

INNOVATION OF AUTOMATION OF THE CHEMICAL INDUSTRY IN THE FIELD OF ECONOMICS

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Abstract: *The authors are investigating the state in modern conditions of innovation of the industrial economy of complex automation and mechanization of chemical industry productions, great attention is paid since the flow of chemical-technological processes is characterized by complexity, high speed, and sensitivity to deviations from the specified modes, the harmfulness of the working area environment, the danger of processed substances. They prove that on the basis of modern technologies of automation of the chemical industry, its production data become the basis for making managerial decisions in the field of economics. For the purpose of complex automation of chemical industry productions, the authors recommend the introduction of a mathematical model of the control object, which would be obtained by the method of the active experiment of chemistry and economics specialists, consists in removing transient characteristics and determining the transfer function coefficients for the efficiency of production indicators.*

Keywords: *complex automation, market, economy, industry, chemical and technological processes, mechanization, efficiency, goods, modernization, digitalization.*

Introduction

In modern conditions, innovations in the industrial economy of complex automation and mechanization of chemical industry productions are given great attention, since the flow of chemical and technological processes is characterized by complexity, high speed, and sensitivity to deviations from the specified modes, the harmfulness of the working area environment, the danger of processed substances.

In connection with the automation of the chemical industry enterprise, optimization of such important indicators of the work of a chemical enterprise as the level of personnel safety, environmental protection and compliance with international quality control standards for manufactured chemical goods and material resources is now widely used. The introduction of automation of technological processes in the chemical industry leads to a reduction in the cost of production, as well as a maximum increase in the efficiency of production of consumer goods, special chemicals and organic (inorganic) products, both with continuous and periodic production processes of chemical industry enterprises.

Based on modern technologies of automation of the chemical industry, its production data become the basis for making managerial decisions in the field of economics.

In the conditions of modernization and digitalization of the chemical industry, modern automated process control systems require:

first, to regulate the quality of the chemical industry's products in accordance with the requirements of its technological regulations and to generate economic income;

second, the determination of the reliability of the equipment of the chemical industry enterprise, the possibility of preventing its breakdowns in order to carry out scheduled repairs in a timely manner on the basis of the provided information, and software automation of the chemical industry.

third, the introduction of the latest automatic equipment in the conditions of modernization and digitalization in the field of economic production.

fourth, the training of engineering and technical personnel with modern production technological processes in the chemical industry.

Chemical industry enterprises widely use various technological schemes, mainly using chemical methods, which are based on profound qualitative changes, as well as transformations of substances and materials, their composition, properties, condition and internal structure.

Chemical production methods allow the use of a variety of raw materials, including various wastes. Some chemical industry enterprises using mining and chemical raw materials perform their processing, as well as extraction, which significantly complicates the structure of such enterprises and the organization of the production process.

Problems of innovation in the economy of the chemical industry and their improvement tasks

The problems of automation of the chemical industry are the lack of information about the flow of highly complex technological processes of the chemical industry, as well as difficulties in comparing available data for conducting a qualitative analysis of the activities of a chemical industry enterprise in order to optimize its work.

In the modern conditions of globalization of the economy in the world, which, as a result of chemical transformations, change the state of substances and purposefully obtain products with specially specified properties, high demands are placed on the quality of raw materials, as well as the preparation of the raw material base. Therefore, the correct organization of technical control of the raw materials used in the chemical industry is of great importance.

A number of chemical industries are characterized by significant consumption of thermal and electrical energy, which determines the increased requirements for the organization of high-quality energy supply of the enterprise to ensure its clear and uninterrupted functioning.

Chemical industry enterprises operate in conditions of constant presence of various hazardous substances and their many technological processes take place at high pressures and

temperatures. This determines the increased requirements for occupational health and safety at a chemical enterprise. Harmful industries especially require the introduction of reliable automation systems for chemical processes.

Most of the technological processes of chemical production take place continuously within the workshop and the entire enterprise as a whole. The continuity of chemical and technological processes determines the importance of uninterrupted supply of chemical production with raw materials and materials, as well as the special organization of the work of service personnel.

A feature of the technological equipment of chemical enterprises is the use of closed devices of continuous or periodic action, which makes it difficult to directly monitor the progress of chemical and technological processes, the condition of technological equipment, as well as taking into account the number of semi-finished products used at various stages of production. This determines the equipment of technological devices with modern automated control systems for technological processes of the chemical industry. Special requirements are imposed on automation systems of chemical enterprises to ensure systematic monitoring of the serviceability of technological equipment, as well as timely inspections and repairs.

The complexity, as well as the variety of chemical and technological processes and technological equipment, the presence of complex automated process control systems of chemical industry enterprises place high qualification requirements on service personnel.

Modern and reliable automation systems are set tasks for the widespread introduction of technological processes in chemical production:

1. automation of chemical production of inorganic substances chemical production of sulfuric acid, chemical production of superphosphate, chemical production of ammonia, chemical production of ammonium nitrate;
2. automation of chemical production of organic substances chemical production of acetylene, chemical production of butadiene, chemical production of styrene from ethylbenzene;
3. automation of chemical production of polymers and elastomers chemical production of high-pressure polyethylene, chemical production of polypropylene, chemical production of styrene-butadiene latex);
4. automation of chemical fiber production, chemical production of viscose fiber, chemical production of polyamide fiber - nylon;
5. automation of chemical production of rubber products chemical production of automobile tires, chemical production of rubber technical products;
6. automated control system for technological processes of plastics processing.

Our proposed solution and its theoretical justification

For the development of automation of technological processes and production of the chemical industry, it is necessary:

- assignment and development of the working design of hydrocracking plants, regeneration of diesel fuel catalyst.
- simulation of the automatic control system.
- selection of automation tools in the conditions of modernization of automatic processes in the chemical industry

In this connection, the development of automation in the chemical industry is associated with the increasing intensification of technological processes and the growth of production, the use of units of large unit capacity, the complication of technological schemes and the presentation of increased requirements for the products obtained.

A technological process is understood as a set of technological operations carried out on the raw material in one or more apparatuses, the purpose of which is to obtain a product with specified properties; they are carried out in distillation columns, reactors, extractors, absorbers, dryers, and other apparatuses. Usually, in order to process chemicals and obtain target products from these devices, complex technological schemes are assembled.

The technological process in the chemical industry, implemented on the corresponding technological process for the production of chemical products, is called a technological control object (TOC).

Technological management of an object is a separate apparatus, unit, installation, department, workshop, production or enterprise. Various external disturbing influences (changes in the consumption or composition of raw materials, condition and characteristics of technological equipment, etc.) disrupt the operation. Therefore, in order to maintain its normal functioning, as well as, if necessary, to change its working conditions, for example, in order to conduct a technological process according to a certain program or to obtain a target product of a different quality or composition, it is necessary to manage production automation at chemical production enterprises.

Practical research and conclusions

In the conditions of modern economy, automation of production of the entire chemical industry system is necessary:

- conduct through the identification of the production facility management,
- identification of tasks for automation of production cycles for the release of chemical products on the market through the channel.

To develop practical applications of automation of production processes in the chemical industry and their importance in the field of economics.

To determine the purposeful impact of automation on the production facility, which ensures its optimal functioning and is quantified by the value of the quality criterion (indicator). The criteria may have a technological or economic nature (the productivity of the technological installation, the cost of production, etc.). With automatic control, the impact on the object is carried out by a special automatic device in a closed loop; such a connection of elements forms an automatic control system. Apply the case of management regulation in the market of chemical products.

Automatic regulation and maintenance of the output values of the object near the required constant or variable values in order to ensure the normal mode of its operation by applying control actions to the object.

Calculation of the economic effect of the introduction of a production automation system

An automatic device that ensures the maintenance of the output values of the object near the required values is called an automatic regulator automatic regulation hydrocracking chemical For example, for synthesis it is necessary to know the mathematical model of the production management object in the new economic conditions.

To introduce a mathematical model of the control object, which was obtained by the method of active experiment of chemistry and economics specialists, consists in removing the transient characteristics and determining the transfer function coefficients for the efficiency of production indicators based on them.

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