

## BASIC PRINCIPLES OF CREATING DIGITAL PRODUCTION IN THE MECHANICAL ENGINEERING INDUSTRY

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**Abstract:** A systematization of the composition of methods and means for building digital production is proposed. Attention is paid to the development of technology for information support of products of production systems.

**Key words:** digital manufacturing new production technologies, information product life cycle

The term digital production means an information electronic model of high-tech production, covering the main areas of advanced production technologies, new materials and information and communication support. This model includes information about all processes occurring in production, as well as the entire amount of information in the product that can be distributed according to the stages of its life cycle: design data information on geometric dimensional relationships of surface layer parameters; production data; quality data; logistics data; operational data; economic data [1, p. 37]. The structure of production processes is tied to the data structure of the product itself. To implement this method, it is necessary to have full compatibility and convertibility of data and software that operates information about the product, information models and production processes. Software and hardware tools traditionally used in project work – the actual project management systems, production management solutions, logistics financial CAD / CAM systems – do not form a single software platform. Data ends up scattered across various systems and promptly obtaining information on a project causes significant difficulties in the process of information support of the product life cycle. An analysis of the structure of a complex of technical means should be carried out to determine the influence of the physical and technological parameters of the elements of the product being created on its cost.

Production technologies used within digital manufacturing require development and adaptation to high-tech dual-use products. For digital production, the most promising technologies are high-speed multi-coordinate processing on numerically controlled machines for the manufacture of complex mechanical engineering products. The main effect of high-speed processing is not a reduction in machine time due to the intensification of cutting conditions, but an increase in the quality of processing and the effective use of modern machines with numerical control; they allow the production of complex parts from the surface and a specialized CAD/CAM system [2, p. 607].

Production technologies based on flexible production systems – the concept of building flexible production systems is the maximum readiness of equipment for integration, even fully automated production without human intervention, compact

arrangement of components, reduction of time for performing auxiliary operations due to program logic, as well as optimizing the time of operations and setup . The fundamental principle of this concept is a modular approach to building a flexible production system based on maximum adaptation of standard processing and auxiliary components in relation to work as part of modules. This is what makes it possible to ensure that the equipment is ready to operate in a fully automated mode without human intervention and maintains the optimal location of the equipment. The main modular components are combined taking into account the individual requirements of specialists according to the type of product being manufactured, in order to create the most compact custom production line with the maximum free assembly architecture to meet customer requirements [3, p. 4].

Additive technologies – with the introduction of additive technologies, it is possible to obtain products of almost any complex shape with structural elements that are difficult to implement with traditional technologies. Combined technology. Combined methods are a combination of technologies based on various physical effects (electrophysical-chemical processing, laser), as well as a combination of various traditional methods (turning, grinding, heat treatment) on one machine. Such methods are used to manufacture parts from difficult-to-cut materials and to reduce time and technological cycle.

The implementation of the principles of digital production lies in the organic combination of breakthrough information production technologies to ensure fundamentally new values of enterprise performance indicators.

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