

56:231 Computer Integrated Manufacturing
What is CIM?
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View 1:

- **technology, tool or method used to improve entirely the design and manufacturing process and increase productivity**
- **using computers to help people and machines to communicate**

View 2:

- **series of integrated activities and operations involving the design, materials selection, planning, production, quality assurance, management and marketing of discrete consumer and durable goods (Bunce, 1985)**
- **deliberate integration of automated systems logical organization of individual engineering, production and marketing/support functions into a computer integrated system (Bunce, 1985)**
- **architecture for integration of multiple technologies through computers, linking each individual island of automation to a closed loop business system (Foong, 1991)**
- **integration of computer aided design, automatic material handling, robotics, process technologies, manufacturing planning & control, computer aided test, computer aided manufacturing**

View 3:

- **focuses on the computer as the center of control of the entire factory, starting from the computerization of the fabrication and assembly processes to the information flow for production control, quality, maintenance, material handling, and inventory control in a totally integrated system (Asfahl, 1992)**

View 4:

- **encompasses the entire realm of processes a part undergoes from receipt of the material to when it is shipped**
- **involves the use of computers to assist in the design, handling, processing, and cataloging of materials as they flow through the manufacturing processes**
- **not computer controlled, but is the use of the computer assets to assist in difficult areas of manufacturing**

View 5:

- links traditional islands of manufacturing automation, the people that work with and support them, and the systems that control them
- requires manufacturing industries to hire well-educated and highly skilled individuals with knowledge in the areas of technical computing, manufacturing process integration, mechanical and electronic systems implementation, process control, and quality assurance (PU CIT Dept. website)

View 6:

- use of electronic technology to streamline traditionally separate phases, including concept, design, manufacture, analysis, and maintenance, into a single process in order to reduce lead time and improve quality of the product

View 7:

- concept of a semi- or totally-automated factory in which all processes leading to the manufacture of a product are integrated and controlled by computers (Rembold et al., 1993)

View 8:

- use of computers and computer technologies in a manufacturing environment that, as a minimum, utilizes information created for one purpose for another purpose
- in its broadest definition, a company strategy of utilizing computer-based technologies to achieve the goals of the company
- an approach to the organization and management of a firm, in which the functions of design, manufacturing, and production management are mutually rationalized (i.e., making to conform to reason) and completely coordinated, through the use of appropriate levels of computer and information/communication technologies (Mize, 1991)

View 9:

- integration of the total manufacturing enterprise through the use of integrated systems and data communications coupled with new managerial philosophies that improve organizational and personnel efficiency (Singh, 1996; from CASA/SME, 1993)

View 10:

- use of computer hardware, software, and communications networks in all aspects of a manufacturing company including inventory control, quality control, planning, cost accounting, design, and manufacturing (machine control)

View 11:

- utilizes the computer, not only to automate the design, control, assembly, and planning, but to link these processes into an organizational entity
- control of information flow and material or product flow to best serve the customer
- informational marriage between customer desires, corporate goals, ease of production, and whatever else makes the company more profitable
- needs to be a strategic organizational tool . . . a tool that can allow dynamic responses to changing trends
- uses automation to reduce redundant information input, redundant storage, in whole, reducing redundant efforts in the manufacturing environment
- uses a shared database with computer software modules running in parallel to reduce design time, number of design cycles, and overall production costs
- effective utilization of computer technology in the management, control, and operation of the entire manufacturing process by utilizing all resources, including information, to best serve the customer; typically incorporating together the following technologies: computer aided manufacturing, computer aided design, computer aided process planning, computer aided quality control, and computer aided design (Groover, 1987)

View 12:

- philosophy in which the computer plays a central role for planning and controlling the manufacturing process

View 13:

- an open system that combines planning, sales, purchasing, production planning & control, computer aided design, computer aided manufacturing, and computer aided quality control through a centralized database so all data can be accessed and used for control purposes

View 14:

- use of the computer to organize, integrate, and disseminate information—product design to shipping
- concept by which all elements of the factory (i.e., people, equipment, materials, computers) are organized and integrated to produce high quality products in the most efficient and least cost manner
- management philosophy that provides the appropriate level of product design and production control; it also provides the shop flexibility necessary to compete in future domestic and international markets

View 15:

- deals with the integration of manufacturing activities and support facilities using computers (Amirouche, 1993)
- single information source that involves common databases, control of production, shipment of products, and communication among a wide range of decision makers (Amirouche, 1993)

View 16:

- strategic goal that a firm strives to achieve over time; a continually evolving integrative process (Bedworth et al., 1991)

View 17:

- computerized integration of all aspects of design, planning, manufacturing, distribution, and management (Kalpakjian, 1995)
- both a methodology and a goal, rather than an assemblage of equipment and computers (Kalpakjian, 1995)

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View 18:

- control and communication structure that integrates company-wide functions, including computer aided design, computer aided manufacturing, computer aided materials management, numerically controlled machine tools, computer scheduling and production control, source data collection, and business functions such as market analysis, sales forecasting, sales management, accounting, financial control, payroll & personnel records, ... to name a few
- computer integrated manufacturing does not mean an automated factory ... people are very much involved (Harrington, 1973)

View 19:

- primarily concerned with planning and organization
- integration of manufacturing systems and business information systems, using a common data base for design, manufacturing, and all other tasks within the entire operation (Warnecke, 1991)

View 20:

- concept of a completely automated factory in which all the functions of a company (design methods, production, administration, accounting, marketing, etc.) are integrated and controlled in the company and use common data shared through the same database
- improves responsiveness when faced with fluctuating markets (Waldner, 1992)

View 21:

- modern engineering concept in which every manufacturing related activity is integrated together closely using computer technology by information and material flows
- goal of CIM is to achieve flexibility, productivity and profitability
- CIM models are highly enterprise specific, but include CAD, CAP, CAM, CAQ and PP&C

View 22:

- definition varies according to the requirements of the company, but has a place in every step of manufacturing industry
- factory communication hardware and software; data management, including collection, storage and retrieval; applications software and hardware, including material planning and control, quality systems, inspection and vision, computer-aided design/computer-aided manufacturing (CAD/CAM) and computer-aided process planning/computer-aided engineering (CAPP/CAE) (Johansen et al.,1995)
- consists of three dimensions: the engineering dimension involves CAD/CAM and CAPP activities; the networking and systems dimension; and the continuous improvement dimension that encompasses areas such as MRP II, TQM, JIT and theory of constraints (TOC) (Weston et al., 1994)

View 23

- (same as View 9)
- goal of CIM is integration of all enterprise operations and activities around common data repositories

CIM References

(no particular order)

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