

CHAPTER I

INTRODUCTION

1.1 Background

Globalization has opened up more markets to manufacturers and generated exceeding pressure on them to provide high quality products fast, economically, and with high level of adaptability (Offodile et al., 2002), in order to create that condition, it is need a very high production cost, undoubtedly, one of the most effective cost reduction strategies is reconfiguration of the production facilities (Saadatin et al., 2010). In real manufacturing system, firms are required to make the system efficient, to create an efficient system, all aspects should be good like the layout, to create a good layout, then we should trial and error and it takes a lot of time and costly, because of its problem virtual manufacture are made. from its virtual manufacturing, we can make a real product. Recently, many companies are using Virtual Manufacturing (VM) in order to save the time and cost. VM is knowledge and information based technique developed in recent years. With the use of the VM technologies, many aspects of activities can be integrated and realized into one system. By implementing VM in manufacturing so it will give benefits on reducing cost and time.

VM is used loosely in number context. It refers broadly to the modeling of manufacture system and components with effective use of audiovisual and other sensory features to simulate or design alternative for an actual manufacturing environment, mainly through effective use of computers (Prashant et al., 2001). There is an increasing needs to generate detailed real time virtual environments that closely

mimic real world facilities (Fumarola et al., 2011). The motivation is to enhance the ability to predict potential problems and inefficiencies in product functionality and manufacturability before real manufacturing occurs.

To create a VM use 4 types of models, there are the virtual device model (object model), the transfer handler model (functional model), the state manager model, and the flow controller model (dynamic model). The object model describing the objects in the system, and their relationships. The dynamic model describing the interactions among objects in the system. The functional model describing the data transformations of the system. The state manager model is use to maintaining decision variables based on the mapping relations between decision variables and the states of virtual devices in the system (Park., 2005). This research will construct the one of VM and create the algorithm to control the model.

Previous research presented a technique to establish VM. Bruno et al., (2000) discuss about controlling the interaction of multilink flexible arm in contact with a compliant surface. For a given position and surface stiffness, the joint and deflection variables are computed using a closed loop inverse kinematics algorithm.

The problems that emerged in this research is to develop a specific VM with control algorithm. It contains an introduction to virtual manufacturing, divided into a general part on modeling and simulation, verification, validation and acceptance. VM must be developed because of there are some issues like the manufacturing cost and time to market can be reduced.

In making the VM there are several stages, the first stage is the selection of a model or models of development, the second stage is to develop control algorithms,

the third stage is to scheduling, finished product, and inventory, the fourth stage is the estimated cost. In the present study will focus on the second stage of develop control algorithms.

1.2 Problem Formulation

Based on the background to the study, hence it can be defined the problem formulation is:

1. How to develop and control system to control VM models in virtual environment?

1.3 Problem Boundary

Bounding the problem need to be defined in order to focus the research so that the research objective can be well-achieved. So, the problem boundary can be defined as follow:

1. The virtual manufacturing system is not discussed about finish product.
2. The virtual manufacturing system is not discussed about inventory.
3. The virtual manufacturing system is not discussed about the cost.

1.4 Research Purpose

Research purpose of the research is:

1. To develop virtual Manufacture.
2. To develop and control system to control VM models in virtual environment.

1.5 Benefit of Research

This research can give its benefit to:

1. To enhance the knowledge of manufacturing system.
2. To enhance the knowledge about control system.
3. To enhance control algorithm technique for the object.

1.6 Writing Systematic

This thesis report will be arranged to some chapter, and every chapter will be explained below:

CHAPTER II LITERATURE REVIEW

Contains both the concept and basic principles needed to solve research problems. Besides it also includes a description of the results of studies that have been done before by other researchers who have anything to do with the research undertaken.

CHAPTER III RESEARCH METHODOLOGY

This chapter includes the research object, method of collecting data, kind and source of the data, tools that use flow diagram of the research, procedure, and data analysis.

CHAPTER IV COLLECTING AND PROCESSING DATA

In this section contains the data obtained during the study and how to analyze the data. Processing result is displayed in tables and graphs. The definition of data processing also includes the analysis conducted on the results obtained. In this section is a reference to the discussion of the results of which will be written in section V of the discussion of the results.

CHAPTER V DISCUSSION

Discussing the results obtained in research and compliance with the objectives of research so as to produce a recommendation.

CHAPTER VI CONCLUSION AND SUGGESTION

Contains the conclusions of the analysis and recommendation or suggestions which achieved and problems found during the study, so needs a recommendation to be studied in further research.