A Study of Application for Production Machine Operation Manufacturing Company in Indonesia

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Abstract

Effective use of machinery is an important element in maintenance performance in the company. There are several ways to measure effectiveness in machinery usage in the manufacturing industry. Among the parameters employed are times of production processes, capability in terms of production quantity and quality, and machinery's capacity to operate, which is looked at from an economic perspective. Machine operation failures often occur at manufacturing companies in Indonesia. Some of the causal factors are the frequency of machine breakdown due to long usage, cost consumed in machine maintenance, and incorrect application of production machinery. For that reason, the purpose of this study were to examine as to how far these factors are true for the manufacturing company in Indonesia namely is PTP 1 Nusantara, as well as to identify the application of production machinery at this company. The study developed concept model that the factors of production machine application. Machine application factor is the model to examine machine maintenance, which included machine operation efficiency. This model is developed to help the company in developing a more effective production system and strategies, consequently, affecting the study companies' performance. The research has been done by quantitative analysis. Based on gathered information, study results showed that oversights in machine application, it was found that there were also oversights in the machine maintenance system. This was because the machine applications at the companies haven't yet to be effective. This is evident from the analysis of data that domain machine condition in this company (min= 1.27), cost of maintenance (min= 1.38), cost of usage (min= 1.26), down time cost (min 1.76), production quantity (min= 1.58) machine maintenance system (min= 1.25). In order to avoid such problems, it is proposed that the company to improve their machine maintenance systems.

Keywords: Machine maintenance, cost of operational machine, machine operational effectiveness

1. Introduction

A productive company should have the capability of technological use, which includes operational capability, optimal supervision and maintenance of all types of technological components. These capabilities are vital for constant improvement of all activities and technological components, to ensure optimal profit while minimizing maintenance cost [4].

Failure in machine operations often occurs in several manufacturing companies in Indonesia. One of the causing factors of the companies' are incrused in maitening the machine and error in the application of production machines. The purpose of this research is to determine the cause of operational failure, develop a model for production machine application, and also test the suitability of the planned models with its application

2. Research Methodology

In order to find out the practices and strategic approaches used by the company being studied, a survey and interviews, as well as document collection was carried out. The company were chosen as research subjects that is PTP 1 Nusantara in Indonesia, a company manufacturing palm oil.

The study was conducted into those responsible for production machine operations/maintenance. In this study, the instrument utilized is a questionnaire consisting of 100 questions, which is categorized by six attributes. Data collected were then analyzed using descriptive and quantitative statistics.

The sequence of research methodology implemented, as proposed by [8], is as the following:
1. Analysis of machine
2. Analysis of employe
3. Analysis of operation cost
4. Analysis of materials
5. Analysis of production

From the study's analyses and interviews, the suitable development model was developed to aid the industry in generating production strategies and systems that are more effective and give an impact on the company performance. The model is the production machine application model.

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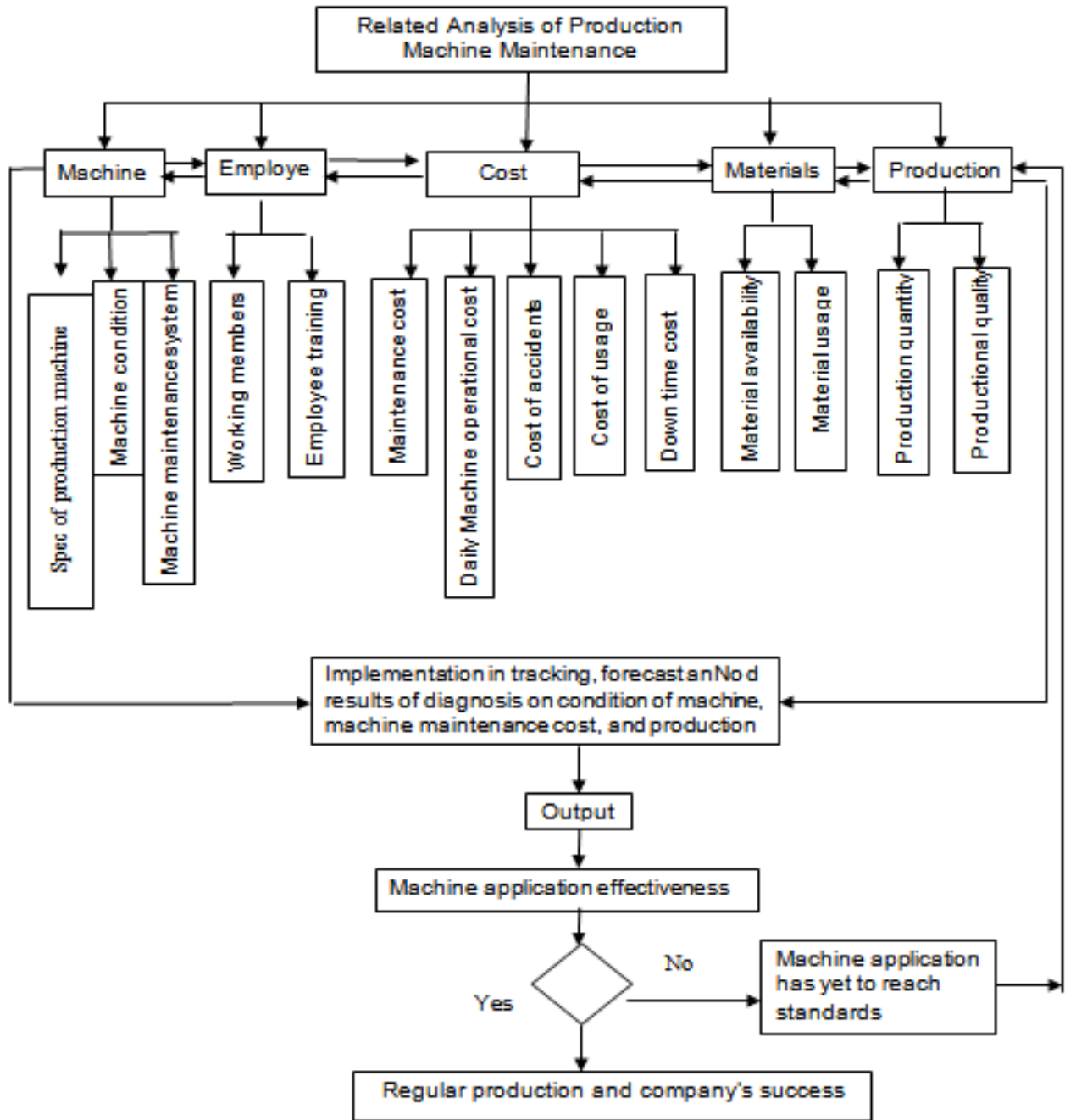 E-mail address: sukria_hanan@yahoo.com.

Fig. 1. Production Machine Application Model

For the machine application model (Fig. 1) to analyze machine maintenance, the parameters involved are assessments made on the machines, employees, cost, materials and production. Next, implementation in terms of tracking, forecast and results of diagnosis on the condition of the machine, cost, machine maintenance and results are carried out. By this analysis, it can be determined whether the machine application of a company is effective or otherwise. If ineffective, further study is needed to identify the cause – are there errors on the part of machine, employees, cost, materials or even the production itself?

The instrument used to analyze this machine application model is an interview carried out at the company being studied. These models is described in the Fig. 1.

Table 1

Interpretation average scores into five stages Likert scale (5 Likert)

Average Scores	Interpretation
1.00 to 1.89	Very Low
1.90 to 2.69	Low
2.70 to 3.49	Moderate
3.50 to 4.29	High
4.30 to 5.00	Very High

Table 2
The Production Machine Application

	Variables	PTP . Nusantara		
		MIN	SD	LEVEL
X1	**Machine Production**			
X1.1	Spec of Production Machine	3.98	.060	H
X1.2	Machine condition	1.27	.140	VL
X1.3	Machine maintenance system	1.25	.175	VL
X2	**Employe**			
X2.1	Working members	4.07	.089	H
X2.2	Employe training	4.05	.091	H
X3	**Cost**			
X3.1	Maintenance cost	1.38	.171	VL
X3.2	Daily maintenance operational cost	3.95	.113	H
X3.3	Cost of accident	3.89	.208	H
X4.4	Cost of usage	1.26	.176	VL
X3.5	Down time cost	1.76	.494	VL
X4	**Materials**			
X4.1	Material availiability	4.12	.143	H
X4.2	Material usage	4.55	.220	VH
X5	**Production**			
X5.1	Production quantity	1.58	.257	VL
X5.2	Production quality	4.95	.094	VH

VL = Very Low
L = Low
M = Moderate
H = High
VH = Very High

3. Result and Discussion

Results of data analysis showed that the machine aplication in the PT.P 1 Nusantara company's is: Analysis of data obtained from respondents through questionnaire, The data obtained so analyuzed using *Statistical Product for Service Solution (SPSS)"*. Descriptive statistics were used as Results of data analysis showed that the machine aplication in the PT.P 1 Nusantara companie's is:

Analysis of data obtained from respondents through questionnaire. The data obtained so analyuzed using min and standard deviation to describe the results of the descriptive analysis stage.

The results of the inference analysis also get a decision research to address the issues relating to the background of the problem and research objectives. All information obtained by the result of research decisions has been processed and analyzed in the form of table and is used to report the decion according to the research backround of problem, statistical inference used ANOVA analysis. The following shows the table of the interpretation average score into five stages Likert scale.

In Table 1 that indicate average scores and interpretation of value from 1.00 to 1.89, This means the interpretation has a very low. 1.90 to 2.69 is low. 2.70 to 3.49 is moderate, 3.50 to 4.29 is high, whereas a value 4.30 to 5.00 is very high. The following shows the results of descriptive applications in manufacturing production machinery PTP 1 Nusantara of five aspects: production machinery, employe in the company, the cost of production, materials and production. Analysis and

descriptions are described according to study issues. The result of the analysis are shown in Table 2:

Table 2 shows the descriptive applications include the production machine:

a) Domain production machines include specs of machine, machine condition and machine maintenance system. Specs of machine in PTP 1 Nusantara (min= 3.98) . This shows the specifications of the machine in the company PTP 1 Nusantara has a very good quality. Domain machine condition PTP 1 N (min=1.27). PTP 1 N production machine often damage. Whereas, machine maintenance system PTP 1 N (min= 1.25), It shows machine maintenance system in the company haven't yet to be effective.

b) Domain employee in a company with a high two stages namely working members and employee training. For employee traning domain, PTP 1 Nusantara (min= 4.05) are at high stage.

c) Domain production cost include the cost of maintenance machine, daily maitenance operational cost, cost of accident, cost of usage and down time cost. Cost of maintenance in company PTP 1 N (min=1.38) is at a very low stage. It shows that the total cost of machine maintenance are very much excluded because these companies often make improvments as a result of machine are often damaged. Within a few years ago at the company PTP 1 N, machine production occurs wear or other damage caused by metal fatigue so that the cost for machine maintenance program in a very large. Therefore, the total cost for machine maitenance program in PTP 1 N value is not in accordance with the company's budget. For domains

daily operating cost, PTP 1 N (min= 3.95). This was due in companies PTP 1 N many uses materials helper to operate machines in their daily company. Domain accident costs in the company.(min= 3.89). This means the company doesn't often happen accident. Domain cost of usage in the PTP 1 N company (min= 1.26) are very low stage. It shows that in the company PTP 1 N more using the cost of using to run the machine at the company's operation. Domain cost to failure machine operations (down time cost) in PTP 1N (min= 1.76) are at very low stage. This is due in the common enterprise machine down time as a result of damage to machine.

d) Domain material covers the supply of materials and the use of materials. The supply of materials in the company PTP 1 N (min=4.12) shows that the company have good material and achieve effective phase. Domain materials usage in the PTP 1 N company (min= 4.55), is at a very high stage . It shows the use of the material in the company has reached the stage of effectivve anyway.

e) Domain production includes production quantity and production quality. In the PTP 1 N companie's (min= 1.58) is at a very low stage, Realization of production quantity in the company PTP 1 N has not reached the budget by the company. Realization of palm oil production which doesn't reach the budget caused by prolonged machine down time due to frequent machine trouble. While the quality of production in PTP 1 N (min=4.95) . This means that the company has carried out maintaining the quality of production and the quality of the company's production has reached the level of effective.

4. Conclusion

Based on the data obtained, it was found that the machine application that there were errors in the machine maintenance system. The this case has been problem because of machine application not yet effective. The situation worsened when the machines need to be improvements must be made to the machine maintenance system.

The effectiveness application of machine will be advantageous to the company because the machine's productivity is better. The application of machine need to be improvement must be made because if not, they will cause various be losses in terms of the increased work needed on the machine, the drop in company's productivity due to delayed production time, product quality will be suffer, increase in the costs for spare parts and employees in the machine maintenance department, and machine damage that will ultimately result in the company to fulfill not the client's order of products.

The developed and pleased models are hoped to contribute to the company being studied, whereby it can be applied for the production machine operations. The developed models are intended to help the company to develop production strategies and system that are more effective. Which can give an impact on their performance.

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