

Karshi engineering-economic institute

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Theme : Process Automation

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Theme : Process Automation

Plan :

1. **Automation of the process**
2. **Partial automation**
3. **Automatic control system**
4. **The basis of process automation**

Automation of the process - a set of methods and tools for implementing the system or systems to be controlled by the process without direct human intervention, or the abandonment of the man the right to take the most important decisions.

As a rule, as a result of process automation created APCS.

The basis of process automation - a redistribution of material, energy and information flows in accordance with the management criteria (optimal).

Partial automation - automation of individual devices, machines, manufacturing operations. Produced when the process control due to their complexity and rapidity almost inaccessible to man. Partially automated usually operating equipment. Local automation is widely used in the food industry. Integrated automation - provides automation of technological area, shop, or enterprise operating as a single, automated system. For example, a power plant Full automation - the highest level of automation, in which all production monitoring and control functions (at the enterprise level) passed technical means. Full automation is not widely applied at the present level of development, as the control functions remain a man. Close to the complete automation of the enterprise can be called a nuclear power.

The main objectives of process automation are:

- reduction of staff;
- the increase of production volumes;
- improving the efficiency of the manufacturing process;
- improving product quality;
- reduction in raw material costs;
- increasing the rhythm of production;
- improving security;
- improving environmental performance;
- increase efficiency

Automation - one of the areas of scientific and technological progress, the use of

self-regulatory technical equipment, economic and mathematical methods and systems of control that would exempt a person from participating in the process of obtaining, transformation, transmission and use of energy, materials or information, significantly reducing the degree of involvement or the complexity of running operations.

It requires additional use of sensors (sensors), input devices, control devices (controllers), actuators, display devices using electronic equipment and calculation methods, sometimes copying nervous and mental functions of humans. Along with the term automatic, automated concept is used, a relatively large degree of emphasizing human involvement.



Automate:

- Production processes;
- Design;
- Organization, planning and management;
- Scientific research.
- business processes

The goal of automation - increasing productivity, improving product quality, management optimization, elimination of human productions that are dangerous to health, improving the reliability and accuracy of production, increase convertibility and reducing data processing time. Automation, except in the simplest of cases, requires a comprehensive, systematic approach to problem solving, so the decision facing the automation tasks are usually referred to, such systems:

- Automatic control system (ACS);
- Automation system design work (CAD);
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Automated process control system (APCS). Automation has a number of advantages and disadvantages in comparison with the previous stage of technical development.

The main advantages are:

- Replacement of the human in tasks involving heavy physical or monotonous work.
- Replacement of the human in the performance of tasks in hazardous environments (ie: fire, space, volcanoes, nuclear facilities under water, etc.)
- The tasks that are beyond human capabilities by weight, speed, endurance, etc.
- The economy improved. Automation can make improvements in the economy of the company, society or the greater part of humanity.

The main disadvantages of automation are:

- The increase in the unemployment rate due to the release of people as a result of the replacement of labor by machines.
- Technical limitations.
- Threats to security / vulnerability.
- Unexpected development costs.
- High initial cost.

Process Automation

Automation of the process - a set of methods and tools for implementing the system or systems to be controlled by the process without direct human intervention, or the abandonment of the man the right to take the most important decisions



The basis of process automation - a redistribution of material, energy and information flows in accordance with the management criteria (optimal). The main objectives of process automation are: · Improving the efficiency of the production process. · Improved safety. · Improving environmental performance. · Increase efficiency. Achieving the goals achieved by the following objectives:

- Improving the quality of regulation
- Increase equipment availability factor
- Improved ergonomics of the labor process operators
- Ensuring the accuracy of information about the material components used in the production (including using the Directory Management)
- Storage of information on the process and emergency situations

Automation of technological processes in a single production process allows you to organize the basis for the implementation of the production management systems and enterprise management systems.

As a rule, as a result of process automation created APCS.

Automated process control system (PCS) - a set of hardware and software designed to automate the management of technological equipment in the workplace. It may be linked to a global automated enterprise management system (MIS).

Under SCADA usually refers to a comprehensive solution that provides automation of key process steps in the production process, as a whole or some portion thereof that produces a relatively finished product.

The term "automatic" as opposed to the term "automated" emphasizes the possibility of human involvement in individual transactions, in order to preserve human control over the process, and due to the complexity or otherwise of the automation of certain operations.



The components of the control system can be selected automatic control system (ACS) and the automated devices connected into a single complex. As a rule the control system is a single system operator controls the process in the form of one or more management consoles, agent processing and archiving of information on the process, typical automation elements: sensors, controllers, actuators. For data communication of all subsystems are used industrial networks. Due to the different approaches are distinguished automation of the following processes:

- Automation of continuous processes (Process Automation)
- Automation of discrete processes (Factory Automation)
- Automation hybrid processes (Hybrid Automation)

Automatic control system

Automated control system or automatic control system - a set of hardware and software designed to manage various processes within the production process, production enterprises. ACS used in various industries, energy, transportation, and so

on.. The term automated, unlike the term emphasizes the automatic saving of a human operator of certain functions or the most common, purposeful character, or is not amenable to automation.

Types of ACS:

- Automated Process Control System (APCS) - solves the problem of operational management and control of technical objects in industry, energy, transport
- Automated production management systems (PACS) - solves the problem of the organization of production, including the main production processes, inbound and outbound logistics. It provides short-term planning, taking into account the release of production capacity, product quality analysis, simulation of the production process. To address these challenges apply MIS and MES-systems and LIMS-system.



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