

Chapter 1

Introduction



During 1997-1998, the economic crisis affected to the automotive industry in Thailand and other countries in this region. Then, the power of buyer and also the demand of the market were reduced. From this reason, all carmakers had been trying with various approaches to reduce the cost of their products. The topics that would influence the cost reduction, are the quality, the cost and the time of delivery because these topics can help reducing the cost of inspection, inventory and increase reliability in the products.

On the other hand, the electrical industry still expand considerably because of the strong support from the mother-company and expanding the sales volume by exportation because the depreciation of Baht value has increased the competitive advantages.

In the future, there will be more competitiveness in all kind of industries on the account of free trade system. Especially, in the automotive industry, the carmaker will have more chance to source their suppliers in the international market that will affect to the local suppliers because the local suppliers have less capital and technology than new overseas suppliers.

Company background

The selected company for the study was established as parts maker, in order to support automotive industry and electrical industry within the limit of one hundred percent of Thai shareholder. The organization structure of the company is divided by its responsibilities which are production1, production2, quality assurance, business planning, human resource and marketing and accounting department. The difference between production1 and production2 is their manufacturing methods. Production 1 manufactures by die-casting and production 2 manufactures by machining. At present,

there are some problems concerning the quality of product so, the company is trying to apply the QS-9000 system to improve the quality system and to increase the chance for competition.

The detail of crankshaft line

The crankshaft is a component in the compressor of refrigerator. The manufacturing crankshaft starts by the process of receiving raw material that fabricated by sand casting (Fe300-Cu) from local supplier. The raw materials are delivered in batch size about 1,000 to 4,000 pieces and stored in storage area before manufacture. In manufacturing process of the crankshaft the production line is composed of 6 major steps which are as following;

1. Pre-turning for making the center drill
2. Pre-turning for supported point for next process
3. Turning \varnothing 18 mm. (long side)
4. Turning \varnothing 14 mm. and drilling \varnothing 8 mm
5. Drilling and reaming \varnothing 13.7 and 13.8 mm.
6. Drilling and reaming \varnothing 3 mm. and \varnothing 4 mm.
7. Chamfering and cleaning in antirust oil

The machining processes of crankshaft are denoted by the number in circle in fig. 1.1.

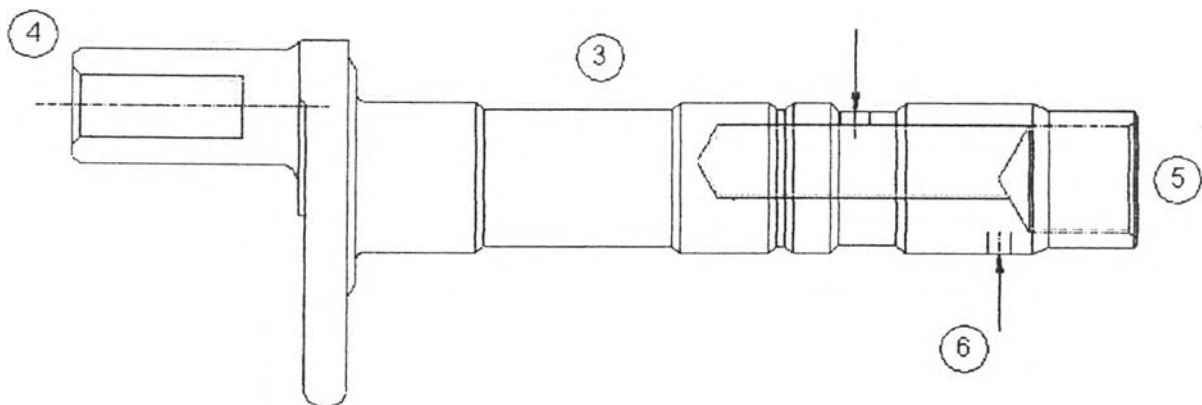


Figure 1.1 The machining processes of crankshaft in each process

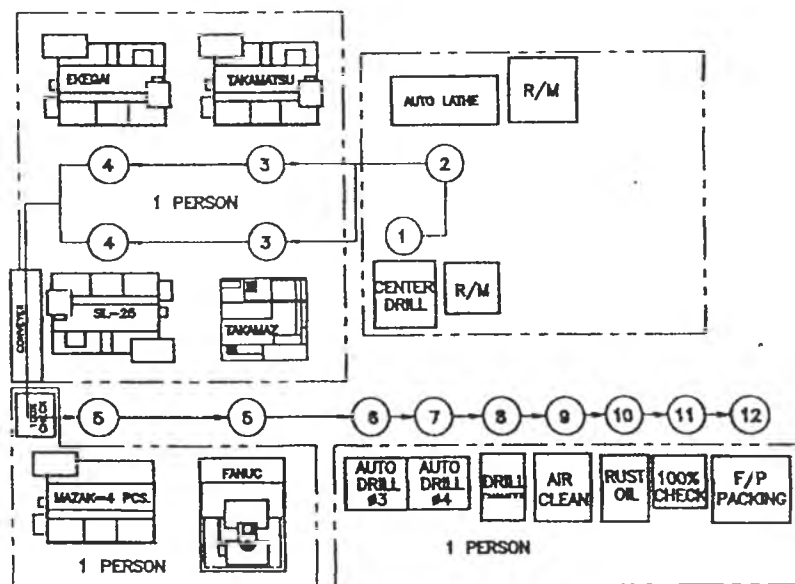


Figure 1.2 The process flow of crankshaft line

Fig. 1.2 shows the flowing process of the crankshaft line that composes of 2 pre-machining processes in process 1 and 2, turning in process 3, turning and drilling in process 4, drilling in process 5 and drilling and chamfering in process 6 and 7.

The crankshaft line is continuous line that was produced in the way of mass production. The customer requires about 25,000 to 30,000 pieces per month, while the capacity of the line is not enough for customer needs. So the productivity of this line should be improved promptly. There are several causes of problem that lead to insufficient in their capacity. For example: high percentage of defect in production line, uncontrolling of the process, lacking of appropriate maintenance system, ineffectiveness in training operators, and etc.

There are many approaches to improve the productivity of the manufacturing process, the first selected approach is reduction of the defect and lost during the process. During the discovery of the percentage of defects, 2 percents comes from raw material and about 7 percents comes from manufacturing process.

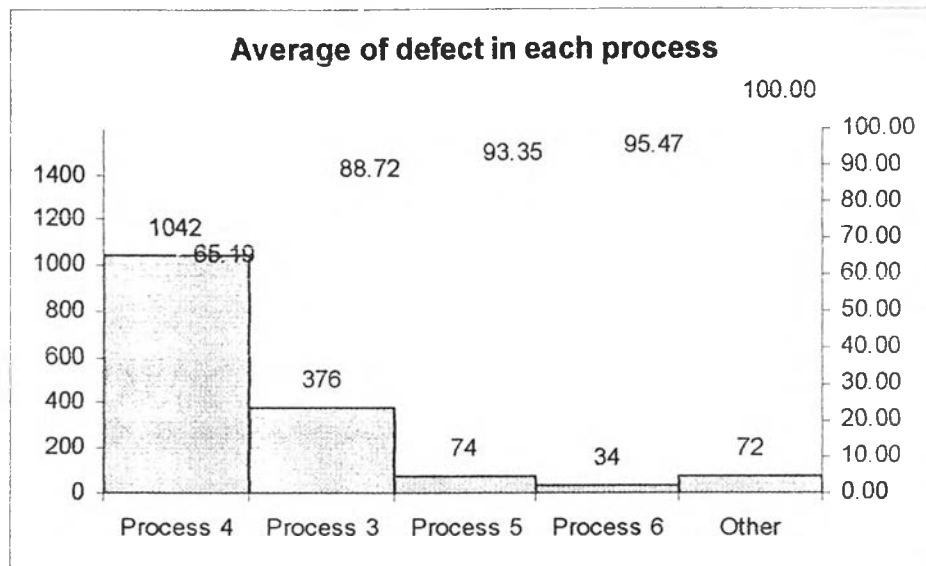


Fig.1.3 Pareto diagram shows the amount of defect in each process

Pareto diagram in fig. 1.3 ranks the significance of defects in each process average between January'99 to March'99. Process 4 has the highest percentage of defect compares to the others.

Policy of crankshaft line

On-time delivery at quality as customer requirement

Objective of the study

To reduce the defects in crankshaft production

Statement of problems

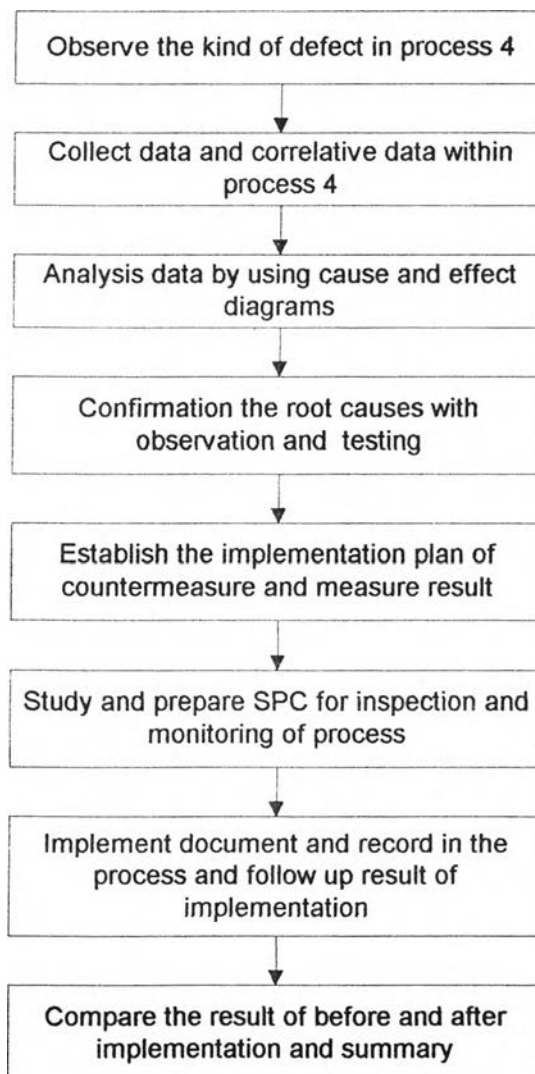
1. The defect in the manufacturing process is high
 - 1.1 Defect from raw material ~ 1.8 percent of total production
 - 1.2 Defect from machining process ~ 7.4 percent of total production
2. The company has no improvement process for all production lines. The conflicts between responsibility and misunderstanding to do the improvement and maintain the corrective and preventive action.
3. There is no monitoring system to show the situation and trend of process.
4. Each year, not only customers request for 5-20 percent price reduction program for their product but new competitors also try to compete in term of the price cutting method.

Scope of the study

Some measurements of improving a production line for crankshaft in compressor of refrigerator: as featuring

1. Reduce the dimension defect in machining process 4 (old process) or process 3 (new process)
2. Establish the monitoring system for controlling in process 4 (old process) or process 3 (new process). Because the defect in process 4 has the highest percentage and much larger than other process. But there are several causes of problems that combine in defect of process 4.

Procedure



Literature survey

Total Quality Management – 1995

Explain about how to manage in total quality way. It is structured in parts of a model for TQM such as the foundation of quality and its relative function and its advantages that it can get from internal and external environment, the method to manage and improvement the quality in organization and the implementation of TQM in organization. The core of method in this book is customer and customer interface, both externally and internally, and the fact that in each interface, there lies a number of process.

Operation management – 1993

The overview of operation management and method to do decision making in organization that relate to other functions such as quality, process, capacity, inventory and workforce. The strategy and policy to meet operation objective and the procedure and method for achieve the objective by using design, analysis and measurement.

Statistical process control - 1995

The type of method for feedback the operation system that help to inform and monitor situations of the processes. The book explains about the statistical process control and process capability analysis in term of background, concept, control chart and some examples.

Measuring system analysis - 1995

The method that makes decision to adjust a manufacturing processes or not based on measurement data. And study the relationship that exists between two or more variables especially in the critical dimension. These relationships increase the knowledge about system of causes that effect the process.

Potential failure mode and effect analysis – 1995

The method to determine possible modes of failure and their effects on the performance of product or operation of the process or service system. By using the ranking that calculate from the estimated probability of problems, the severity of problems and the difficulty of detecting, then do corrective action in highest number of the result.

Quality improvement tools & techniques – 1995

The quality improvement tools and technique to identify and solve the quality problems in organization. The matter of usage and construction of tools and technique includes basic quality improvement tools and techniques, advance quality improvement techniques and quality improvement system.

Hong, Jai Woo – 1993

This study was conducted to develop a reliable instrument to measure employees' perceptions regarding the total quality management (TQM) practices in manufacturing organizations. The TQM profile was developed on a review of the literature and based on panel of experts justifications and recommendations. Among the independent variables examined were different sizes of companies and different lengths of exposure to TQM.

Moore, Melanie Hope – 1992

The purpose of this study is to ascertain how organizations in the Edmonton, Alberta area which are in the process of adopting a quality improvement process, such as TQM, are managing formal quality training activities. The result provide support for the use of a model for the development of a quality training program that integrates five basic content categories with educational planning process are: needs assessment, curriculum development, delivery of training, audience for the training, and evaluation approaches.

Rekhi, Ishpal Singh - 1995

This thesis involved the continuous improvement of productivity and quality by considering the problem of optimal allocation of work in assembly system, the process flow in assembly line, the environment where process improvement and measure the quality of output