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Literature Review: The Importance of Working Time Measurement in the Manufacturing Industry to Increase Company Productivity (Case in Indonesia)

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Abstract: This paper is an overview of the importance of working time measurement in the manufacturing industry to increase company productivity. The method used was the study of literature on articles, theses, and proceedings obtained through several search engines, including 9 from Google and 21 from Google Scholar. The criteria for national journals are accredited, published in 2012, and above. This research refers to the working time measurement paper which is devoted to the stopwatch time study method. The review conducted showed that more than 50% was used to determine the standard time or standard time. By the standard time, the company can determine the time needed to complete a production process, the optimal number of workers and work schedules as well as reduce the workload while saving costs because production is completed on time, and others.

Keywords: Working time measurement, manufacturing, stopwatch time study, productivity

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1. Introduction

Every company, including large, medium, and small scale companies, has a goal to make a profit. The size of the profit that will be obtained by the company is influenced by the way the company optimizes the workforce it has. Calculating productivity is very important considering it aims to determine the level of output of input in the production process. By knowing productivity, company management can plan the production factors needed in the production process and the amount of production within a certain time (Muzakir, 2018).

There are two types of activities carried out by the workforce, namely productive activities and non-productive activities. Productive work activities are activities carried out by skilled workers where workers can produce goods or services following the quality that has been set in a shorter time. In completing this work, the workforce is also given leeway for personal needs, for example relieving fatigue, discomfort, and others. Non-productive activities are working time activities that are used by employees incorrectly which will cause a waste of time, causing delayed production completion time. Non-productive time includes time spent idle, chatting, calling, and others (Aziria, 2017).

In the industrial world, working time is one of the important factors and needs attention for the production system. Working time plays a role in determining work productivity and becomes a benchmark for determining the best work method in completing a job. To compare the best work from the existing work methods, a standard time or standard time is needed as a reference for determining the best work method. According to Schroeder (2007), production standards are also often referred to as time standards. Formally, production standards can be defined as the amount of time required to carry out tasks or activities of trained employees who work at a normal speed with a predetermined method. Standard time is obtained from the measurement of working time. Measurement of working time can be done directly and indirectly. Direct measurement means that the observer will measure or record directly the time required by an operator to complete his work at his place of work. The indirect measurement meanwhile is that the observer does not have to always observe a job directly at the operator's place of work because the job has been conditioned (Ghozali, 2016).

The importance of measurement in every activity carried out by the company makes an accurate measurement method very much needed. Through accurate measurement methods, accurate information will be obtained on the time required and the efficiency of the movement of each activity to produce products. One of the methods used to measure time for activities used is the time and motion study method. This method can show an increase in the effectiveness of the time and movement of the resources used which will then be compared with the results achieved by the company (Septiyana, 2019). Measurement of working time, in this case, is done by using downtime, especially for short and repetitive work. According to the measurement results, a standard time will be obtained to complete a work cycle. The standard time will then be used as the standard time for completing a job for all workers who will carry out the same job (Wignjosoebroto, 2000).

Based on this description, this paper examines the important role of measuring working time with the stopwatch time study method which aims to increase work productivity in various manufacturing industries through a study of the existing literature in the last ten years.

2. Method

The method used in this research was a literature study in the form of articles, theses, and proceedings obtained through several search engines, including 9 from Google and 21 from Google Scholar. The criteria for the national journal used was accredited with the year published 2012 and above. This research was conducted by identifying the results obtained from past studies related to the importance of measuring working time in the manufacturing industry to increase company productivity. The method used for measuring working time was devoted to the stopwatch time study method. The journals obtained were industrial engineering journals and optimization journals.

3. Findings and Discussion

Through a search of national journals related to the processing of working time measurement tests using the Stopwatch Time Study method, 30 journal sources were obtained from various accredited publishers in Indonesia. These selected journal sources were then analyzed and investigated further to find out if there is an increase in productivity in the Manufacturing Industry after the work measurement test was carried out using the Stopwatch Time Study method.

Table 1. Journal of Working Time Measurement

No	Journal Title	Publication	No	Journal Title	Publication
1	Measurement of Employee Working Time at Toyota Workshop, PT. Dunia Barisa in Banda Aceh City	Optimization Journal	16	Analysis of Standard Time Calculation Using Stopwatch Time Method On Pulley Products in CV. Putar Mandiri Jakarta	PASTI Journal
2	Determination of Standard Time Using Stopwatch Time Study Method, Case Study in CV. Mans Group	Industrial Engineering Online Journal	17	Measurement of Pen Assembly Standard Time Using Stopwatch During Work Design Analysis Practicum	Journal of Education and Industrial Applications
3	Determination of Standard Time and Optimal Number of Workers in Batik Cap Production (Case Study: LKM Batik Saud Effendy, Laweyan)	Jati Undip: Journal of Industrial Engineering	18	Standard Time Measurement And Workload Analysis In The Filling and Packing Process Of Bath Scrub Products at PT. Gloria Orikita Cosmetics	Scientific Journal of Engineering and Innovation

4	Comparison of Standard Time Measurement With Stopwatch Time Study Method And Ready Work Factor (RWF) Method In Hand Insert Department PT. Sharp Indonesia	Trisakti Industrial Engineering Journal	19	Analysis of the standard time of work elements in the work of pasting cutting stickers in CV. Cahaya Thesani	Journal of Energy and Manufacturing
5	Measurement of Standard Time for Finishing Line Volpak Production of Lannate Sp 25 Grams Philippines to Increase Productivity (PT. Dupont Agricultural Products Indonesia)	Journal Knowledge Industrial Engineering	20	Calculation of Standard Time With Various Product Variations at PT. X	Tirta Journal
6	Measurement of Standard Time for Garuda Indonesia Aircraft Component Assembly Work Station Temperature Control Valve (TCV) Using the Stopwatch Method at PT. GMF Aeroasia	IENACO National Seminar	21	Work Measurement Analysis Using the Stopwatch Time Study Method	National Seminar on Technology and Engineering (SENTRA)
7	Measurement of Working Time Standards to Determine the Optimal Number of Workers	Wahana Inovasi	22	Worker Productivity Analysis Using Time and Motion Study Method (PT. Astra Honda Motor Palembang)	INTEGRATION: Scientific Journal of Industrial Engineering
8	Evaluation of Working Time Measurement Using the Time Motion Study Method at the Final Inspection Division of PT. Gajah Tunggal Tbk	Technical Journal: University of Muhammadiyah Tangerang	23	Proposed Standard Time Determination for Tetoron Rayon Fabric Folding Packing Operators Using the Stopwatch Method	INTENT Journal: Integrated Journal of Industry and Technology
9	Measurement of Work Station Standard Time On Sio Type Pipe Using Stopwatch Method At Pt. XYZ	IDEC National Seminars and Conferences	24	Analysis of Polyester Pre-drawing Operator Standard Time To Compare Stopwatch Method And M.O.S.T Method At PT. Apac Inti Corpora (Jln. Soekarno-Hatta Km 32 Bawen)	UMS Library

10	Measurement of Standard Time in the Process of Installing the LC Program Using the Stopwatch Method	Journal of Industrial Engineering Unrika	25	Determination of the optimal number of workers with a workload analysis approach (Case Study at PB Sri Tani)	Technoscientia Journal of Technology
11	Measurement of Working Time Based on Stopwatch Time Study and Occupational Health and Safety Analysis at the Tofu Factory Sukri Bukit Batrem Dumai	Journal of Industrial Engineering Design Application (ARTI)	26	Determination of Standard Time Using the Stopwatch Time Study Method of Manifold Production Process (Ud. Jaya Motor Pasuruan)	Journal of Knowledge Industrial Engineering (JKIE)
12	Work Measurement Planning in Determining Standard Time Using Time Study Method to Increase Work Productivity at Oil Pump Division PT. Bukaka Teknik Utama Tbk	Scientific Journal of Management Faculty of Economics (JIMFE)	27	Proposed Standard Working Time in the Production of Plain T-shirts Using the Stopwatch Time Study Method at Suckseed Konveksi Tasikmalaya	Galuh Industrial Student Journal
13	Analysis of Standard Time and Number of Workers Based on Workload at Pt XYZ Packing Department	CIEHIS Proceedings	28	Standard Time Analysis for Making 2 Inch Pvc Elbow Fittings With Stopwatch Time Study Method	JENIUS: Journal of Applied Industrial Engineering
14	Time Measurement of Water Meter Product Assembly Work Stations With Stopwatch Method at PT. Multi Instrumentasi	Proceedings of SNST Faculty of Engineering	29	Analysis of Working Time Measurement With Stopwatch Time Study To Increase Production Targets at PT. XYZ	Juminten: Journal of Industrial Management and Technology
15	Determination of Standard Time Measurement of Wire Connector Checks On Out Going Check Using the Stopwatch Method	Journal of Creative Industries (JIK)	30	Determination of the optimal number of workers through the measurement of standard time using the Stopwatch Time Study Method in the Making of Press Brick (Case Study Ud. Tiga Setangkai, Nagan Raya Regency)	Optimization Journal

Many problems are common in the manufacturing industry. One of the common problems in production delays. Afiani (2017) tries to test this problem by calculating the standard time based on the SWTS (Stopwatch Time Study) method to measure the length of time ITC products are made. After calculating SWTS,

it is known that the standard time for the ITC manufacturing process is 4244.5 seconds or 70.7417 minutes per product.

In another study, Muzakir (2018) examined the Measurement of Working Time for Toyota Workshop Employees at PT. Dunia Barusa in Banda Aceh City to analyze the level of employee performance in the car oil change process at the PT. Dunia Barusa. The test shows that the standard time required to complete the car oil change process is 14.61 minutes. The number of standard operators in this workshop is 2 people.

Ghozali (2016) examined the most common sources of waste in the industry in his study "Measurement of the Standard Time for the Finishing Line Process of Volpak Production of Lannate Sp 25 Grams of the Philippines to Increase Productivity (PT. Dupont Agricultural Products Indonesia)." According to the findings of his investigation, the standard time for the finishing procedure before the research was 22.4384 seconds, with a total of 7 operators working. Following the investigation, the standard time for the completing process was reduced to 21.3844 seconds. In this situation, the number of operators is six. The standard time for the finishing procedure fell by 1,054 seconds as a result of this measurement or the efficiency increased by 4,6973 %. A similar study was also carried out by Purbasari (2020) which was aimed at measuring the standard time of the IC program installation process to the PCB using the stop clock method. Data were collected 10 times for 4 work stations (SK) with research subjects consisting of 4 male operators.

Damayanthi's study (2020) aims to produce the proper time in the manufacture of SIO type pipes, ensuring that the product reaches the customer on time. The stopwatch time study is the method used to calculate the standard time. The cycle time was found to be 5.56 hours after data processing for up to 8 observations. The normal time was 5.67 hours when the rating factor was taken into account, whereas the standard time was 6.42 hours when the allowance was taken into consideration.

Saputra's research (2021) on "Measurement of Working Time Based on Stopwatch Time Study and Occupational Health and Safety Analysis at the Tofu Factory Sukri Bukit Batrem Dumai", found that the completion time for 5 work elements was calculated as many as 8 trials with a standard deviation of the average price distribution. the subgroup mean was 0.32 seconds. This stage is followed by a data uniformity test and gives the result that the data is uniform with the data that has been taken. Researchers conducted this data processing using an accuracy level of 95% with a confidence level of 10%. That is, the researcher believes that the accuracy of data collection carried out on the measurement of working time from 5 work elements is 95%. Practice is carried out using 10% confidence which indicates that the researcher believes that only 10% of the observed data have errors/failures. The five elements of work are pouring dough, pouring water, inserting a steam pipe, expanding, and pouring water after the dough has risen. After the calculation, the results of the Standard time needed to complete one cycle of boiling tofu are 507.03 seconds or 8.45 minutes with details of 4.88 seconds for pouring dough, 7.4 seconds for pouring water, 2.03 seconds for entering the steam pipe, 485 seconds for the dough to rise and 7.85 seconds for pouring water after the dough has risen.

Widagdo's research (2018) discusses the Analysis of Standard Time Calculation Using the Downtime Method on Pulley Products at CV. Putra Mandiri Jakarta. This study tries to find the calculation of the standard production time to produce the right time to deliver goods (MTO) to customers to prevent waiting lists. There are 6 work elements examined in the study, which include measurement, machining, welding, finishing, painting, and installation of rubber lagging. The difference between the largest and smallest rating factor is 0.13 which is obtained from the finishing section of 0.33 and 0.2 from the welding section. The difference between the largest and smallest normal time is 70.84 which is obtained from the largest normal time in the painting section (72 minutes), while the measurement section on the left and right covers is 1.16 minutes. In this study, the author can determine the difference between Allowance and the amount of difference in the standard time of the entire Pulley production process. The difference between the largest and the smallest Allowance is 30% which is obtained from the Painting section by 67% and from the rubber lagging section by 37%. The difference between the largest and smallest normal time is 216.04 which is obtained from the largest time in the painting section, which is 218.18 minutes, and the smallest standard time in the measurement section on the left and right covers, which is 2.14 minutes.

Working time measurement not only serves to identify the standard time used in the manufacturing process. Sari (2020) did observations to learn about the workload that workers face. Observations were made at the Purbasari bath scrubs filling and packing sector, where working time data was acquired utilizing downtime and Westinghouse as an adjustment tool. The study included 7 work parts, 10 subgroups, and 6 measurements (placing the pot into the spa machine's mole, closing the pot, adding a shrink label, installing a cap seal, inspecting the shrink label and cap seal, inspecting the sterilizing results, inserting it into a master box). According to the calculation of standard time, it was obtained a workload of less than 100% which covers the process of closing the pot, installing the shrink label, and installing the capital. In this process, one operator

was deducted each, while in the shrinking process inspection process, an excessive workload was found which reached 114%. For this reason, this inspection process requires overtime.

Based on the many publications mentioned above, it is clear that measuring working time may solve a variety of difficulties in the manufacturing industry. Working time measurement can significantly improve industrial productivity by determining the time required to complete a production process, determining the optimal number of workers, determining an effective work schedule, analyzing workloads, and reducing costs because production is completed on time, among other things.

4. Conclusion

Every manufacturing industry relies heavily on the measurement of working time. A stopwatch time study, which is performed briefly and repeatedly on a job, is one approach of directly measuring working time. According to a review of 30 literature studies on the direct measurement of working time in the manufacturing industry, standard time is employed in more than half of the cases. The organization can utilize standard time to determine the time it takes to complete a manufacturing process, the appropriate number of people, work schedules, reduce workloads, and save money since production is completed on time, among other things.

References

1. Purbasari, dan Reginaldi. (2020). Pengukuran Waktu Baku Pada Proses Pemasangan IC Program Menggunakan Metode Jam Henti *(Measurement of Standard Time in the Installation Process of the IC Program Using the Downtime Method), Jurnal Teknik Industri Unrika,* 8(2), 116-128
2. Afiani, R. dan D. Pujotomo. (2017). Penentuan Waktu Baku Dengan Metode Stopwatch Time Study Studi Kasus CV.Mans Group *(Determination of Standard Time Using the Stopwatch Time Study Method Case Study CV. Mans Group), Industrial Engineering Online Journal*, 6(1).
3. Ardian, I. K., Mulyono, K., & Nurjanah, S. (2020). Analisis Waktu Standar Pembuatan Fitting Elbow Pvc D 2 Inch Dengan Metode Stopwatch Time Study *(Standard Time Analysis for Making 2 Inch Pvc D Elbow Fittings With the Stopwatch Time Study Method). Jenius: Jurnal Terapan Teknik Industri*, 1(2), 67-76.
4. Aziria, S. (2017). Penentuan Waktu Baku untuk Menentukan Produktifitas Karyawan di Perusahaan Tas CV.A'tilyo Andalas Prima *(Determination of Standard Time to Determine Employee Productivity at CV.A'tilyo Andalas Prima Bag Company)*. Skripsi. Teknik Industri, Sekolah Tinggi Teknologi Industri, Padang.
5. Bellina, S., & Widharto, Y. (2019). Analisis Waktu Baku dan Jumlah Pekerja Berdasarkan Beban Kerja pada PT XYZ Bagian Packing *(Analysis of Standard Time and Number of Workers Based on Workload at PT XYZ Packing Section). CIEHIS Prosiding*, 1(1), 18-24.
6. Bora, M. A., & Kamariah, T. (2020). Penentuan Pengukuran Waktu Baku Pemeriksaan Wire Connector Pada Out Going Check Menggunakan Metode Jam Henti *(Determination of Standard Time Measurement of Wire Connector Checks On Out Going Check Using the Downtime Method). Jurnal Industri Kreatif (JIK)*, 4(01), 57-62.
7. Cahyawati, A. N. (2018). Analisis Pengukuran Kerja Dengan Menggunakan Metode Stopwatch Time Study *(Work Measurement Analysis Using the Stopwatch Time Study Method). In Prosiding SENTRA (Seminar Teknologi dan Rekayasa)*, 4, 106-112, FT UMM, Malang
8. D. Septiyana, dan Mahfudz. (2019), Evaluasi Pengukuran Waktu Kerja Dengan Metode Time Motion Study Pada Divisi Final Inspection PT Gajah Tunggal Tbk (Evaluation of Working Time Measurement Using the Time Motion Study Method at the Final Inspection Division of PT Gajah Tunggal Tbk). *Jurnal Teknik: Universitas Muhammadiyah Tangerang,* 8(1), 42-50.
9. Damayanthi, H. dan S. Hidayat. (2020). Pengukuran Waktu Baku Stasiun Kerja Pada Pipa Jenis Sio Menggunakan Metode Jam Henti di PT. XYZ *(Measurement of Work Station Standard Time on Sio Type Pipe Using Downtime Method at PT. XYZ). Seminar dan Konferensi Nasional IDEC,* Prodi Teknik Industri UNS, Surakarta.
10. Fathurohman, N. (2020). Usulan Waktu Standar Kerja Pada Produksi Kaos Polos Menggunakan Metode Stopwatch Time Study Di Suckseed Konveksi Tasikmalaya *(Proposed Standard Working Time for Plain T-shirt Production Using the Stopwatch Time Study Method at Suckseed Convection Tasikmalaya). Jurnal Mahasiswa Industri Galuh*, 1(01), 31-40.
11. Fitriadi, F., Putra, G., & Abdullah, A. (2020). Penentuan Jumlah Tenaga Kerja Optimal Melalui Pengukuran Waktu Baku Dengan Menggunakan Metode Stopwatch Time Study Pada Pembuatan Batu Bata Press (Studi Kasus Ud. Tiga Setangkai Kabupaten Nagan Raya) *(Determination of the optimal number of workers through the measurement of standard time using the Stopwatch Time Study Method in the Making of Press Brick (Case Study Ud. Tiga Setangkai, Nagan Raya Regency). Jurnal Optimalisasi*, 4(2), 62-69.
12. Ghozali, M. W. dan M. Hermansyah. (2016). Pengukuran Waktu Baku Proses Finishing Line Volpak Produksi Lannate SP 25 Gram Philipina Guna Meningkatkan Produktivitas (PT. Dupont Agricultural Products Indonesia) (Measurement of Standard Time for Finishing Line Volpak Production of Lannate SP 25 Grams Philippines to Increase Productivity *(PT. Dupont Agricultural Products Indonesia). Journal Knowledge Industrial Engineering,* 3(3), 31-39

13. Krisnaningsih, E., Dwiyatno, S., & Sasongko, R. (2020). Usulan Penentuan Waktu Baku Pada Operator Packing Folding Kain Tetoron Rayon Dengan Metode Stopwatch *(Proposed Standard Time Determination for Tetoron Rayon Fabric Folding Packing Operators Using the Stopwatch Method). Jurnal Intent: Jurnal Industri dan Teknologi Terpadu*, 3(2), 67-81.
14. Lutfia, C. F., & Hidayat, S. (2018). Pengukuran Waktu Stasiun Kerja Perakitan Produk Meter Air dengan Metode Jam Henti Pada PT. Multi Instrumentasi *(Time Measurement of Water Meter Product Assembly Work Station with Downtime Method at PT. Multi Instrumentation)*. *Prosiding SNST Fakultas Teknik*, 1(1), FT Unwahas, Semarang.
15. Masruri, A. A., Hastarina, M., & Lavender, P. (2017). Analisis Produktivitas Pekerja Dengan Menggunakan Metode Time And Motion Study (PT. Astra Honda Motor Palembang) *(Worker Productivity Analysis Using Time And Motion Study Method (PT. Astra Honda Motor Palembang)..Integrasi: Jurnal Ilmiah Teknik Industri*, 2(1), 1-7.
16. Muzakir, H. T. Irawan, dan I. Pamungkas. (2018). Pengukuran Waktu Kerja Karyawan Bengkel Toyota PT. Dunia Barusa di Kota Banda Aceh *(Measurement of Working Time Toyota Workshop Employees PT. New World in Banda Aceh City). Jurnal Optimalisasi,* 4(1), E.ISSN: 2502-0501.
17. Pradana, A. Y., & Pulansari, F. (2021). Analisis Pengukuran Waktu Kerja Dengan Stopwatch Time Study Untuk Meningkatkan Target Produksi Di Pt. Xyz *(Analysis of Working Time Measurement With Stopwatch Time Study To Increase Production Targets At Pt. Xyz). Juminten*, 2(1), 13-24.
18. Rahayu, M., & Juhara, S. (2020). Pengukuran Waktu Baku Perakitan Pena Dengan Menggunakan Waktu Jam Henti Saat Praktikum Analisa Perancangan Kerja. Pendidikan Dan Aplikasi Industri *(Measurement of Pen Assembly Standard Time Using Downtime Hours During Work Design Analysis Practicum. Education And Industrial Applications) (UNISTEK)*, 7(2), 93-97.
19. Rahma, M. dan A. J. Pratama. (2019). Pengukuran Waktu Baku Stasiun Kerja Perakitan Komponen Pesawat Garuda Indonesia *Temperature Control Valve* (TCV) Menggunakan Metode Jam Henti Pada PT. GMF Aeroasia *(Measurement of Standard Time for Garuda Indonesia Aircraft Component Assembly Work Station Temperature Control Valve (TCV) Using the Downtime Method at PT. GMF Aeroasia). Seminar Nasional IENACO,* Prodi Teknik Industri UMS, Surakarta.
20. Rinawati, D. I., D. P. Sari, dan F. Muljadi. (2013). Penentuan Waktu Standar Dan Jumlah Tenaga Kerja Optimal Pada Produksi Batik Cap (Studi Kasus: IKM Batik Saud Effendy, Laweyan) *(Determination of Standard Time and Optimal Number of Workers in Batik Stamp Production (Case Study: IKM Batik Saud Effendy, Laweyan). Jati Undip: Jurnal Teknik Industri*, 7(3), 143-150, https://doi.org/10.12777/jati.7.3.143-150.
21. Rizani, N. C., D. M. Safitri, dan P. A. Wulandari. (2012). Perbandingan Pengukuran Waktu Baku dengan Metode *Stopwatch Time Study* dan Metode *Ready Work Factor* (Rwf) Pada Departemen Hand Insert PT. Sharp Indonesia (Comparison of Standard Time Measurement with Stopwatch Time Study Method and Ready Work Factor (Rwf) Method in the Hand Insert Department of PT. Sharp Indonesia). *Jurnal Teknik Industri,* 2(2), 127-136
22. Rully, T., & Rahmawati, N. T. (2015). Perencanaan Pengukuran Kerja Dalam Menentukan Waktu Standar Dengan Metode Time Study Guna Meningkatkan Produktivitas Kerja pada Divisi Pompa Minyak PT Bukaka Teknik Utama Tbk *(Work Measurement Planning in Determining Standard Time Using Time Study Method to Increase Work Productivity at the Oil Pump Division of PT Bukaka Teknik Utama Tbk). JIMFE (Jurnal Ilmiah Manajemen Fakultas Ekonomi),* 1(1), 12-18.
23. Saputra, J., Hafrida, E., & Musri, M. (2021). Pengukuran Waktu Kerja Berbasis Stopwatch Time Study Dan Analisis Keselamatan Kesehatan Kerja Pada Pabrik Tahu Sukri Bukit Batrem Dumai *(Measurement of Working Time Based on Stopwatch Time Study and Occupational Health and Safety Analysis at the Tofu Factory Sukri Bukit Batrem Dumai). Jurnal ARTI (Aplikasi Rancangan Teknik Industri)*, 16(1), 86-93.
24. Sari, E. M., & Darmawan, M. M. (2020). Pengukuran Waktu Baku Dan Analisis Beban Kerja Pada Proses Filling Dan Packing Produk Lulur Mandi Di Pt. Gloria Origita Cosmetics *(Standard Time Measurement And Workload Analysis In The Filling And Packing Process Of Bath Scrub Products At Pt. Gloria Orikita Cosmetics). Jurnal Asiimetrik: Jurnal Ilmiah Rekayasa & Inovasi*, 2(1), 51-61.
25. Schroeder, R. G. (2007). *Manajemen Operasi: Pengambilan Keputusan dalam Suatu Fungsi Operasi Jilid 1. Edisi Ketiga*. Jakarta: Erlangga.
26. Septiyana, D. dan Mahfudz. (2019). Evaluasi Pengukuran Waktu Kerja Dengan Metode Time Motion Study Pada Divisi Final Inspection PT Gajah Tunggal Tbk *(Evaluation of Working Time Measurement Using the Time Motion Study Method at the Final Inspection Division of PT Gajah Tunggal Tbk). Jurnal Teknik* Universitas Muhammadiyah Tangerang, 8(1), 42-50.
27. Setyawan, D. (2012). Analisis Waktu Baku Operator Predrawing Polyester Untuk Membandingkan Metode Jam Henti Dan Metode MOST Di PT. Apac Inti Corpora (Jln. Soekarno-Hatta Km 32 Bawen) *(Analysis of Polyester Predrawing Operator Standard Time To Compare Downtime Method And MOST Method At PT. Apac Inti Corpora (Jln. Soekarno-Hatta Km 32 Bawen)).* Doctoral dissertation, Universitas Muhammadiyah Surakarta.
28. Sukania, I. W., & Gunawan, T. (2014). Analisa Waktu Baku Elemen Kerja pada Pekerjaan Penempelan Cutting Stiker di CV Cahaya Thesani *(Analysis of the Standard Time of Work Elements on the Job of Paste Cutting Stickers at CV Cahaya Thesani). Jurnal Energi Dan Manufaktur*, 7(2), 119-224.
29. Susanti, E., Palit, H. C., & Aysia, D. A. A. Y. (2015). Perhitungan Waktu Baku dengan Berbagai Variasi Produk di PT X *(Calculation of Standard Time with Various Product Variations at PT X). Jurnal Titra,* 3(2), 303-310.

30. Tarigan, M. I. (2015). Pengukuran Standar Waktu Kerja Untuk Menentukan Jumlah Tenaga Kerja Optimal *(Measurement of Working Time Standards to Determine the Optimal Number of Workers). Wahana Inovasi,* 4(1), ISSN: 2089-8592.
31. Wahid, A., & Chumaedi, A. (2020). Penentuan Waktu Baku dengan Metode Stopwatch Time Study Proses Produksi Manifold (UD. Jaya Motor Pasuruan) *(Determination of Standard Time with Stopwatch Time Study Method for Manifold Production Process (UD. Jaya Motor Pasuruan)). JKIE (Journal Knowledge Industrial Engineering)*, 7(2), 54-60.
32. Widagdo, G. U. Analisis Perhitungan Waktu Baku Dengan Menggunakan Metode Jam Henti Pada Produk Pulley Di CV. Putra Mandiri Jakarta *(Analysis of Standard Time Calculation Using Downtime Method On Pulley Products In CV. Putra Mandiri Jakarta). Jurnal PASTI* . Volume XII No, 1, 119-136.
33. Wignjosoebroto. (2000). *Ergonomi Studi Gerak dan Waktu: Teknik Analisis untuk Meningkatkan Produktivitas Kerja*. Jakarta : PT.Gunawidya.
34. Yunanta, A. L., & Darajatun, R. A. (2021). Penentuan Jumlah Tenaga Kerja Optimal Dengan Pendekatan Workload Analysis (Studi Kasus Di Pb. Sri Tani) (*Determination of the optimal number of workers using a workload analysis approach (a case study in Pb. Sri Tani)). Jurnal Teknologi Technoscientia*, 13(2). 158-164.

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