

CHAPTER 1

INTRODUCTION



1.1 Background

1.1.1 Thai automobile industrial

Since late 1992, the demand of automobile in Thai market is on a path of rapid growth. Therefore, many automobile manufacturers in Thailand planned to increase their production. At the same time, the number of foreign car dealers and new entrants in the market increased as well. This made the competition in vehicle sales now become more intense.

In the case of Japanese cars which have continued to be the market leader for a long time, nowadays they are facing a problem of strengthening Japanese yen causing cars and parts imported from Japan more expensive. Hence, they have to find out ways to retain competition in the market. One is to improve their production efficiency and management effectiveness in the area of maintenance.

Since the process of automobile assembly is a continuous one, every machine is important. Breakdown of a single machine will affect the whole assembly process resulting in wasting of time and other resources. This makes the effective maintenance planning very necessary for preventing the breakdown of a machine.

1.1.2 Company under the study

X Company was established in 1962 to assemble, distribute and service the company's automobiles and parts. Now there are two manufacturing plants located at Samrong and Gateway. At Samrong plant, the yearly capacity is 150,000 units including various models of both pick-up and passenger car.

Although there are many models, all closely follow same processes. The main production processes are shown in the Figure 1.1 as following.

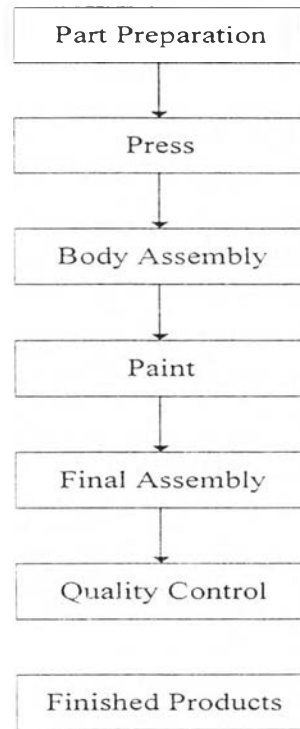


Figure 1.1 Car manufacturing process flow diagram.

The organization chart of the company is shown as following.

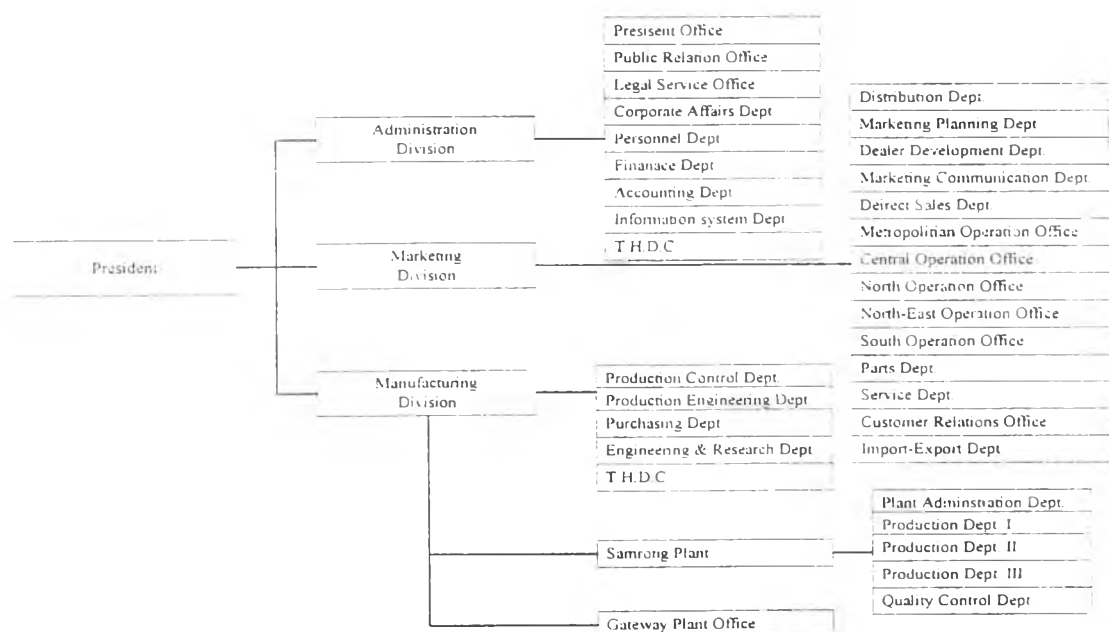


Figure 1.2 Organization chart.

1.2 Problem area

The problems in area of maintenance of the X Company are :

1. Maintenance activities are not repetitive in the same manner as operations tasks and do not lend themselves to systemization.

2. The maintenance staffs use the data from machine manufacturer and their experience to plan maintenance scheduling for the machine. For major machines, the failure data are kept but their characteristics are not analyzed systematically.

3. The maintenance budget is set up annually from historical data, however, it is difficult to forecast the frequency of failures for some particular machines. Consequently, unpredictable repairing and parts replacement that will create problems in controlling the budget.

1.3 Objective of the study

To develop an appropriate preventive maintenance plan with cost consideration.

1.4 Scope of the study

1. The company under study is the X Company at Samrong plant.

2. The planning of maintenance scheduling is considered with top coat painting machine in paint line only.

3. This study concerns only the preventive maintenance policies and maintenance cost of the machine. It does not include machine specifications designing and does not recommend solving any related processes problems.

1.5 Steps of the study

1. Survey literature
2. Study the existing maintenance system of the company
3. Collect and analyze the failure and cost data of the machine
4. Assign the proper preventive maintenance policy for the machine
5. Design maintenance planning and scheduling based on maintenance cost
6. Conclusion and recommendation
7. Conduct a pattern of thesis

1.6 Benefits of the study

1. To provide more meaningful information concerned with the history of the machine for management in maintenance planning.
2. To reduce the number of breakdown of the machine.
3. To reduce the maintenance and production costs by increasing the useful life of the machine.
4. To increase productivity and improve the overall efficiency of plant operations.
5. To be a guideline of the maintenance planning that can be further applied to other machines.

1.7 Literature review

Since the study relates to the methods of planning the preventive maintenance in a production system by considering the costs of maintenance, therefore the literature considered is reviewed in two related topics, preventive maintenance and maintenance costs. The literature used to construct this study are:

Balbir S. Dhillon, 1983

This book is an attempt to fulfill the knowledge of basic reliability and various specific areas of reliability and its applications. This book concerns design and operations reliability, applications of reliability, and other closely related areas such as maintenance and safety engineering.

Barlow, R. and Hunter, L., 1960

This paper presents two preventive maintenance policies. The first is to perform preventive maintenance after a certain number of hours of continuous operation without failure. The other is to perform preventive maintenance after a fixed number of hours of operation regardless of the number of intervening failures.

Benjamin W. Niebel, 1985

This book covers the fundamental theories, principles, procedures, and techniques utilized by the engineering maintenance management function. Moreover, there are up to date presentations on the maintenance organization, maintenance cost control systems, estimating material and labor costs, and maintenance planning and scheduling.

Elson H.V., 1985

This paper presents description in depth of Weibull analysis. It includes Weibull distribution, Weibull probability paper, cumulative percentage, procedure for plotting on Weibull probability paper, etc.

G. J. Glasser, 1969

This paper presents two basic methods of planning replacements in a preventive maintenance program. Two methods are age replacement policy and block replacement policy. Both policies are described by Weibull distribution.

Ilva B. Gertsbakh, 1977

This book is designed to provide mathematical descriptions of different types of preventive maintenance models. These models serve as tools to provide the optimal actions for preventive maintenance.

Jardine, A.K.S., 1970

This paper describes some of the information usually required in an equipment preventive replacement study. Simple replacement models to evaluate alternate replacement decisions is also shown.

Patrick D.T. O'Connor, 1991

This book presents maintainability of a system, types of maintenance, and preventive maintenance strategy. It also gives an example of how to calculate the optimum age replacement of a part or component.

Suzuki, T., 1994

This book presents a step by step implementation of planned maintenance which is a part of total productive maintenance (TPM). It also presents the activities for a general plan and suggests the practical steps which can be easily developed for many plants.

Warwick Manufacturing Group, 1996

This handout shows reasons for doing maintenance, maintenance costs, types of maintenance, types of maintenance organization, etc.