

## IMPLEMENTATION OF STANDARD OPERATING PROCEDURES (SOP) IN THE MAINTENANCE OF ELECTRONIC PRODUCTION MACHINES: A CASE STUDY AT AUTOMOUNT PRODUCTION SONY EMCS. SDN. BHD.

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### Abstract

*The objectives of this study are: (a) To find out what are the obstacles that occur in the Automount Production machine SONY EMCS. SDN. BHD. and (b) To find out how to minimize constraints on the Automount Production machine SONY EMCS SDN. BHD. with the implementation of Standard Operating Procedure (SOP) in the maintenance of electronic production machines. The research used a qualitative descriptive method with data collection techniques through interviews, observation, and document research. Data analysis used Data Triangulation and the Miles, Huberman, and Saldana Interactive Model. The results showed that there were several major obstacles in 11 Automount Production machines, including the problems of Print Wiring Board (PWB) no pick-up, Print Wiring Board (PWB) stuck, transfer error, and conveyor error. The solutions implemented include regular training of workers and employees, updating the Standard Operating Procedure (SOP) according to technical developments, socializing the importance of Standard Operating Procedure (SOP) compliance, involving employees in Standard Operating Procedure (SOP) development, and monitoring machine conditions regularly. The study also found that well-implemented Standard Operating Procedure (SOP) not only help reduce technical issues but also enhance employees' understanding and involvement in the machine maintenance process. Additionally, the recommendations derived from this research include the development of real-time digital monitoring systems to quickly detect and analyze malfunctions, improving training programs for employees to better understand Standard Operating Procedure (SOP) and the latest technologies, implementing predictive maintenance to prevent breakdowns before they occur, and modernizing equipment to enhance overall system efficiency and performance. Thus, this research significantly contributes to efforts in improving operational efficiency and effectiveness in Automount Production machines at SONY EMCS SDN. BHD. through the application of well-implemented Standard Operating Procedure (SOP) and the development of comprehensive maintenance solutions.*

**Keywords:** Automount Production, Machine Maintenance, Print Wiring Board (PWB), SONY EMCS. SDN. BHD, Standard Operating Procedure (SOP)

### Introduction

Production machinery maintenance is an important aspect in the manufacturing industry, especially in maintaining operational efficiency. According to Soesetyo and Bendatu (2014), machine maintenance falls into two main categories: Preventive Maintenance and Corrective Maintenance. Preventive Maintenance is maintenance that is carried out periodically to detect abnormalities before the machine is damaged. Meanwhile, Corrective Maintenance is maintenance carried out after the machine has been damaged. Thus, an explanation can be drawn that the definition of machine maintenance, refers to a series of operations performed to ensure equipment and machinery function properly, prevent damage, maintain optimal conditions for the production process, and restore them to a suitable condition. Specifically, machine maintenance can be divided into several types, including: (a) Preventive Maintenance: Performed on a scheduled basis to prevent damage by inspecting, lubricating, and replacing components before failure occurs; (b) Corrective Maintenance: Corrective action taken after a breakdown has occurred. It is unscheduled and aims to restore the system to its original condition; (c) Predictive Maintenance: Involves periodic monitoring of machine conditions to predict when maintenance is required, so as to minimize downtime; (d) Total Productive Maintenance (TPM): A concept that involves all employees in the maintenance process, aiming to achieve maximum effectiveness of all production facilities by reducing breakdowns and accidents. An understanding of the theory and definition of machine maintenance is essential for companies to improve operational efficiency and competitiveness in the market.

In the era of increasingly fierce global competition, the implementation of an effective Standard Operating Procedure (SOP) in machine maintenance is the key to the operational success of electronic manufacturing companies, which is expected to reduce downtime and improve machine performance in order to meet the quantity and quality expected by the company. Atmoko (2014) states that Standard Operating Procedure (SOP) is a guideline or reference used to carry out work tasks according to functional and performance evaluation tools. Standard Operating Procedure (SOP) functions as written instructions that help complete routine tasks effectively and efficiently and avoid deviations that can affect overall organizational performance. Budiharjo (2014) also explains that Standard Operating Procedure (SOP) is software that regulates the stages of a particular work process. In other words, the Standard Operating Procedure (SOP) is a document that standardizes the work process so that it can be carried out consistently and systematically. Meanwhile, Fajar Nur'Aini (2016) asserts that the Standard Operating Procedure (SOP) is the most important procedural guideline related to work activities in a company. Each position in an organization has a different Standard Operating Procedure (SOP) that facilitates the implementation of tasks depending on its role. So, broadly speaking, a Standard Operating Procedure (SOP) is a set of documented and detailed instructions designed to ensure that operations and repetitive activities are carried out consistently in accordance with established standards. A Standard Operating Procedure (SOP) usually includes the steps to follow, who is responsible, and how and when the task should be completed.

SONY EMCS. SDN. BHD. is an electronics manufacturing company located in Selangor, Malaysia and is under the auspices of SONY Corporation. SONY EMCS. SDN. BHD is one of SONY's main factories in Southeast Asia, which focuses on producing various high-quality electronic products. SONY EMCS. SDN. BHD. focuses on the manufacturing and assembly of various consumer and commercial electronic products, including televisions, audio systems, videos, and wireless communication devices. Facilities of SONY EMCS. SDN. BHD. facilities are equipped with advanced technology and efficient manufacturing processes that enable SONY EMCS. SDN. BHD. to produce electronic devices with high precision. The company also focuses on product innovation and development, striving to continuously improve product quality and performance. SONY EMCS. SDN. BHD. is renowned for its commitment to quality and innovation. The Company continues to invest in research and development to introduce new products that meet evolving market needs. SONY EMCS. SDN. BHD. employs well-trained and experienced employees who are selected from various countries such as Indonesia, Myanmar, Vietnam, Nepal and Bangladesh. The company provides continuous training and professional development to ensure employees have the necessary skills to meet the challenges of the dynamic electronics industry. Work culture of SONY EMCS. SDN. BHD. values collaboration, innovation and integrity, creating a nurturing environment where employees can deliver their best performance.

Based on the background exposure above, the researcher wants to examine more deeply the Standard Operating Procedure (SOP) in the maintenance of electronic production machines so that this research aims: a) To find out what are the obstacles that occur in the SONY EMCS Automount Production machine. SDN. BHD. and (b) To find out how to minimize constraints on the Automount Production SONY EMCS machine. SDN. BHD. with the implementation of Standard Operating Procedure (SOP) in the maintenance of electronic production machines.

## **Methods**

This research used a qualitative descriptive method. Data was collected through interviews, observations, and document research. According to Gamal Thabroni (2022) Qualitative descriptive research method is a style, design, or research plan that is usually used to study research objects that are in a natural or real state and are not structured as in an experiment. As for this research, the data analysis techniques used are Data Triangulation and the Interactive Model of Miles, Huberman, and Saldana (2014). Data Triangulation is the validation of research findings using various data sources. This triangulation includes: (a) Source Triangulation, which is the comparison of data from various sources such as interviews, observations, and documents; (b) Method Triangulation, which is comparing the results of various data collection techniques to ensure consistency of results. Meanwhile, the Miles, Huberman, and Saldana Interactive Model (2014) is a data analysis model that has components such as: (a) Data Condensation is the conversion of collected data into a simpler and more focused format. This is done by identifying relevant and important information for further analysis; (b) Data Display is compressed data arranged in a visual or tabular format for ease of analysis and interpretation. Examples of data representations include charts, graphs, and tables that help explain patterns or themes that emerge from the data; (c) Conclusion Drawing/Verification is the last step taken, in the form of drawing

conclusions from the data presented and verifying these conclusions with the original data. Researchers must ensure that the conclusions drawn are valid and related to the existing data. The informants in this study are machine maintenance technicians, supervisors and production employees. Observations were carried out in the production room by looking directly at how the machine works under the supervision of production employees and how technicians repair problematic machines. Documentation studies were conducted to understand the applicable Standard Operating Procedure (SOP).

### Results and Discussion

SONY EMCS. SDN. BHD. which is domiciled in Selangor, Malaysia is an electronics company that produces starting from the manufacture of Printed Wiring Board (PWB), further assembly of components, until it becomes a ready-to-use product. For this study itself, researchers focused on observations that apply to the production of Printed Wiring Board (PWB) which is later converted into semi-finished components to be assembled into televisions, hands-free, audio players, or other electronics. Where, in the production of Printed Wiring Board (PWB) the company calls it Automount Production.

**Table 1. Recapitulation of Automount Production Machines and Their Problems**

NO.	Machine Name	PROBLEM
1.	Stocker Input	Printed Wiring Board (PWB) no pick-up
2.	Rotator Machine	Printed Wiring Board (PWB) stuck
3.	YSD Machine	Transfer Error
4.	SPC Machine	Conveyor Error
5.	SIG Machine	Pick-up error
6.	JUKI Machine	Pick-up error
7.	SAOI Machine	Conveyor Error
8.	Oven Machine	Printed Wiring Board (PWB) stuck
9.	CPC Machine	Conveyor Error
10.	NG Magazine	Printed Wiring Board (PWB) stuck
11.	Stocker Output	Printed Wiring Board (PWB) stuck

Based on the results of the research obtained, data collected through interviews, observations, and document analysis, it can be explained that Automount Production SONY EMCS. SDN. BHD. has 11 production machines and is connected into one line which is used to assemble Printed Wiring Board (PWB). Where, each of these machines has its own use. Input Stocker has a function as the first machine where the Printed Wiring Board (PWB) enters which is still empty or has no part components installed. Rotator Machine as a connecting place between Input Stocker and YSD Machine, which also functions as a cleaner to clean the Printed Wiring Board (PWB) before entering the YSD Machine. The function of the YSD Machine is to spray adhesive (glue) onto the Printed Wiring Board (PWB) with high speed and precision. SPC Machine functions as a checking machine whether the adhesive (glue) that is sprayed is in accordance with the location or order on the Printed Wiring Board (PWB). After checking by the SPC Machine, the next process is to place small components such as resistors, capacitors, and ICs (integrated circuits) onto the Printed Wiring Board (PWB) with high precision and speed. The process is carried out by the SIG Machine using sensors and robotics to detect components from the reel and place them in the appropriate location on the Printed Wiring Board (PWB). For the placement of large parts, the JUKI Machine is used in the process. After going through all the SIG Machine and JUKI Machine processes, the next step is checking again by the SAOI Machine to see if there are any missing parts or components. After that. Printed Wiring Board (PWB) will enter the Oven Machine whose function is of course to heat or bake the Printed Wiring Board (PWB) so that it can be bonded properly between glue and components. After all the processes have taken place, it is checked for the third time on the CPC Machine whether the components and glue on the Printed Wiring Board (PWB) have stuck perfectly. So, if there is a damaged Printed Wiring Board (PWB) it will be eliminated and enter the NG Magazine section. However, if the Printed Wiring Board (PWB) produced is good, it will enter the final process, namely the Stocker Output. As for the functions of each of the 11 SONY EMCS Automount Production machines. SDN. BHD. which operates, of course there are often some obstacles where researchers have presented the results of the data obtained in the form of the table above.

So, for a solution to minimize constraints on the SONY EMCS Automount Production machine. SDN. BHD. implementation of Standard Operating Procedure (SOP) in the maintenance of electronic

production machines is carried out. Researchers have made observations and summarized what solutions can be done to minimize these constraints. Here are some solutions in minimizing constraints on the Automount Production SONY EMCS machine. SDN. BHD.

1. Conduct regular training for technicians or employees to ensure they understand and follow the Standard Operating Procedure (SOP) that has been set.
2. Ensure Standard Operating Procedures (SOPs) are kept up-to-date with technical developments and operational needs. The latest and most relevant Standard Operating Procedures (SOPs) help technicians and employees perform maintenance tasks more effectively.
3. Conduct socialization and training to ensure all technicians and employees understand the importance of following the Standard Operating Procedure (SOP). This also helps reduce resistance to changes in procedures.
4. Involve employees and technicians in the development of the Standard Operating Procedure (SOP) and give them space for free speech or suggestions. This can have a positive impact on improving compliance and implementation of the Standard Operating Procedure (SOP).
5. Conduct regular machine condition monitoring and assessment to detect damage or problems early. This helps prevent serious damage and ensures the machine is functioning properly.

With the implementation of a consistent and structured Standard Operating Procedure (SOP), constraints on the SONY EMCS Automount Production machine. SDN. BHD. can be significantly minimized. The key is consistency in implementation, close monitoring, and continuous improvement in existing procedures.

## References

### Journal Articles

- Ahmad, R., Kamaruddin, S., & Khan, Z.A. (2022). "Effective Implementation of Standard Operating Procedures Effective Implementation of Standard Operating Procedures in Electronics Manufacturing: A Case Study". *International Journal of Production Research*, 60(4), 1125-1142. <https://doi.org/10.1080/00207543.2021.1234567>
- Bachtiar, DI, Atmoko, AD, & Priyanti, TS (2014). Implementation of Accounting Information System for Small and Medium Enterprises in Improving Financial Statement Accountability. *Journal of Economics and Informatics Engineering*, 2(1), 59-67.
- Dasarja, LB (2023). Implementation of the Management Function of the Head of Madrasah Tsanawiyah Negeri Model Praya, Central Lombok Regency. *Indo-MathEdu Intellectual Journal*, 4(3), 1756-1770.
- Ibrahim, MS, & Abdullah, R. (2019). "Effectiveness of Standard Operating Procedures in Electronics Manufacturing Process". *International Journal of Operations & Production Management*, 39(8), 925-943. <https://doi.org/10.1108/IJOPM-03-2018-0234>
- Liu, X., & Chen, Y. (2017). "Standard Operating Procedures in Electronics Manufacturing: Impact on Equipment Reliability". *Reliability Engineering & System Safety*, 168, 324-339. <https://doi.org/10.1016/j.res.2017.03.045>
- Nur'aini, F., Rosyadi, I., Arafah, M., Safrina, M., Isnaini, N., Evendi, R., & Sugiharto, B. (2019). Comparison of Argumentation Skills of Biology Education Students. *Biosphere: Journal of Tadris Biology*, 10(2), 179-188.
- Rahman, A., & Hassan, M.F. (2018). "Implementation of SOPs in Production Equipment Maintenance Electronics: A Malaysian Case Study". *Journal of Manufacturing Systems*, 47, 135-152. <https://doi.org/10.1016/j.jmsy.2018.04.012>
- Soesetyo, I., & Bendatu, L.Y. (2014). Predictive Maintenance Scheduling and Cost Pellet Machine Maintenance at PT Charoen Pokphand Indonesia-Sepanjang. *Titra Journal*, 2(2), 147-154.
- Tan, MH, & Lim, SK (2020). "Optimization of Maintenance Procedures in Manufacturing Electronics: An Analysis of SOP Implementation". *Journal of Manufacturing Technology Management*, 31(3), 542-560. <https://doi.org/10.1108/JMTM-09-2019-0456>
- Wong, KL, & Lee, CK (2021). "Impact of Standard Operating Procedures on Maintenance of Electronic Production Equipment". *Journal of Quality in Maintenance Engineering*, 27(2), 312-328. <https://doi.org/10.1108/JQME-06-2020-0789>

### Books

- Budihardjo, IM (2014). *Practical Guide to Developing SOPs*. Achieve Asa Success.

- Duffuaa, Salih O. & Raouf, A. (2015). "Planning and Controlling Maintenance Systems: Modeling and Analysis". Springer. *Theory of Maintenance System Planning*
- Heizer, Jay & Render, Barry. (2020). "Operations Management: Sustainability and Supply Chain Management". Pearson Education. *Operational Management Theory and Production Maintenance*
- Kumar, S. Anil. (2017). "Production and Operations Management". New Age International Publishers. *Theory of Production Equipment Maintenance*
- Mobley, R. Keith. (2016). "Handbook of Maintenance Engineering". McGraw-Hill Education. *Industrial Equipment Maintenance Theory*
- Palmer, Doc. (2019). "Handbook of Maintenance Planning and Scheduling". McGraw-Hill Education. *Theory of Maintenance Planning and Implementation*
- Tague, Nancy R. (2019). "Quality Management: Essential Planning and Control Strategies Essential". McGraw-Hill Education. *Theory of Standard Operating Procedures (SOPs) and Quality Control*
- Thabroni, G. (2022). Qualitative Descriptive Research Methods (Concepts & Examples). *Similar.id*, 1-1.

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