



CHAPTER 1

Introduction

General

In the past few years, Thailand has grown faster than most of the rest of the world. This growth has resulted in the rapid industrialization of the country. The manufacturing of air-conditioning units is one industry that has benefited from this growth. Because of the high humidity and temperature experienced in Thailand and the need for more a comfortable environment, air-conditioning equipment is now specified for most commercial buildings and many residences. Over 50 different brands with numerous options are in the market. Ninety per cent of the smaller residential and commercial units are now in Thailand.

With this many manufacturers, strong competition occurs and stronger competitors capture marketshare by offering consumers better quality, services, and satisfaction. Producers can become strong competitors if their production system is developed to reduce production costs, to produce better product quality, and to ensure on time deliveries.

Unquestionably, effective production systems play a major role in promoting the business survival in our competitive world.

In general, manufacturing enterprise are composed of 5Ms and 2Ss which are : *manpower, methods, machines, material, money, space,*

and *systems*. With the 5Ms and 2Ss system (see Figure 1.1), one can describe all the facets of manufacturing in simple terms and with new understanding of the interfaces and overlaps within manufacturing. Each subset of the 5Ms and 2Ss reveals an interesting view of the infrastructure within manufacturing. For example, *methods*, in manufacturing include of the critical sequence, safety, tooling, material, time standards, while material are material handling, volume, bill of material/M.R.P., and packaging.

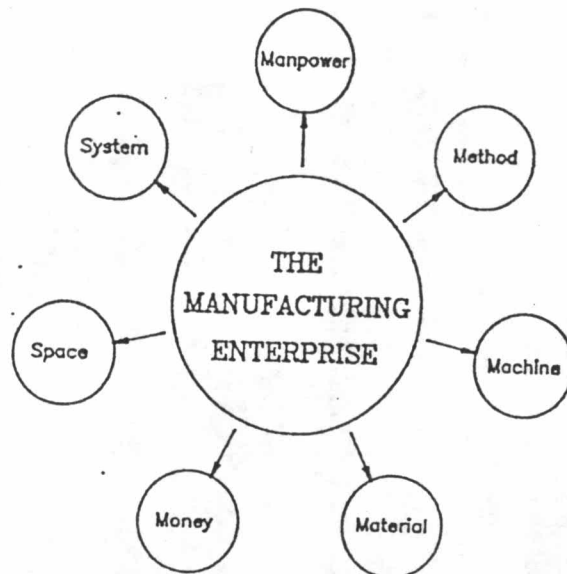


Figure 1.1. The manufacturing enterprise.

The 5Ms and 2Ss provide a taxonomy for classifying the complexities of manufacturing into several logical categories. The 5Ms and 2Ss structure will be the same when one applies this to a particular business. This can be applied equally to discrete parts

manufacturing for batch production, FMS, and continuous production.

Manpower and methods are of interest in this thesis. Industrial engineers use the technique of work study to improve operations of workers by establishing standard times and operations. The method used to establish these is *Work Measurement*. Work measurement is the application of systematic techniques to determine the work content of a defined task and the time required for its completion by a qualified worker. Over the years, new techniques have evolved for work measurement : work sampling, predetermined time standard (PTS), and time studies. In 1974, H.B. Maynard introduced *Maynard Operation Sequence Technique (MOST)* in the United States after it had been successfully developed in Sweden during 1969-1972. The technique which is an MTM-based system is applicable for any cycle length and repetitiveness, as long as there are variations in the motion pattern from one cycle to another.

Problem declaration

Air-conditioner production systems may be divided into *fabrication* and *assembly* sections. The fabrication sections produce galvanized steel sheet metal components which are assembled with various components at assembly sections.

At the fabrication section, flat steel sheets will pass through shear, notch, punch, and bend processes. Machines are frequently laidout by process sequence. Components are produced in a variety of sizes and shapes using different lot sizes to suit requirements. At the selected plant to be studied, the following problems were found :

1. No established standard times and operations;
2. No technical data collection and no production performance evaluation;
3. High set up times at some work stations;
4. Workpieces have long manufacturing lead times;
5. Long materials flow distances.

These problems make it difficult to manage, improve, or control the plant productivity and managers have insufficient information supporting their decision making.

Objectives

The study has the following objectives :

1. Establish standard times to manufacture workpieces at the fabrication section.
2. Suggest proposed plans to improve fabrication section productivity by such industrial engineering techniques as work study, facility layout and other suitable methodology.

Scope and limitation

1. All technical data will be collected from a selected air-conditioner manufacturing plant with emphasis only on shear, notch, punch, and bend activities.
2. Basic MOST (Maynard Operation Sequence Technique) work measurement system will be used for establishing time standards.
3. The study includes developing Work Management Manuals,

proposing a labor report (for continuous improvement), and submitting sample operational method sheets for one work cell.

Stages

1. Familiarize the manufacturing process.
2. Investigate the historical data related to existing production system.
3. Analyze data and propose ways to improve productivity.
4. Write the work management manual, labor report procedure, and sample operational method sheets.
5. Conclusion and recommendation.
6. Documentation.

Benefits

1. A systematic, simple, identified procedure will be introduced to analyze product work content for planned reduction, elimination, or simplification. Production costs can be addressed through team activities with mutually understood goals and action plans.
2. Easy follow up and self control of shop floor activities.
3. Production performance and continuous improvement is measurable and understood.
4. The study may be a basis for designing other similar production systems.