STUDYING THE MODEL OF SITUATIONAL CONTROL OF CHEMICAL-TECHNOLOGICAL PROCESSES

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Abstract: *This thesis considers models of chemical-technological process control and their analysis. Various aspects of situational management models for chemical production have been studied.*

Key words: *Chemical-technological processes, model, methods, situational management, control, diagnostics, decision making, optimization*

The situational control model for a chemical- technological process (ChTP) is one of the main models for managing production processes in the chemical industry.

It is a system that allows you to control ChTP in various situations, such as changes in input parameters, unexpected equipment failures, changes in the composition of raw materials, etc.

One of the important aspects of the model is the control of process parameters. To do this, it is necessary to determine the optimal values of parameters such as temperature, pressure, flow rate and concentration of components, and maintain them within specified limits. For this, various management methods are used, such as regulation, model management and optimization.

In addition, the ChTP situational control model includes mechanisms for diagnosing and preventing possible malfunctions in the process. Various methods are used for this, such as parameter monitoring, data analysis, prediction and diagnostics.

The ChTP situational management model consists of several main components:

1. Process model: describes the physical and chemical processes that occur within the ChTP.

2. Control model: defines control algorithms that allow you to maintain the specified process parameters within the standard values.

3. Diagnostic model: defines methods for detecting and diagnosing possible faults in equipment or process.

4. Decision-making model: defines decision-making algorithms in various situations that may arise in the process of managing ChTP.

The study of the ChTP situational control model requires knowledge in the field of chemical engineering and production automation. It is necessary to have an understanding of the physical and chemical processes occurring within the framework of the ChTP, as well as knowledge of the principles of control and diagnostics of production processes.

The process model includes a mathematical description of the physical and chemical processes occurring within the ChTP. This may be a description of the process in the form of equations, models or other mathematical algorithms that allow you to determine the interaction between the components of the process and its parameters. To create a process model, it is necessary to conduct experiments and collect data about the process, which can then be used to create a model.

The control model defines control algorithms that allow you to maintain the specified process parameters within the standard values. For this, various management methods are used, such as regulation, model management and optimization. For example, to maintain the temperature of the process within the specified limits, a control method can be used by changing the supply of heat or cooling.

The diagnostic model defines methods for detecting and diagnosing potential faults in a machine or process. Various methods are used for this, such as parameter monitoring, data analysis, prediction and diagnostics. For example, monitoring of parameters such as temperature, pressure, and flow rate and comparing them to predetermined guideline values can be used to detect possible equipment failure.

The decision-making model defines decision-making algorithms in various situations that may arise in the process of managing the ChTP. For this, various decision-making methods are used, such as risk analysis, optimization methods, and decision-making algorithms based on expert knowledge. For example, in the event of a hardware failure, an expert decision-making algorithm can be used to quickly determine the possible causes of the failure and select the most effective method for correcting it.

Also, within the framework of the ChTP situational control model, monitoring of process parameters is used. To do this, various sensors and instruments are used that allow you to control temperature, pressure, flow rate and other process

parameters. The received data is processed and analyzed using special programs that allow you to determine deviations from the specified standard values and take measures to eliminate them.

Another process management method used within the HTP situational management model is the use of artificial intelligence and machine learning. For example, to detect possible faults in a process, machine learning algorithms can be used that learn from a large amount of process data and are able to identify faults at an early stage.

In general, the ChTP situational control model is a complex system that combines various methods and technologies of process control. Its application improves production efficiency, ensures stable product quality and reduces the risk of process malfunctions.

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