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# AUTOMATION OF MEASUREMENT PROCESSES OF GAS CONSUMPTION IN HIGH PRESSURE

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The modern level of automation of production processes is gradually characterized by the emergence of integrated scientific-production complexes (INEIK). This is a very high level of automation. It is necessary to apply such flexible computing technologies and automation tools within INEIK that the entire production process, i.e. from scientific research to the release of finished products was carried out automatically. To ensure the required flexibility of such systems, control should be carried out only with ED networks. In this sense, when talking about the problems of automation of production processes, it should be taken into account that the goal is to create a flexible automated production process. [1]

This type of automation is accompanied by the solution of very complex, heterogeneous tasks. All over the world, these problems are called automation problems. These problems can be prioritized over each other or have the same priority. The main issue for solving the problem of the gas flow measurement system and its commercial accounting is to provide the metrological features required during flow measurement, as well as to create conditions for obtaining prompt, complete and reliable data.

Recently, the rapid development of computer technology, the wide application of microprocessor and microcontroller technologies have created the possibility of using software products in the qualitative solution of the above tasks. In other words, the installation of microprocessors and microcontrollers in the mentioned devices and devices significantly increases the capabilities of the devices themselves, as well as the capabilities of the system as a whole and, of course, its efficiency, ensuring the intelligence of the devices and higher metrological indicators [6, p.427]. In this regard, when choosing a flow meter, it is necessary to study the functionality of the proposed device, taking into account this factor. Therefore, special attention should be paid to this aspect of the issue in the process of selecting flow meters. On the other hand, by improving the software, it is possible to achieve higher efficiency by increasing the functional capabilities of the central processor of the system, that is, the main computer.

When designing, it is necessary to take into account the multifunctionality of the used algorithms, that is, the possibility of using the same algorithm in different modes and situations. At the same time, it should not be forgotten that oil and gas production enterprises have a distributed structure. On the other hand, the inclusion of structural redundancy, such as the provision of redundant measurement channels, also increases the reliability of the system. This also implies efficient use of the measurement channel. In addition, strict requirements must be placed on gas flow conversion and measurement. Output signals of transmitters can not only be in the form of different physical quantities, but also because signals of the same form have different parameters, normalization is required - limiting, amplifying and filtering of these signals. The use of mathematical models of the devices allows to correct the indicators and dynamic characteristics of the devices, taking into account the changes in the environmental parameters. It is considered necessary to perform the process of filtering the measured value from random obstacles and interferences.

In addition to hard processing and control algorithms, one of the ways to increase the efficiency of the system is to use fuzzy processing algorithms that allow considering all possible options. It was determined that fuzzy parameters appear both during the selection of flowmeters and in the technological process. This leads to the need to prioritize the processing of the output signal of the flow meter with fuzzy algorithms.

In modern management theory, problems with different priorities are expressed at different levels. Tasks with the same priority form the scope of this level. A typical automation process (Figure 1) is more correctly explained by a pyramidal structure, taking into account the priorities. The philosophy of analogy is determined by the characteristics of the pyramid itself. The top of the pyramid represents the ultimate goal of automation. Although it is short and specific in meaning, it is very broad in content and requires a lot of exposition. When content is discovered (surfaces parallel to the pyramid seat), automation tasks expand (pyramid height). Thus, the main levels are: planning, optimization of the production process, programming, management - regulation of the production process.

These levels are usually called individual systems or subsystems of the overall system. However, at the moment there is some uncertainty about the priority. [2,3]. The production process is the most important and the lowest level of the automation structure. The most important thing is the industrial equipment and the technological process that takes place there. The importance of this level is that reliability, performance, flexibility, etc. achieved after automation. The actual possible indications of its parameters are determined by the composition of this level.

The next level is the management and regulation level. Here, management should be understood only as management of industrial equipment that is part of the production process. Production management itself is the highest levels of planning, optimization and programming.

Another problem of the automation process is the creation of an information system. The information system includes feedback lines from the most common sensors, as well as data banks that provide automation of flexible control and programming algorithms. These banks have a lot of information about the production program, the initial state of the production process and the recording of the output states of the production process. At the same time, conventional signals from transmitters are feedback signals of both control systems and individual equipment control systems and can be used to adjust control and monitoring software and equipment diagnostics. In this sense, the information system of the automated production process can be studied as its own simulation model. A simple explanation of how an information system works is that there is always an exchange of information: this exchange can take place at different levels and between different parties at the same level.

In general, the typical components of any automated system, regardless of the level of automation, are control, regulation and control, programming, testing and documentation, as well as programming languages.

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