Analisa Posisi Kerja Terhadap Resiko Kejadian Low Back Pain Pada Pengrajin Keramik Dinoyo', *Physiotherapy Health Science (PhysioHS)*, 4(1), pp. 22–26.
- Anggono, Y.P. *et al.* (2020) 'Pengaruh katalis zeolit alam pada pirolisis plastik polyethylene terephthalate dan polypropylene', *Jurnal Energi Dan Manufaktur*, 13(1), p. 22. Available at: <https://doi.org/10.24843/jem.2020.v13.i01.p04>.
- Anthony, M.B. (2020) 'Analisis Postur Pekerja Pengelasan Di CV. XYZ dengan Metode Rapid Entire Body Assessment (REBA)', *JATI UNIK: Jurnal Ilmiah Teknik dan Manajemen Industri*, 3(2), pp. 128–139. Available at: <https://doi.org/10.30737/jatiunik.v3i2.844>.
- Aras, A.F. *et al.* (2019) *Perancangan meja laptop portable yang ergonomis untuk penyandang cerebral palsy dengan pendekatan antropometri*, *Jurnal Inovator*. Available at: www.ojs.politeknikjambi.ac.id/index/inovator.
- Dewantari, N.M. (2020) *Resiko Ergonomi pada Pekerja Pemilab Sampah*, *Journal Industrial Services*.
- Dewi, N.F. (2020) 'IDENTIFIKASI RISIKO ERGONOMI DENGAN METODE NORDIC BODY Jurnal Sosial Humaniora Terapan', *osial Humaniora Terapan*, 2(2), pp. 125–134.
- Geovania Azwar, A. (2020) 'ANALISIS POSTUR KERJA DAN BEBAN KERJA DENGAN MENGGUNAKAN METODE NORDIC BODY MAP DAN NASA-TLX PADA KARYAWAN UKM UCONG TAYLOR BANDUNG', *Jurnal Techno-Socio Ekonomika*, 13(2).
- Handayani, L. *et al.* (2023) 'SOSIALISASI PENCEGAHAN NYERI PINGGANG DENGAN PENGENALAN POSISI ERGONOMIS DALAM KEGIATAN SEHARI-HARI', *Jurnal Kreativitas dan*

- Inovasi (Jurnal Keanova)*, 3(2), pp. 81–85. Available at: <https://doi.org/10.24034/keanova.v3i2.5321>.
- Hasanah, M. and . W. (2019) 'Pengaruh Postur Kerja Terhadap Keluhan Muskuloskeletal', *Gema Lingkungan Kesehatan*, 17(1), pp. 14–19. Available at: <https://doi.org/10.36568/kesling.v17i1.1047>.
- Haslindah, A. *et al.* (2021) 'Analisa Postur Kerja Operator Mesin Pembuatan Adonan Mie Menggunakan Metode REBA (Rapid Entire Body Assessment)', *Journal Industrial Engineering & Management (JUST-ME)*, 2(1), pp. 39–45. Available at: <https://doi.org/10.47398/just-me.v2i1.602>.
- Julian Firdaus, E. and Angga Sujarno, P. (2023) 'Penilaian Postur Tubuh Pekerja dan Perbaikan Sistem Kerja dengan Metode RULA dan REBA pada PT. Sharp Electronics Indonesia', *Jurnal Serambi Engineering*, VIII(2).
- Lesmawati, S. *et al.* (2022) 'Meminimalisir cedera otot pada pegawai keripik pare panineungan dengan metode ergonomi', 2(2), pp. 5134–5137.
- Lubis, Z.I. *et al.* (2021) 'Hubungan Resiko Posisi Kerja Duduk Terhadap Keluhan Musculoskeletal Disorders (MSD) Pada Pegawai Pemerintah Kabupaten Malang', *The Indonesian Journal of Ergonomic*, 07(01). Available at: <https://doi.org/10.24843/JEI.2021.v07.i01.p08>.
- Mindhayani, I. (2021) *Identifikasi Postur Kerja Bagian Pengelasan Dengan Pendekatan Ergonomi*, *Jurnal Teknik Industri*.
- Pratiwi, P.A., Widyaningrum, D. and Jufriyanto, M. (2021) 'ANALISIS POSTUR KERJA MENGGUNAKAN METODE REBA UNTUK MENGURANGI RISIKO MUSCULOSKELETAL DISORDER (MSDs)', *PROFISIENSI: JURNAL PROGRAM STUDI TEKNIK INDUSTRI*, 9(2).
- Purbasari, A. *et al.* (2019) 'ANALISIS POSTUR KERJA SECARA ERGONOMI PADA OPERATOR PENCETAKAN PILAR YANG MENIMBULKAN RISIKO MUSCULOSKELETAL', *Sigma Teknika*, 2(2), pp. 143–150.
- Salcha, M.A. and Arni Juliani (2021) 'Relationship between Work Posture and Symptoms of Musculoskeletal Disorders in Rice Farmers', *MIRACLE Journal Of Public Health*, 4(2), pp. 195–201. Available at: <https://doi.org/10.36566/mjph/vol4.iss2/260>.
- Shobur, S., Maksuk, M. and Sari, F.I. (2019) 'FAKTOR RISIKO MUSCULOSKELETAL DISORDERS (MSDs) PADA PEKERJA TENUN IKAT DI KELURAHAN TUAN KENTANG KOTA PALEMBANG', *Jurnal Medikes (Media Informasi Kesehatan)*, 6(2), pp. 113–122. Available at: <https://doi.org/10.36743/medikes.v6i2.188>.
- Tamala Adelia (2020) 'PENGUKURAN KELUHAN MUSCULOSKELETAL DISORDERS (MSDs) PADA PEKERJA PENGOLAH IKAN MENGGUNAKAN NORDIC BODY MAP (NBM) DAN RAPID UPPER LIMB ASSESSMENT (RULA)', *Jurnal TIN Universitas Tanjungpura*, 4(2), pp. 144–148.
- Tambun, M.S.M.O.S.S. (2019) 'PENGUNAAN METODE REBA UNTUK MENGETAHUI KELUHAN MUSCULOSKELETALDISORDER PADA PEKERJA SEKTOR INFORMAL', *JURNAL JIEOM*, 2(2), pp. 9–11.
- Teh, D. *et al.* (2022) 'Hubungan Gerakan Repetitif Terhadap Kejadian Carpal Tunnel Syndrome (CTS) Pada Pemetik The Relationship of Repetitive Movements To The Incidence Of Carpal Tunnel Syndrome (CTS) In Tea Leaf Pickers At Pt. Mitra Kerinci, South Solok Regency in 2021', *Jurnal Fisioterapi dan Rehabilitasi*, 6(1).
- Telaumbanua, M., Marbun, C. and Siboro, B.A.H. (2022) 'Perancangan Sistem Manajemen Keselamatan dan Kesehatan Kerja Pada Laboratorium Desain Produk dan Inovasi', *JISI: Jurnal Integrasi Sistem Industri*, 9(1), p. 47. Available at: <https://doi.org/10.24853/jisi.9.1.47-57>.
- Tiogana, V. and Hartono, N. (2020) 'Analisis Postur Kerja dengan Menggunakan REBA dan RULA di PT X', *Journal of Integrated System*, 3(1), pp. 9–25. Available at: <https://doi.org/10.28932/jis.v3i1.2463>.
- Utomo, C., Sulistiarini, E.B. and Putri, C.F. (2021) 'ANALISIS TINGKAT RESIKO GANGGUAN MUSCULOSKELETAL DISORDER (MSDs) PADA PEKERJA GUDANG BARANG JADI DENGAN MENGGUNAKAN METODE REBA, RULA, DAN OWAS', pp. F111–F117.
- Widitia Rizka, Entianopa and Hapis Abul Ainin (2020) 'Faktor Yang Berhubungan Dengan Keluhan Muskuloskeletal Pada Pekerja di PT. X Tahun 2019', *Scientific Periodical Journal of Public Health and Coastal Health*, 2(2), pp. 76–86.