Creation of a pumping station management system in the Urtabulak gas field

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Abstract: This article presents the development and implementation of a comprehensive management system tailored for pumping stations within the Ortabulak gas field. The system integrates various technologies and methodologies to optimize operations, enhance efficiency, and ensure reliable performance of the pumping stations. Through detailed analysis and strategic planning, the management system addresses key challenges faced in the field, offering innovative solutions to improve overall productivity and resource utilization. They focusing on proactive monitoring, maintenance scheduling, and data-driven decision-making, the system aims to streamline operations, minimize downtime, and maximize the output of the gas field's pumping infrastructure.

Keywords: Management system, pumping stations, Ortabulak gas field, optimization, efficiency, reliability, operations, maintenance, monitoring, data-driven, productivity, infrastructure, resource utilization, strategic planning.

Introduction:

Log in. In recent decades, the global manufacturing industry has undergone significant changes, shifting from traditional role automation settings to computerized control systems. Leading industrial enterprises in the country are adopting this transition process, realizing the need to modernize their activities with advanced technology. In a recent address, our President emphasized this need and emphasized that modernizing technological processes allows the production of competitive products for the international market. The National Literature Programme plays an important role in the development of modern information technology in this area, especially educational programs, and the improvement

of the skills of information and communication technologies. The programme aims to unite the country's information infrastructure with world standards, promote socio-economic development and improving competitiveness. The decree, adopted in 2002, reiterates the government's commitment to computerization and the development of information technology throughout the country, and to improve the country's economic competitiveness. Looking ahead, the focus will be on nurturing a skilled workforce capable of using emerging technologies to implement innovative solutions and effectively solve real problems.

Medium-sized gas cone needed for U.S. energy. Located on the border with Turkmenistan in the southern region of Uzbekistan, the Middle East oil and gas condensate condensate condensate is an important natural gas tank with many years of history. Since its founding in 1961, the con has played a crucial role in the country's energy sector, attracting attention with its production capabilities and unique problems it has faced.

It is noteworthy that the con gained international recognition due to the devastating explosion of a natural gas well, which brought an unprecedented response: the use of a nuclear bomb to seal a well. This event was a historic stage in which we demonstrated innovative problem solving in the event of accidents in production. Geographically, the Ortabulok Cone is located in a hilly relef, and the Middle East is located on the tectonic point of Chorjo, in the eastern part of the Sea Of The Sea. The geological formation of the territory includes mesozoic and kaynozoic beds, which are distinguished by carbonate in the Qumtosh, alevolitosh, giltosh and Kelloveyoxford basin.

The geological structure of the cone has an important Brchiyanticliny, located in the central part of which is graben, which includes mostly paleogenic layers. The shear amplitude of these structural wings reaches 300 m, which is evidenced by significant geological activity over time.

Carbon monoxide is a colorless, olessless gas that kills by reeds. These cones, in particular the 15R and 15NR horizons, are distinguished by organogendetritic limestones with a high porosity and facilitate gas extraction. The cone's operational infrastructure includes six wells that are dug to a depth of 2510 meters to 2500 meters, giving gas on an industrial scale. In addition, at a depth of 2578 meters to 2556 meters, batteries with a flow of 300 liters of oil per day were opened in five wells. The gas collector himself shows the formation of an expanse, which is characterized by a massive appearance and large gas reserves. However, the water of the layer associated with 15 horizons has a high mineralization, is related to the type of namakob, causing certain difficulties in the extraction work.

Despite such complexities, the Middle East cone serves as an important component of U.S. energy infrastructure. Its constant use emphasizes the importance of flexible technologies and strategic management in optimizing resource extraction and ensuring sustainable energy production for the country.

The possibilities and application of the Simple-SCADA software complex for the creation of automated technological systems. Automated process management systems are usually divided into hardware and software components. The equipment segment includes system devices, mechanisms, electronic parts and related physical components. In contrast, software support includes a wide variety of software packages designed to design automated systems. In the global landscape, corporations operate in this area in a variety of capacities. Some focus solely on the manufacture of hardware components such as modules, controllers, converters and terminal blocks. Others specialize in developing software for these systems. In addition, some corporations do an all-round development that includes hardware and software components. Both hardware and software packages mature over time, improving their functionality and addressing specific flaws. It is worth noting that optimized software can make the most of the capabilities of hardware components within automated systems and thus improve overall system efficiency. However, the possible drawback arises from the constraints of

compliance between automated systems and other software applications. This can create difficulties when these systems are integrated into wider technological ecosystems or interact with external software platforms. Therefore, while the development of integrated hardware and software solutions can streamline operations and improve efficiency, maintaining compliance remains a critical issue for corporations operating in this area.

Let's take a look at the purpose and possibilities of the TRACE MODE software package developed by the group AdAstra, which is renowned for creating software solutions for automated systems of technological processes in Russia. This software package is important because it is the basis for the design and use of automated management systems in various enterprises through our country.

Figure 1. The main window of the program, here the Ventilation system is fully displayed.

"TRACE MODE" is available in several versions, each designed to meet evolving technological requirements. Previous iterations up to version 4.10 run in a DOS environment. Subsequently, starting with version "5.0", the package will switch to a Windows environment according to modern computing standards and user preferences.

The TRACE MODE software package is a comprehensive software solution that, in its essence, makes it easier to create, configure, and operate technological process management systems in real-time. Its functionality is structured in two main groups of applications:

1. Instrumental System for Designing Automatic Process Management Systems (TJ ABS): This component serves as the basis of the TRACE MODE package, enabling engineers and designers to conceptualize and develop automated management systems with precision and efficiency. Instrumental system offers a customized suite of tools and features for the design, modeling and simulation of complex management processes under various industrial conditions.

2. TJ ABS Performance Module (uptime): The design phase complementary uptime module ensures the continuous implementation and operation of automated control systems developed in the TRACE MODE environment. By providing real-time monitoring, data collection, and management functionalities, this module ensures the continuous and efficient operation of automated processes in an industrial environment.
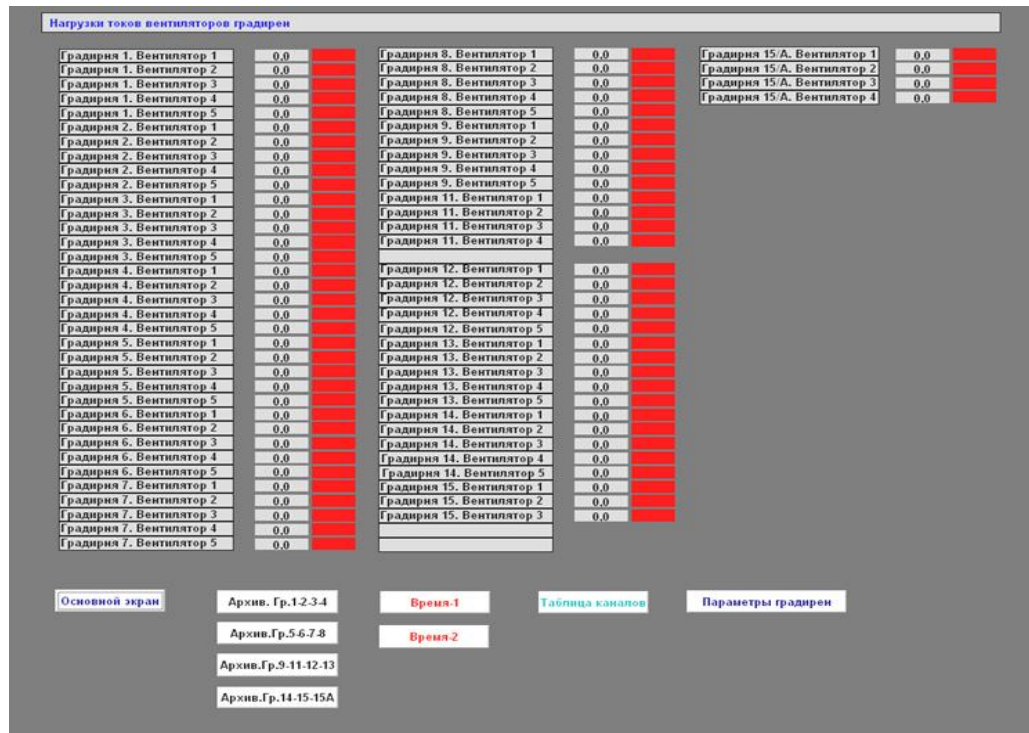
Figure 2. This window shows the load of ventilators in the graph

The versatility and flexibility of the "TRACE MODE" software suite makes it an preferred choice for businesses looking for reliable solutions for their automation needs. In production, energy production or infrastructure management, TRACE MODE offers a wide range of tools and facilities to meet various operational requirements.

The main features and capabilities of the "TRACE MODE" software package include:

- Intuitive design interface: "TRACE MODE" provides a user-friendly design interface equipped with drag-and-drop function, graphical modeling tools and customized templates. This intuitive environment simplifies the design process and allows engineers to easily conceptualize and customize control systems.

- Flexible configuration options: The software kit offers users extensive configuration options that allow them to customize control algorithms, determine system parameters, and adapt user interfaces to meet specific operating needs. This flexibility ensures that control systems adapt to variable requirements and adapt to changes in process conditions.

- Real-time monitoring and control: With an uptime module, "TRACE MODE" makes it easy to track and manage automated processes in real-time, providing operators with quick access to important data and system status updates. It improves real-time performance efficiency, allows timely interventions and optimization to maximize efficiency and resource usage.

- Comprehensive diagnostics and reporting: "TRACE MODE" includes advanced diagnostic tools and reporting functions that enable operators to analyze system performance, identify potential problems, and generate comprehensive reports for further analysis and optimization. This capability improves system reliability and facilitates proactive maintenance, minimizes downtime and ensures uninterrupted operation.

- Uninterrupted integration with external systems: The software package supports seamless integration with external systems, allowing for interaction with third-party devices, sensors and applications. This cross-compliance increases the scalability and versatility of automated control systems, allowing for easy expansion and integration within existing infrastructure frameworks.
- Powerful security features: Recognizing the importance of data security and system integrity, "TRACE MODE" includes robust security features, including user authentication, access control mechanisms, and data encryption protocols. These security measures protect confidential information and ensure compliance with regulatory requirements, reducing the risk of unauthorized access or data breaches.

Figure 3. Graphically release the state of the ventilators in the graph at the time of their work.

The specified applications facilitate various critical operations necessary for the continuous operation of automated systems of technological processes. These operations include visualizing the progress of the process on computer screens, creating a real database, managing technological processes, working with the data obtained, archiving technical process information in a timely manner, and preparing reporting forms.

Instrumental systems in these programs indicate differences in the number of common points for receiving and extracting information. Licensed programs typically offer a variety of capacities on a single block (automated system) ranging from 128 to 64,000 input-output signals. Input signals represent data from devices used in the technological process, and output signals represent signals transmitted to executive mechanisms and measuring instruments. Devices such as thermojufts and thermoresistans for measuring temperature, sapphire gauges for pressurising and vacuum sensing, and seat interfaces indicating working condition are usually integrated into these systems.

The channel database editor serves as the main tool for completing several important tasks:

1. Create a math base:

The editor provides the basis for determining management logic and operating parameters, enabling the mathematical foundations of an automated management system to be formed.

2. Configuration description:

Users can specify the configuration of workstations, controllers and communication devices within a technological object, facilitating continuous communication and coordination between system components.

3. Visualization of information streams:

It visually represents the directions of information flows between editing devices, helping to identify communication paths and data exchange protocols.

4. Display the alarm and collect data:

Input and output signals, along with their respective data collection mechanisms, are identified and configured within the editor, providing accurate data collection and transmission.

5. Manage information exchange:

Users can determine the frequency and mode of data exchange between workstations and objects, optimizing system performance and respiration.

6. Data Processing and Management Logic:

The editor helps to primary process the information received and transmitted, including determining technological boundaries, determining processing logic, and establishing management protocols.

7. Archiving and network communication:

Technological parameters are archived within the system, ensure data integrity and facilitate historical analysis. In addition, the editor provides seamless communication and collaboration, making it easy to communicate across networked systems.

In fact, the channel database editor serves as the basis for creating a mathematical and information structure of the TJ BAS project. This structure includes a set of major channels, configuration files for controller and workstations, and project configuration settings. Configuration files specified by the ".cmt" extension are stored in the working catalog, while the channel database stored in the ".dbb" extension file contains important system information. The editor can be started by starting the "chb.exe" application, which can be accessed through the corresponding icon in the instrumental system interface.

Conclusion. In conclusion, the channel database editor plays a crucial role in shaping the functionality and operation of automated management systems for technological processes. By facilitating the creation, configuration and management of system components, this tool allows users to design and deploy efficient and robust automation solutions adapted to their specific requirements.

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