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86. Computer-aided Manufacturing

Maxim Lyashenko, Liudmyla Vlasenko
National University of Food Technologies

Introduction: Computer-aided manufacturing is a process in the development of machine production, where the control and monitoring functions, previously performed by

the person, are transmitted to automatic devices. Introduction of automation in production can significantly improve productivity and product quality, reduce the proportion of workers employed in different spheres of production. In general automation promotes intensification of technological processes and reducing the cost of manufacturing products, is fundamentally changing the working conditions in the industry, smoothing out the contradiction between mental and physical labor.

Resources and methods: Prior to the introduction of automation, physical labor was replaced through mechanization of the main and auxiliary operations of the production process. Intellectual labor has longer duration not mechanized (manual). Currently the operation of physical and intellectual labor becomes the object of mechanization and automation. Basically CAM was created to implement production processes without direct human actions or partly under his control. As a consequence, productivity and quality of the production have been increased in several times

Results: The interesting fact is that automation process began much earlier than we might seem. Automation actually appeared almost immediately with the emergence of production and production itself has been around for a long time. Actually, the prototypes of modern sophisticated devices appeared in antiquity.

Surprisingly, but 40 years ago, nobody expected any machine to replace a human completely. As you know, first computers appeared in the early 50s. These ware bulky tube machines, taking a lot of space and consuming hundreds of kilowatts of electricity. They could only solve math problems. However, they had less computing power than today's calculators and, apparently, they couldn't have been used for controlling industrial processes. Nowadays, the impact of machines on every sphere of our life is difficult to exaggerate. There are even 2 types of automation: factory automation and brainwork automation.

Modern automatic control system has the following elements:

- CNC machines, which first appeared on the market in 1955(However their rapid spread began only with invention of microprocessors)
- Robotic Technology Complex(first appeared on market in 1970s-1980s)
- Flexible manufacturing systems
- Automated Storage and Retrieval Systems — AS/RS
- Computer-aided Quality Control — CAQ
- Computer-aided Design — CAD
- Computer-aided Planning — CAP

The Hershey Company, known until April 2005 as the Hershey Foods Corporation and commonly called Hershey's, is the largest chocolate manufacturer in North America. It was founded by Milton S. Hershey in 1894. Hershey is one of the oldest chocolate companies in the United States, and an American iconforits chocolate bar. This company is definitely one of the most successful on the whole market. This outstanding representative of food industry is also one of the largest purchasers of milk (7 hundred million pounds per year), nuts (2 hundred million pounds per year), and chocolate (6 hundred million pounds per year) in North America. With more than 13000 employees, Hersey's company has from 4 to 8 billion dollars revenue annually.

Everything begins with transporting cocoa beans to the starting point of production. This function is made by specially-mechanized line. Then refined product goes to a huge chocolate grinder, where it is mixed with cocoa butter and other additional components. After these operations chocolate automatically flows through different lines, where is formed as «Chocolate bar» with adding milk, nuts, sugar and other products. The

proportion of added components is controlled by a computer as well as the temperature of the bar and its form. Practically every operation is done by specially-constructed machine. The only thing which is controlled by a person is the taste of the chocolate. However, there a lot of people who pay attention to the machines, testing whether they are serviceable or not. Furthermore, what makes Hershey's company so famous indeed, is the perfect combination of new technologies and ancient recipes. It is one of few companies all over the world which uses unique robots. Hershey's company has already mixed the strength and power of machines with soul and feelings of people and, obviously, has gained unprecedented result.

Conclusions: Despite being so unlike in comparison with each other, all automated enterprises have same features. The organization of the production process in every enterprise and in any shop is a rational combination in space and in time. Features and methods of these combinations are different but there are general principles: specialization, proportionality, parallelism, minimum breaks, rhythm. To sum up, automation is becoming more and more vital for all spheres of our life. Every person is dreaming about advanced machine that will be able to do all of his requests. Only few people understand that having so many machines is a great responsibility. However, practically everyone is sure that it is impossible to substitute a human.

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