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DEVELOPMENT OF THE STRUCTURAL SCHEME FOR MANAGING THE COAL BRIQUETTE PRODUCTION PROCESS

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Abstract: This article focuses on the development of a structural scheme for managing the coal briquette production process. It presents an analysis of the key components involved in the production process, including the machinery, technological stages, and the overall management system. The paper discusses the integration of various processes and systems to optimize the production of coal briquettes, improve efficiency, and reduce costs. The proposed structural scheme aims to enhance the control and monitoring of the production stages, ensuring high-quality output and effective management.

Keywords: Coal briquette production, process management, structural scheme, efficiency, technological stages, production optimization, control systems.

Introduction. Coal briquettes are widely used as an energy source in various industrial and power generation applications. They are produced by compressing coal into a compact form, making them easier to transport, store, and handle. However, the production process of coal briquettes is complex, involving several technological stages that require effective management to ensure optimal efficiency and quality. This article focuses on the development of a structural scheme for managing the coal briquette production process. It aims to explore the key components involved in production, including machinery, materials, and resource management, while also proposing strategies for optimizing these processes to enhance productivity. A well-organized management system plays a vital role in improving the quality of the final product, simplifying production stages, and reducing costs. This paper presents the necessary structural framework and approach for improving the coal briquette production system, contributing to both efficiency and quality enhancement in the industry. The development of a structural scheme of an automated system is understood as a description of the general view of the control of the technological process. The structural scheme of an automated system is developed on the basis of three-level control. In the automation of small enterprises, the structural scheme can be developed as a two-level control system. The specification of a specific control system is determined by the software and hardware platform used at each level in it.

The three-level management system consists of:

-lower level (field);

-medium level (controlled);

-high level (information-computation).

To develop the structure of the management system, we will consider each level separately.

Coal briquettes working release The structural scheme of the automation and control of the process looks like this:

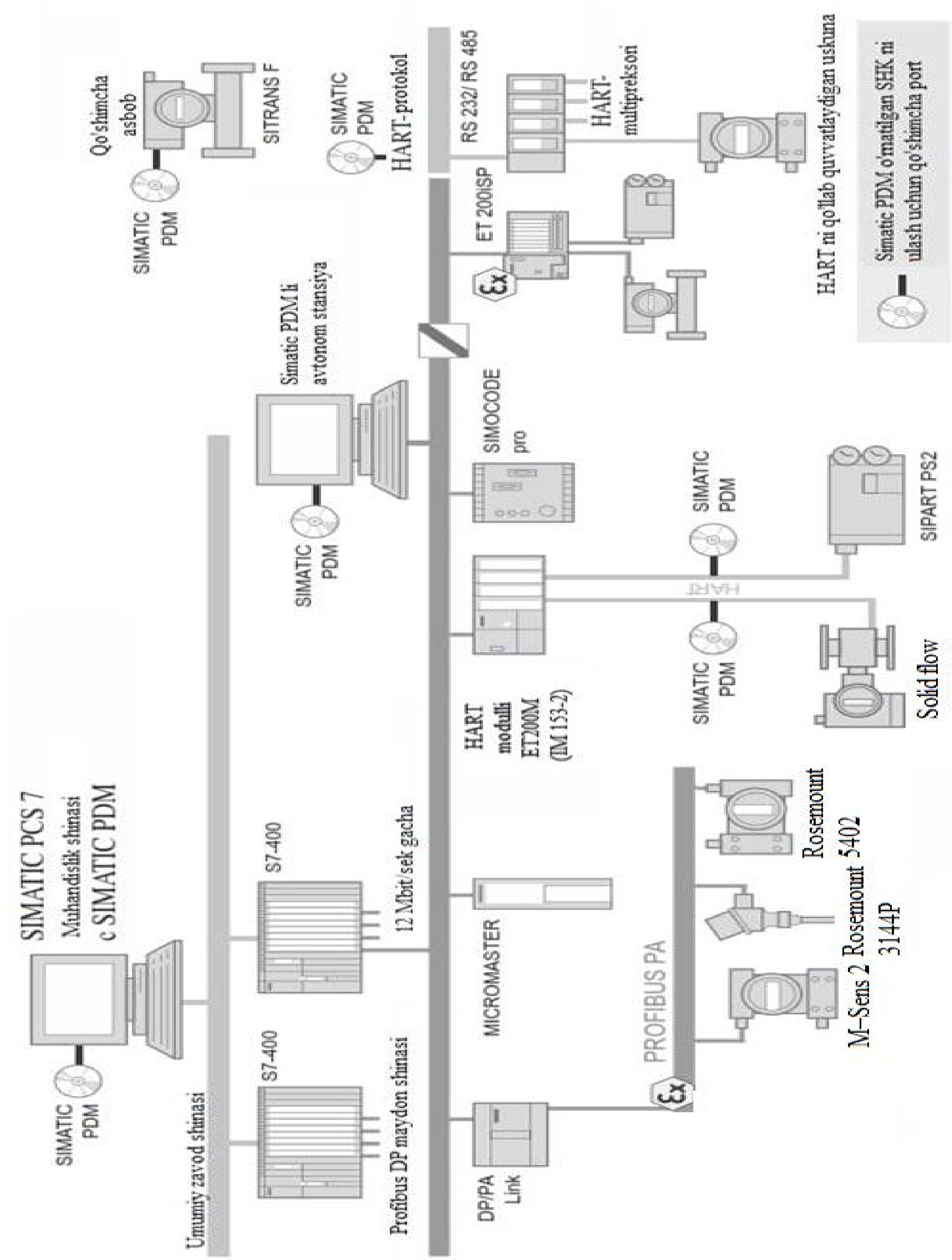

Figure 2. Coal briquettes working release process automation and control system structural scheme

1. The lower level (field) consists of primary sensors that collect information about the progress of the technological process, actuators that implement control and adjustment effects, as well as cables, terminal blocks, and switches.

2. The middle level (controller) consists of controllers, analog-to-digital and digital-to-analog converters, and devices (gateways) designed to provide communication with the higher level. If several controllers are used in the control system, they can be interconnected via controller networks.

Typically, controller networks are built on the basis of RS-232, RS-485 interfaces or, if appropriate controllers are used, on the basis of systems that cooperate with servers of Profibus, HART, CAN and other ORS and SCADA systems.

3. The higher level (information-computing) consists of computers and they are connected to Ethernet, Token Ring, ARCnet, ATM (Asynchronous Transfer Mode), Low-level sensors transmit information to middle-level controllers that control the process. Controllers perform the following functions:

-collection, processing and storage of information on the condition of equipment and technological process parameters;

-automatic logical control and adjustment;

-execute commands from the control point;

-diagnostics of the software and the controller itself;

-exchange of information with the control point.

These schemes determine the composition of the elements of the automation system, reflect the connections between them, the methods of power supply of devices and automation means. The initial material for the development of the principle electrical scheme is the scheme of automation of technological processes. The AES, in turn, serves as the basis for the development of assembly diagrams of assemblies and other technical documentation [18-24].

This diagram shows the power supply of measuring instruments and automation equipment.

The following issues are addressed when designing the scheme:

1. Type of electric current, voltage value, source power, etc.

2. The reliability of the supply scheme is being reviewed.

3. Depending on the importance category of the technological facility, continuity of supply, backup, etc.

4. Protecting devices from short circuits and continuous overloads;

5. Measures to disconnect from the power source when repairing, adjusting, and servicing vehicles;

These power supply networks can be of the following types: single-phase and two-wire with neutral; two-phase two-wire; two-wire with constant current; three-phase with three wires; three-phase four-wire.

Depending on the location of the power supply panels and power sources, the power supply of automation systems can take on different forms.

If the supply shields and assemblies are located on different sides relative to the supply source and the distances between the shields are large, a supply network scheme is used.

When the distance between the switchboard and the assemblies is relatively close to the supply source, trunk circuits are chosen. Distribution networks are usually made radially, in which the electrical consumers are connected to the switchboard by several radial lines. Control and protection devices can be installed in power supply networks as follows .

1. On supply lines - automatic circuit breakers or fuses; these are installed at the point of connection to the supply source, as well as at the entrance to the shield and assemblies;

2. The chain of electric actuators includes a circuit breaker and a magnetic starter or a switch, fuses and a magnetic starter.

3. In circuits of instruments, automation devices, transformers, rectifiers - switches and fuses or automatic circuit breakers;

4. Signaling circuits in supply chains - switches and fuses or circuit breakers;

5. Circuit breaker and fuse in the lighting circuits of the panels.

In the distribution and supply networks of electricity supply, package switches, control switches, and tumblers can be used.

The following should be considered when designing:

1. If the electricity consumer has its own circuit breakers and fuses, control and protection devices are not installed;

2. If there is a fuse in the electrical consumer circuit, only the control device is selected;

3. It is prohibited to install control and protection devices on grounding wires;

4. In devices with interconnected circuits (for example, a sensor and a secondary device), common control and protection devices are provided;

Conclusion. In conclusion, the development of a structural scheme for managing the coal briquette production process is crucial for improving efficiency, optimizing resources, and ensuring high-quality output. By integrating the various technological stages and control systems, the proposed management system offers a comprehensive approach to streamline the production process, reduce costs, and enhance product quality. Effective management and monitoring of each stage are essential for achieving sustainable and cost-effective coal briquette production. This article emphasizes the importance of a well-organized control system and suggests practical approaches to enhance the overall production process, ultimately contributing to the advancement of the coal industry.

References

1. Guliyev, I. (2021). "Technological Processes and Equipment for Coal Briquette Production". *Journal of Energy and Industry*, 12(4), 56-62.

2. Ahmedov, B. (2020). "Optimization of Coal Briquette Production Process". *Coal Technology Review*, 14(3), 45-49.

3. Sodiqov, F. (2019). "Management Systems in Coal Briquette Production: A Structural Approach". *Industrial Management and Technology*, 8(2), 33-40.

4. Karimov, R., & Ismailov, M. (2018). "Innovative Methods in Coal Briquette Manufacturing". *Energy and Environmental Engineering*, 15(7), 78-83.

5. Xudoyberganova, D. (2022). "The Role of Efficient Management Systems in Coal Briquette Production". *Energy Efficiency Journal*, 20(1), 14-21.

6. Komilov, S., & Gafurov, T. (2021). "Optimization of Technological Processes in Briquette Production". *Journal of Coal Science and Technology*, 13(5), 92-97.

7. Ismailov, B. (2017). "Efficiency Improvements in Coal Briquette Production". *Energy Management Review*, 10(6), 55-60.