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Digital Manufacturing Process: Perspective

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I. Introduction

The last few decades' information technology has been extensively used by the manufacturers. This new tool applied in simple machinery application, manufacturing, planning and marketing etc. The application of IT in manufacturing cell costs and management are the main advantage. In late 1980s the computer integrated manufacturing has been introduced for enhancement of performance, efficiency, operational flexibility product quality and time to market. However the full strategic advantage of use of IT was poorly understood and could not be exploited (Cagliano, R.as Spina G.J .Ops Mgmt 2003,18,169).

Computer aided design (CAD) system paved the way for facilitating the integration among diverse software applications. (Chryssolouris G Manufacturing System theory and Practice). The Process of information system over the last decade played a very crucial role in the adaptation of new information Technology in the environment of manufacturing system.

II. Computer Aided Technology

Computer aided design boosted productivity reduced the time required for a product development CAD systems have become indispensible to today's manufacturing firms because of their strong integration with advanced manufacturing techniques. For the production of the parts of a machine since they can be used for generating the code required to dive the machines for production of the parts since they can be used for generating the code required to drive the machines for production of the part.

Process planning activities determines the necessary manufacturing processes and their sequence in order to produce a given part economically.

Again computer aided process planning (CAPP) system have been used for generates of consistent process plan and are considered as essential components of CIM environment (Cay,F and Chassapls G , Computer Industry,1997,34,307).

Denkena et.al proposed a component manufacturing process planning model based on the combining technological and business considerations to form the basis for enhancement of available CAPP solution.

Kim and Duffca introduced a dynamic model design and have analyzed to the algorithms for close loop process planning central. Azab and Elmaraghy presented a mathematical model for reconfiguring macro level process plan .Veda introduced a new simultaneous process planning and scheduling method using artificial neural network.

Computer aided Engineering (CAE) systems are used to reduce the level of hardware prototyping. In an automotive assembly IT is applicable to a series of process such as production order control, material control, maintenance management etc.

The digital mock up (DMU) software allows manufacturing Engineers to visualize the production process via a computer. The discrete event simulation (DES) helps engineers to focus closely on each individual operation. So it helps decision making in the early phase.

Besides the above mentioned software there are other applications of IT in engineering.

III. Enterprise resource planning (ERP)

Enterprise resource planning system integrates all data and processes of an organization into a unified system. An ERP system uses various components of computer software and hardware to make the integration. Most ERP system uses unified data base to store data for different modules.

MRP-II is manufacturing resource planning. It incorporates the financial accounting and management system, including human resources, product design etc.

IV. Recent Developments

Recent use of Digital System

Developments in digital manufacturing may be categorized into two major groups. The bottom up approach considering digital manufacturing and then extending its comcept to digital factory or enterprise. This is first approach.

The second one is the top down approach which considers the individual aspects of manufacturing means simulation and e collaboration. Now what a digital factory consists of. It must include models, methods and tools for factory planning and operation. Brancht et.al published a theoretical paper on the digital factory vision.

The concept of Digital Enterprise Technology (DET) recently introduces for digital modeling of the global product development. New frameworks for distributed digital manufacturing came up. Agent based system consisting of decentralized manufacturing have been reported. Such agents are called multi agents working together. Each agent should be responsible for a specific set of resources such as machine, labour etc. For collaborative product development and production have been used by digitalized information.

V. Application

BMW at Leipzig achieved 50 percent less faults per vehicle and recorded for better process capability because of the use of simulation of production process. General Motors (GM) used a three dimensional work cell simulation for commercially available vehicles. Volvo uses DE as a tool for continuous process verifications in industrial system development.

VI. Simulation

In manufacturing system s design is mostly used which the engineers enable to understand the complexity of the system and how operational policy affects performance of the system.DMU which is the factory digital mock up Software allows engineers to visualize production process via a computer. The DED is the Discrete Event simulation software helps the engineers to look into the each individual operation .At Volvo Des has been used as a tool for continuous process verification in industrial development.

Hence the above mentioned soft wares are widely used in manufacturing units. Besides there are huge number of software which are part of digital manufacturing process are widely used throughout the world.

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