Chapter 1

Introduction

1.1 Background : The Case Study

This case study is about an automotive part manufacturer, which produces specific water and oil pumps to supply both domestic and overseas customers. This company consists of many production activities that are managed by the Production Department. At present, the Production Department organizes many production activities such as Production Control, and sequential processes as primary, intermediate and final process. In this case, primary process is "Die-Casting", intermediate is "Machining" and final is "Assembly".

The Production Activity Control System is the integration of many production activities in the Production Department. This system starts when the Production Control Section receives customer orders and arranges these orders into the Final Assembly Schedule (FAS) form. This section also analyzes the details of FAS in setting up the Purchasing Plan for suppliers. A group of production activities from this section is called "Order Planning Activity."

Next, the Production Department picks up the completed FAS forms to prepare the Work Order Schedule (WOS) for the Assembly, Machining and Die-Casting Sections. The WOS for Assembly Section consists of many data items to produce a finished product. However, the WOS for the Machining and Die-Casting sections focus only on specific items in producing the main body. A group of production activities that prepare WOS in the Production Department are called "Operation Scheduling Activity."

The Production Department then distributes the WOS to supervisors in each section for preparing details of production resources in each daily operation. After finishing the daily operation, each supervisor collects the results from the respective operation into the Work Order Report (WOR) and passes it to the Production Department. A group of production activities in the each sections are called "Production Reporting Activity."

At present, the company is not satisfied with the existing system due to the following problems: shortage of parts in the Assembly Section, poor resource utilization, and excessive work-in-process, all of which are described in topic 1.2.

These problems indicate that the company needs to improve the information system it uses to control operations. Each section operates with little coordination and communication. Therefore, there is proliferation of information, which leads to wasted effort and inconsistency of data. Lack of appropriate information also leads to poor operation.

1.2 Statement of the Problems

At present, when customers require flexibility lead to change in delivery, they send their request to the Production Control Section. The Production Control Section then changes the FAS and WOS for final process (Assembly). However, the changes are not communicated to the intermediate process (machining) and primary process (Die-Casting). Therefore, the fabrication of finished products may not be consistent with the revised FAS. This causes the following problems:

1. Part shortages before final process.
2. Part shortages leading to expenditures in the intermediate and primary process, which in turn causes poor utilization of resources.
3. Parts used in final process according to the original plan becoming excessive work-in-process.

1.3 Objective of the Study

The objective of this study is to develop an information system for Production Activity Control (PAC) for the company.

1.4 Scope and Assumptions of the Study

1.4.1 System Boundaries

1.4.1.1 Concerned Departments

The system will cover activities in the Production Department, which consists of the Die-Casting, Machining, Assembly, and Production Control Sections.

1.4.1.2 Activities

The activities in this system include Order Release, Operation Scheduling, Dispatching, Data Collection, Operation Reporting, and Order Closeout.

1.4.1.3 Resources Management

The system will cover the management of only three resources, which are Manpower, Production Capability, and Materials Availability.

1.4.1.4 Application

The system will include basic operations as stated in 1.4.1.1–1.4.1.3 with the emphasis on solving the problems in 1.2.

1.4.2 System Design

The design of the system will include the following:

1.4.2.1 General systems design that supports the system mentioned in 1.4.1

1.4.2.2 A system structure design to support the general systems designed in 1.4.2.1.

1.4.2.3 A detailed system design which includes application programs.

1.4.3 Implementation

1.4.3.1 The part of the system designed in 1.4.2 that will be implemented include Order Release, Operation Scheduling, and Data Collection. Programs will be written to support these operations.

1.4.3.2 The system will be developed on the Personal Computer Platform.

1.4.3.3. The performance evaluation will be based on users' satisfaction in terms of solving the problems stated in 1.2.

1.5 Study Methodology

This study will take the following methodology:

1.5.1 Study the relevant literature.

1.5.2 Analyze the existing system in the case study.

1.5.3 Develop the Production Activity Control (PAC) system in the case study.

1.5.4 Appraise the system by comparing the developed PAC system with the existing system.

1.5.5 Prepare the final report.

1.6 Outcome of the Study

1.6.1 The document that describes the system design as stated in 1.4.2.

1.6.2 The part of the system that will be implemented

1.6.3 Report on the result of implementing the PAC system

1.7 Benefits of the Study

The improved quality of information in terms of correction, completeness, and relevance for solving the problem of PAC system.

1.8 Details of the Report

Chapter 1 covers a brief information of the thesis, i.e., background, statement of the problems, objective of the study, and scope of the study and so on.

Chapter 2 illustrates the theoretical study, which includes the IDEF0 modeling technique, the Production Activity Control (PAC), Data Dictionary/Directory (DD/D), Normalization technique, and the Bill of Materials.

Chapter 3 describes the case study in detailed information and applies the IDEF0 modeling technique to analyze the existing Production control and sequential processes. This chapter also analyzes the problems of the representative product from the final process (Assembly), intermediate process (Machine), and primary process (Die-Casting). It also indicates the causes of each problem.

Chapter 4 develops the information system for Production Activity Control (PAC). This is done by grouping and rearranging the existing production control and sequential processes into its respective functional models, creating the normalized database structure by using the concept of Data Dictionary/Directory (DD/D), BOM, and the normalization technique. This chapter also implements the information system into the representative product. The result of the development can be used to evaluate by production resource utilization, which include manpower, production capability, and material availability.

Chapter 5 provides the conclusion and suggestion regarding the developing of information system for PAC.