



An Innovative Approach to the Design of Technical and Technological Processes of Production

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ABSTRACT

The article describes the design of technical and technological processes of production, and indicators summarizing the technical level and efficiency of new techniques and technologies and their use.

Keywords:

Technological process, technological level of production, technological device, innovation, efficiency, product quality, level of technological development.

Introduction

At the current stage of the development of the world economy, the competition in the market of chemical industry and building materials engineering products is increasing, because the engineering industry is the basis of the economy - the main capital creator. Various machines and equipment, vehicles, tools and aggregates become the main capital of the economy in the course of their activity and increase the production capacity of the country [1-3].

The indicator of the level of technology is the proportionality coefficient in the equation that connects the change in labour productivity in the technological process with the change in technological equipment. The level of technology is a characteristic of each technological process, which is characteristic of the method of production of a certain product. This property is determined by the idea of the technological process and the technical implementation of this idea [4-7]. The idea of the technological process is expressed in the

nature and sequence of the working and auxiliary actions of the technological process [7-9].

Materials and methods

If in the process of improving the technological process, its main idea does not change, that is, there is a rational development of technology, and the level of technology remains unchanged. This is the qualitative aspect of the technology level indicator. Quantitatively, this indicator is a generalized assessment of the effective utility of this type of technology from a societal perspective [10-17]. The technological level of production can be evaluated by the quality of the product. The level of technology is determined by the product of living and past labour productivity and represents the overall efficiency of the technological process in terms of independent transfer of living and past labour [18-21]. When evaluating the level of technology, the advantages of new technologies are not obvious at the initial stage of their implementation, even if they are more than the old technology, that is, the dynamics of process

changes more clearly reflect the development perspective. The evaluation allows comparing different technological processes in terms of quality. For example, according to the level of technology, it is possible to compare the level of improvement of the technology of tractor and cloth production, any product. In the conditions of the market economy, the enterprise must analyze the technical level and analysis of new techniques and technologies. Such events are held to improve production activities because one of the main conditions for the successful development of this enterprise is innovation.

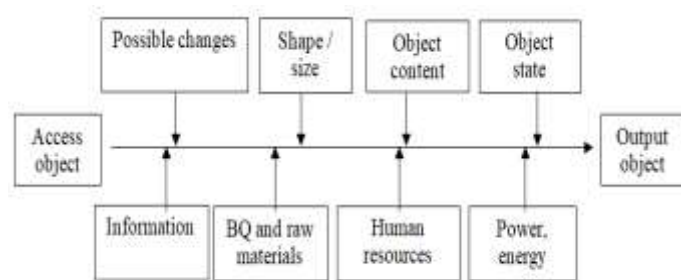


Figure 1. Schematic form of the technological process

For this, indicators summarizing the technical level and efficiency of new techniques and technologies are used.

It is in the stage of scientific research: responsiveness, patent purity, level of standardization and unification, research and development costs, economic efficiency, scientific intensity, continuity of design, product complexity, variability, ergonomic indicators, aesthetic indicators, safety, environment indicators.

In the production stage: performance, speed, parameters and dimensions, management, optimal structure, optimal performance, reliability and security; economic indicators: labour intensity, material consumption, capital intensity, basic costs, labour productivity, specific capital investments, degree of mechanization, automation.

In use: reliability, safety, stability, performance, power, manufacturability, lifetime, efficiency, design, operating costs,

availability of components and spare parts, serviceability, warranty.

That is, indicators of the innovative technical level of production describe the economic efficiency of measures for its technical and organizational development.

Table 1. Indicators of technological level of production

<i>Indicators of technological level of production</i>	
Scientific and technical level	Production level
New product	Technological discipline
Technological efficiency	Production flow
Technological progress	Technical and energy armament
The level of development of production technological equipment	Production automation, support and re-equipment
Technical and technological level of production	

The state of production technology is the most important factor that predetermines the quality of manufactured products. Therefore, each product is the most complete and clear indicator of the development of production technology. At the same time, technological development depends on a number of elements of production that have an active influence: formation of the equipment park; staffing; use of new materials, fuel and raw materials [22-28].

The technological level is the technological cycle of production, where the person who controls the means of production performs the professional operations necessary for the creation of the product, technology in general for individual products and groups of products, individual units, assemblies and spare parts in the enterprise may be production technology [29-31]. External indicators of the level of technology include:

1. Work mechanization coefficient (Km.r), labour mechanization (Km.t) and labour intensity mechanization (Km.tr):

$$K_{M.P} = \frac{O_M}{O}; K_{M.m} = \frac{T_M}{T}; K_{M.P} = \frac{K_{Mm}}{K_{M.P}};$$

Here:

$O_{m.p.}$ - the volume of mechanized production (work);

O - the total volume of work;

T_M - working time spent on mechanized work;

T is the total time worked for a certain volume of production or work.

Automation coefficient; Share of advanced technological processes;

Accuracy factor; Proportion of production equipment; The share of products produced by progressive technological methods and the ratio of works performed using progressive technologies; Specific weight of machine time in technological labour intensity; Indicators of technological discipline; Coefficient of unification and standardization.

The level of technology also depends on:

- the level of mechanization and automation of technological management, the level of technological influence of various methods (physical, chemical, mechanical, etc.), the subject of work, the level of technological intensity of the process, the level of use of material, energy and time parameters of the technological process;
- from the level of technological management - the ability to change technological processes when external factors change, to achieve the highest productivity and maximum production efficiency for the highest profit, to the level of technological organization of the process (process continuity, number, optimal composition), to the level of adaptation of the technological process - the possibility of operation of the technology following this mode in combination with the existing production and environment [28-33].

We will consider the technical level and efficiency indicators of the new technology. Innovative technologies ensure the technological progress of production and largely determine the technical level and efficiency of the technology.

The level of technological influence: mechanization, automation, electronification;

physical, chemical, mechanical, electronic, ion, other types of effects, and the level of use of computers and ABTs.

The level of technological intensity: metal cutting speed, raw materials, energy consumption; duration of the technological cycle; level of utilization of production space and equipment, etc.

Level of technological organization: a combination of technological methods;

- continuity of processes; the number of technological stages of processing;
- the number and directions of movement of material flows;

The degree of adaptation of the technological process: reliability, smoothness and security; preservation of tools and technologies, compliance with technical aesthetics and ergonomics requirements.

Modern technological processes are seen as economic objects. The level of modern technology development determines the competitiveness of the enterprise in many ways and therefore has an economic impact. This effect affects each layer of the enterprise differently during the production process.

Conclusion

- The share of innovative products in any country can be high only if the level of development of education, science and technology imports is at an appropriate level.
- Innovative approach- this is the final result of the introduction of innovation (scientific achievement) to meet the needs of the market (production) by changing the object of management and obtaining an economic, social, ecological, scientific-technical or another type of impact.
- The level of technological development is an important indicator of every manufacturing enterprise.
- Changes in technological processes should lead to an increase in the level of technological armament and technological development.
- The level of technological development is an indicator of the introduction of new

techniques and technology and production efficiency.

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