

**THE IMPORTANCE OF RELIABILITY OF MACHINE ON OPERATIONAL
IMPROVEMENT: A CASE STUDY**

JULIANA BINTI MD NOR

**BACHELOR DEGREE OF INDUSTRIAL TECHNOLOGY MANAGEMENT WITH
HONOURS
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JULIANA BINTI MD NOR

Thesis was submitted in fulfillment of the requirements
for the award of the degree of
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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Bachelor of Industrial Technology Management with Honours.

Signature :

Name of Supervisor : SUZIYANA BINTI MAT DAHAN

Position : LECTURER

Date :

STUDENT'S DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

Signature :

Name : JULIANA BINTI MD NOR

ID Number : PC12007

Date :

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ABSTRACT

The study investigated the measurement of machine reliability and determines the machine that need for improvement in Stationery Company in Kuantan. There is a need to show how reliability of machines could contributed to the overall operational objective the reliability of machine is closely related to the maintenance. Hence, the improvement method that initiated in Japan which is Total Productive Maintenance (TPM) was the essential method that being used by most industry. During this study, the time losses that were observed in the production for the first 5 working days in September 2015 were recorded and calculated the three main factors contributed to Overall Equipment Effectiveness (OEE). Three machines that regularly used in production is chosen. Based on this study, we knew that the machines need for improvement since the OEE recorded was lower than 85%. A more detailed data collection should be carried out for future research after the implementation of TPM in order to obtain more accurate result.

ABSTRAK

Kajian ini menyiasat pengukuran kebolehpercayaan mesin dan menentukan mesin yang perlu untuk penambahbaikan dalam syarikat alat tulis di Kuantan. Terdapat keperluan untuk membuktikan bagaimana kebolehpercayaan mesin boleh menyumbang kepada keseluruhan objektif operasi. Seterusnya, cara penambahbaikan yang bermula di Jepun iaitu Total Produktif Penyelenggaraan (TPM) adalah langkah yang perlu digunakan oleh setiap industry. Kerugian masa yang dapat diperhatikan dalam proses pengeluaran dalam tempoh 5 hari bekerja pertama pada September 2015 telah direkodkan dan tiga faktor utama yang menyumbang kepada Keseluruhan Keberkesanan Mesin (OEE) diukur. Berdasarkan kajian ini, didapati bahawa tiga mesin yang dipilih perlu untuk penambahbaikan oleh sebab OEE yang dicatatkan adalah lebih rendah daripada 85%. Satu koleksi data yang lebih terperinci perlu dijalankan untuk penyelidikan masa depan selepas pelaksanaan TPM untuk mendapatkan hasil yang lebih tepat.

CHAPTER 1

INTRODUCTION

Nowadays, markets were influenced by numerous customer need. The power of customer increase in which demand higher customer service level, higher quality, lower price and fast delivery time. Meanwhile, products life cycles were getting shorter. Accordingly, the manufacturing company has moved from labor industry to a high technology industry. A lot of changes in the internal environment of the organization were occurring with high utilization of automation and mechanical of operation such as robots, flexible manufacturing system (FMS), just-in-time concept (JIT) and automatic warehousing. Therefore, as the major component in manufacturing industry was associated with the utilization of machine, the reliability of machine should be considered as the first priority to maintain the effective production (Alshyouf, 2007).

Reliability of machine was the capability of an equipment, machine or system to maintain its specific function or task to fulfill the operational requirement. It was the machine's ability to operate it the production line without failure or breakdown. The mean time between failures (MTBF) normally used to indicate the probability of failure-free performance over machine cycle life or specific time frame (Douglas et al., 2011).

In recently decades various, barrier was encountered by manufacturing industry. This is due to great competition in the market and the era of globalization. Consequence, the product life cycle will become shorter, drastic changes in manufacturing technology and the various product demands. Machine was the most essential component in manufacturing industry. Even though, machine was becoming more advance and sophisticated, it also not

exempted from breakdown due to regularly usage and aging. The machine that regularly use without maintenance and aging deterioration will cause the major breakdown in the system and out of control .Next, the reliability of machine become low and will effects the production due date and the cost incurred to fix it. Therefore, concentrating on this arising problem was very crucial as the reliability of machine problem cannot be solved easily unless it was designed and planned specially (Houshyar et al., 2015).

The impact of the reliability of machine on operational performance had increased tremendously. Unplanned stoppage and breakdown during operation hour will lead to total output lost for the whole production period. It will not be replaced otherwise additional cost being certified for instances, overtime working. The role of machine's reliability cannot be denied as it performs its function in maintaining and improving the quality rate, performance rate and availability of the machine itself. Besides, machine's reliability ensures on time deliveries, highest total plant cost effectiveness and safety requirement in the operation. The disturbances like unplanned stoppage and breakdown in operation caused by maintenance and other will reduce productivity and profitability of the company. Moreover, this low machine's reliability would result in loss of productivity, failure in providing timely service to customers and might result in safety and environment issues that will give bad image to the company. Thus, there was a need to proof that the reliability of machines greatly contributed to the overall operational (Alsyouf, 2007; Houshyar et al., 2015).

The reliability of the machine was very essential as the main asset in an organization for production. The benefit of machines reliability includes maintaining and increasing the efficiency, performance, availability, quality product, total plant cost effectiveness, environment and safety requirement and ensure on-time deliveries. Every manufacture will face a problem regarding the machine such as a machine breakdown result from wrong usage and aging. However, these constraints should overcome unless it will lead to a low productivity, delay in time and poor customer satisfaction.

1.1 PROBLEM BACKGROUND

Machine reliability plays an importance role in attaining company's goals and objectives by improving productivity and return on investment of the company. Basically, maintenance has been regarded as less important activity that only incurred a high cost of money instead of producing profit by most organization's executives or stakeholders. This scenario is due to the blurred perception about its role in achieving company's goal and objectives (Enofe and Aimienrovbiye, 2010).

Machines were liable to deteriorate relatively the regularly usage and age. This scenario will results in higher production cost and low product quality. Normally, most manufacturing industries implemented preventive maintenance (PM) in the operation to avoid and control the usage and aging among machinery. Preventive maintenance includes scheduled downtime which is perform periodically as a set of tasks containing attributes like repair, cleaning, adjustment, inspection, replacement, lubrication and alignment. However, this practiced seem not enough to determine the root problem that effect on machines (Das et al., 2007).

The machine's breakdown caused the delays in operation which affect the production rates. Furthermore, its results in reducing the overall productivity of the manufacturing operation and scheduling issues. This scenario shows that the machine's reliability matter should be considered when operation being conducted (Das and Kader, 2011).

Reliability of machine was the major issues that must be aware of in manufacturing industries. It was the most important component that affects the manufacturing system's performances. The machine with low reliability will leads to the various problem in the operation. For instances, delays in production and scheduling breakdown problems. In other hand, the machine's reliability issues bring a different impact on different manufacturing situation. In highly automated mass production system, they were most