

IMPLEMENTATION OF COMPUTER INTERGRATED MANUFACTURING INDUSTRY IN MODERN

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ABSTRACT

Computer Integrated Manufacturing - CIM, is an organizational concept of production systems representing automated manufacturing system based on a network computer control manufacturing machines, robots and devices for quality control. The paper presents the basic modules of CIM systems such as CAD, CAM, CAQ and the location of the technological process in the CIM system. From the aspect of implementation of CIM systems in the metal industry points to the fundamental advantages of such systems.

Keywords: Implementation, new production philosophy, computer integrated manufacturing (CIM), flexible manufacturing, modernization of production.

1. INTRODUCTION

Most of the production capacity as well as workers in the metal industry is out of service and work. Given the state of the industry of metal before the war, when the industry employed more than 162,000 workers, or 18.51% of total employment in the economy, or 34.9% of total employment in the industry and has made more than 21% of gross domestic product, may can safely conclude that the development of metal industry stagnated.

Technological obsolescence of production systems in the past few years is that it will be difficult to catch up technologically developed production without stronger support of external partners, donors, designed technological development and economic and market policies that will create all conditions to go into intensive quality upgrading and modernization of this industry. Modern industrial production based on the new production philosophy, which is based on knowledge of new production techniques and technologies, particularly in the application of information technologies [1]. Looking at the previous facts it creates the vision possible implementation of modern systems in the metal working industry.

2. BASED SYSTEMS OF CIM AND PLACE OF TEHNOLOGICAL PROCESSES INCIM SYSTEM

CIM is a common information and technical activities of all factors of production, using a common base of knowledge. It covers development tasks, projects, constructions, planning, processing and testing and delivery of all stages of conducting the production process [1,3]. Production of computer-guided CIM is the concept of using EOP, with the aim of maintaining acquired, or the conquest of new positions in the world market. CIM is not a method of rationalization, or a product that you can buy and install, but it is a way of thinking that, compared with other manufacturing partners, can provide an opportunity for long-term economic success. However, in practice there are a number of outstanding issues, uncertainty and lack of knowledge about the possibilities, assumptions, borders and bands CIM solutions, because there is no uniquely defined the meaning of the information CIM. In terms of CIM information is integral information processing and data to solve the technical,

organizational and economic tasks within industrial companies. Technological process [5] is as important in the design of new products as well as the development or revitalization of existing. At the same applies general knowledge that neither technical - technological solution is not so good today that tomorrow can be better.

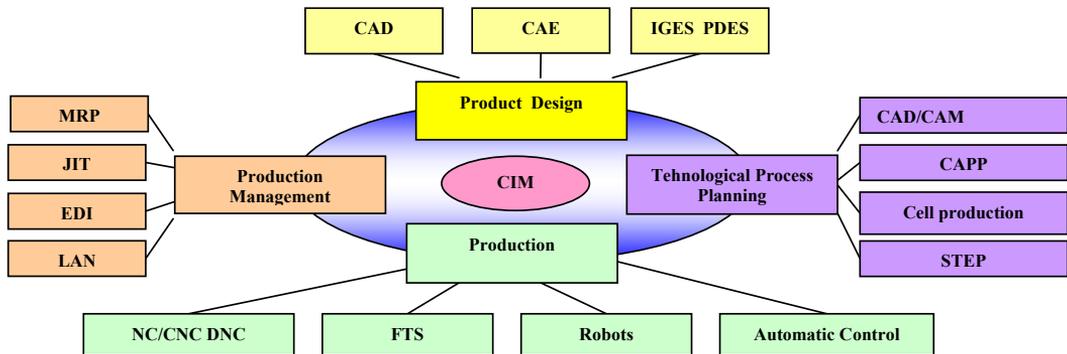


Figure 1. Place of technological process planning in CIM concept [1]

3. STRATEGY OF INTRODUCING CIM SYSTEMS IN METAL INDUSTRY

CIM - the concept is, like everything else, is in constant motion, development and updating. The more experts to be interfere with the real problems of CIM, it will be more amendments. Standardize concepts and certain generalizations will contribute to resolving this complex area [2]. Totality of the management system is primarily based implementation of the concept of computer integrated production in manufacturing organizations, which are formed on the basis of the following actions:

- development of business strategy and goals,
- plan and measure success factors to support the business strategy,
- identification of the starting position of enterprises or systems.

One way of organizing activities in the metal company, linked to the concept of computer integrated manufacturing, should be the next [1,3,4,6]:

- sales system that ensures quick offer, estimate demand and contracting, monitoring of contracts and monitoring market demand and competition,
- operating system with the latest resources for planning,
- system engineering designing, implementing interactive graphics and construction programs,
- production with a system of automatic planning,
- system with CNC programming, which can be automatically programmed machining highly complex parts,
- factory management system, which provides communication between machining machines, flexible cells and systems and their auxiliary functions, control stations and service centers,
- flexible automation systems with the most advanced machining machines and modules in flexible cells and systems serving, robots,
- automated factory, with full automation of the production of input materials to the delivery, and paperless news systems with the possibility of rapid and flexible response to all business activities and the rapid planning and rebalancing plan production according to real production flow,
- application simulating engineering can make a great contribution to the reduction of production costs and shorten delivery time, because it was found that 70% of the costs in the production of a part is defined in the structure,
- artificial intelligence will play a significant role in the future because it has the ability to transform a non-deterministic system of production in intelligent manufacturing system, which is "capable of solving, within certain limits, unprecedented, unexpected problems based on incomplete and inaccurate information".

There is no standard procedure for the introduction of CIM systems in any field as well as in the metals industry. Each product and business system has certain characteristics, capabilities and limitations in terms of the introduction of CIM systems. Performed research in technologically developed industries suggest the introduction of CIM systems by the method of “step by step” in order to introduce it in detail, systematically and comprehensively regarding the implementation and the results achieved. Today’s assessment of the state of implementation of the CIM systems, expectations of the future and the existing limitations can be analyzed through three concepts CIM system:

- CIM in the narrow sense (Hard automation),
- CIM in the extended sense (Soft automation),
- CIM in the broad sense (Integration / Strategy).

Expected trends in the development of application specific hardware components of CIM systems are:

- Numerically controlled machines:
 - application of the higher cutting speed processing,
 - development of new programming languages and systems,
 - simplifying the connection man – machine,
 - introduction by condition with self-diagnostic status,
 - the introduction of automatic detection and correction of errors in the work.
- Flexible manufacturing systems:
 - the application of machines high flexibility and completeness of the work,
 - the application of manipulation and transportation systems with the appropriate sensors,
 - the application of artificial intelligence and simulation,
 - standardization modules,
 - increasing the use of new energy sources in the processing,
 - the development trend of smaller and simpler systems,
 - the automotive industry became a major area of application,
- Robots:
 - development in the area of operation,
 - expected to increase applications in the field of assembly, textile and wood industry, process industry and services,
 - increasing the use of sensors to identify,
 - increasing the use of artificial intelligence.
- Sensors:
 - non-contact dimensional measurement of objects,
 - identify colors,
 - speech recognition,
 - determination and forecasting tool life by analyzing vibration spindle and tool.
- Computers:
 - increase capacity on-chip,
 - in addition to GUI applications increase MUI (multimedia),
 - the fifth generation of computers and neural computers,
 - optical memory,
 - the development of communication,
 - open systems,
 - parallel computers and computer of the fifth generation.

Trends in the development of software components CIM are:

- Integrated information systems (IIS):
 - development of new software tools for rapid development of information systems,
 - integration method OI and DSS (decision support on) in IIS,
 - the integration of CA packages of software systems in IIS,
 - directly taking analog data from the monitoring of manufacturing processes and their conversion to digital data processing and monitoring in IIS.
- CA software packages and software systems:

- The CAD system that has the most significant application of all the CA program packages and software systems are expected: the increasing use of PCs and workstations, the development of the theory of the construction and its applications in CAD systems, the development of new concepts of CAD applications.
- The CAP system is expected greater use of artificial intelligence in selecting and defining a work plan and improving links with CAD, CAM and PPS software systems.
- The CAM system is expected to better integration with CAD, CAP and PPS systems, application software maintenance by the state and the TPM, to develop the model for production management.
- The CAQ system is expected to further the development and installation of sensors and diagnostic systems in the manufacturing process, the integration of CAT systems as well as integration with PPS, CAD and CAM systems.
- The PPS system lacks quality relationship with CA software packages and programming systems, expected greater use of optimization algorithm (OI), the development of models for rapid feedback of the progress of the plan, the greater use of expert systems and neural networks.
- Communications software and protocols:
 - increasing the speed of transmission,
 - neural networks,
 - widespread use of ISDN,
 - EDI for office automation,
 - jobs"at home",
 - communication faster transmission speeds (ATM, etc).
- Artificial intelligence:
 - the development of expert systems for manufacturing processes,
 - development not distinct systems.

CIM broadly encompasses the entire integration of equipment, software, organizations and personnel in the systems, personnel and organizational units connected by common goals CIM [6].

4. CONCLUSION

At the present time, to be able to organize production whose products compete in western european market and beyond, it is necessary to introduce modern technology and manufacturing equipment. Conventional knowledge and outdated techniques can not ensure penetration and survival on turbulent and choosy international markets. The rapid development of computer technology has created new opportunities for automation, which is particularly pronounced in machine tools. This has paved the way for the development of flexible technology. It is clear that the management of modern production systems necessary use of information technology - software. Factories must be trained to implement the new production philosophy. The introduction of this mode of production to meet the requirements arising turbulent market situation (increased productivity, product quality, save energy and materials, a large range of products, low price, provided the market, etc.).

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