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# INDUSTRY 4.0: SMART PRODUCTION EQUIPMENT

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**Abstract:**
The article substantiates the use of smart production equipment, which is the basis of Industry 4.0. The emphasis is on software that controls the operation of not one installation, but a group of machines and systems as a whole.

**Keywords:** smart equipment, cyber-physical system, software, analytical systems, electronic services, equipment efficiency.

The key tool of smart manufacturing is, of course, equipment. It is on him that the level of technology, the quality of the final product, and the capabilities of the enterprise largely depend.
The industrial revolution would not have been possible without qualitative changes in production equipment. In this chapter, we will look at the main changes in this area, which we are already witnessing and will continue to witness in the coming years.
Even if you and I continue to call equipment equipment out of habit, it has already ceased to be just equipment, today it is already a physical element of a complex system that is rapidly developing towards a cyberphysical system (Fig. 1).

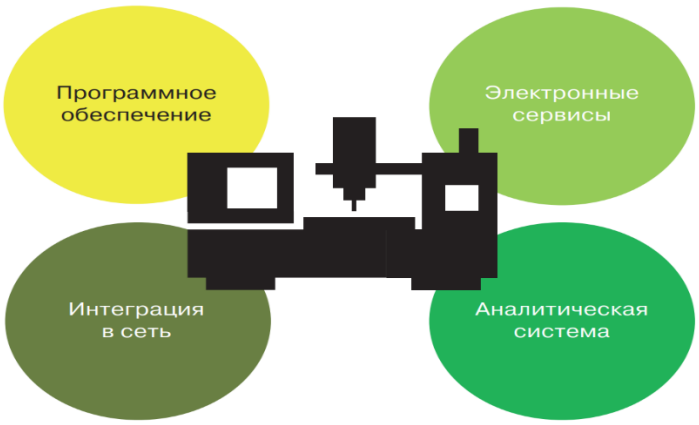


**Fig. 1. Production equipment as an element of the system**

Modern production systems must necessarily be equipped with a powerful software package that ensures the integration of various functions, including development, production and quality management.
For more efficient operation of the equipment, in some cases it is advisable to combine it into a network. This imposes additional requirements on this software: it must



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manage the operation of not one installation, but a group of machines and systems as a whole.

Analytical systems are finding their place in this field today. The software supplied with the equipment already today allows you to automate previously unavailable functions (or available using third-party software):

• analysis of electronic design documentation for compliance with technological requirements;
• analysis of equipment operation parameters for efficiency and compliance with operating requirements;
• identification of the causes of equipment failure;
• predicting equipment failure;
• work planning and dispatching of the equipment fleet;
• analysis of cause-and-effect relationships between defects and operating parameters of technological equipment;
• automatic optimization of equipment operation parameters and much more.

Meeting the market, equipment manufacturers and service companies are actively implementing electronic services that make the operation of equipment and the enterprise as a whole more efficient. These services may relate to machine park maintenance management, proactive delivery of tools and supplies, remote equipment diagnostics, or something else. Thus, modern machines and machine tools are elements of product and service systems Consider a closer look at some points related to the development of production equipment.

1. The Case DMG Mori CELOS: Company DMG Mori Seiki Co. Ltd., one of the world leaders in the field of metalworking, is actively developing software designed for more efficient use of equipment manufactured by the company. Today, the company offers its customers a wide range of software products integrated into the CELOS complex, which significantly improves the efficiency of equipment and related business processes.

**Fig.2. A set of applications for managing the DMG MORI equipment fleet. Photo: DMG MORI**



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With the help of a software package, an enterprise can combine functions such as software development for equipment, simulation of technological operations, monitoring of equipment operation, production planning, maintenance management, tooling management, and so on in a single information environment.

The Service Agent module is a comprehensive equipment maintenance management tool. It helps to carry out maintenance planning, diagnostics of the technical condition of equipment, early notification of the need for maintenance and placing orders for spare parts.

The Messenger module allows you to remotely monitor the status of the equipment fleet in real time, including using a smartphone, evaluate its effectiveness and receive notifications about emergency situations.

In addition, the company offers an equipment programming training module, which allows new employees to master their work skills before they receive a practical assignment.

The CELOS complex, a novelty of the company, is designed taking into account modern trends. Therefore, the complex also includes the Condition Analyzer module, which registers a large number of machine operation parameters (by the way, about big data), sends them to cloud storage and, based on the analysis of parameter values, allows you to identify unusual behavior of equipment. If the system detects a deviation in the operation of the machines, information about this is directly transmitted to the service center and the customer. This allows you to quickly intervene in the process, eliminating serious equipment damage.

In addition, the system provides the possibility of remote technical support from the manufacturer's service center.

Thus, thanks to an integrated approach to software and electronic services, users of DMG Mori equipment can use new opportunities to improve the efficiency of equipment, and the manufacturer receives additional competitive advantages.

**References:**

1. Evgeny Lipkin. Modern electronics. A magazine for specialists. E—book INDUSTRY 4.0: Smart Technologies are a key element in industrial competition. https://www.soel.ru/online/kniga-industriya-4-0-umnye-tekhnologii-klyuchevoy-element-v-promyshlennoy-konkurentsii-chast-12-umno

2. Saak A.E., Pakhomov E.V. Key technologies Industry 4.0, Societies 5.0, Economies 3.0 // Engineering Bulletin of the Don, No. 2 (2020) ivdon.ru/ru/magazine/archive/n2y2020/6324

3. IDC FutureScape: Worldwide IT Industry 2017 Predictions Latin America Impact, idclatin.com/predictions2017/PPT_IDC_LA_IT_Industry_FutureScape 2017.pdf (accessed on 26 December 2019).

4. Pakhomov E.V. Digital technologies of a smart city // Engineering Bulletin of the Don. 2017. № 3. URL:ivdon.ru/ru/magazine/archive/N3y2017/4367.



Journal Zone Publishing, Ilford, United Kingdom

5. Accenture Communications Technology Vision 2019. The Post-Digital Era is Upon Us, accenture.com/_acnmedia/PDF-108/Accenture-Communications Technology-Vision-2019-Full-Report.pdf (accessed on 26 December 2019).
6. The Essential Eight. Your guide to the emerging technologies revolutionizing business now, pwc.com/gx/en/issues/technology/essential-eighttechnologies.html (accessed on 26 December 2019).
7. National Intelligence Council. 2012. Global Trends 2030: Alternative Worlds, dni.gov/files/documents/GlobalTrends_2030.pdf.
8. National Intelligence Council. 2012. Global Trends: Paradox of Progress, dni.gov/files/documents/nic/GT-Full-Report.pdf.

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