THE ROLE OF COMPUTER NUMERICALLY CONTROLLED

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Automation is one of the directions of scientific-technical progress, the use of self-regulatory and technical means, economic-mathematical methods and management systems that frees a person from participate in the processes of production, transformation, transmission and use of energy, materials or information, significantly reduce the degree of this participation or the complexity of the operations. Requires the complementary application of sensors (sensors), input devices, control devices (controllers), actuators, output devices, using electronic equipment and methods of computation, sometimes mimicking the nervous and mental functions of the person. Along with the term automatic is used the concept of automated, emphasizing the relatively greater degree of human intervention in process.

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

Numerical control (CNC) (also computer numerical control (CNC)) is the automated control of machining tools (drills, boring tools, lathes) and 3D printers by means of a computer. A CNC machine hold a piece of material (metal, plastic, wood, ceramic, or composite) to meet specifications by following a coded programmed instruction and without a manual operator.

CNC machines is a motorized maneuverable tool and often a motorized maneuverable platform, which are both controlled by a computer core, according to specific input instructions. Instructions are delivered to an CNC machine in the form of graphical computer-aided design (CAD) files, which are transformed into a sequential program of machine control instructions such as G-code, and then executed. In the case of 3D Printers, the part to be printed is "sliced", before the instructions (or the program) is generated.

CNC is an advance machine, and is a vast improvement over non-computer type machining that requires manual control, by hand wheels or levers, or mechanical control by fabricated pattern guides (cams). In modern CNC systems, the design of a mechanical part and its manufacturing program is highly automated. The part's mechanical dimensions are defined using CAD software, and then translated into manufacturing directives by computer-aided manufacturing (CAM) software. The resulting directives are transformed (by "post

processor" software) into the specific commands necessary for a particular machine to produce the component, and then are loaded into the CNC machine.

Computer Numerically Controlled (CNC) Operator Tasks

- Operate a jib crane to manipulate parts.
- Perform basic quality checks at the point of production using scales, micrometers, calipers and gages.
- Notify and involve the supervisor of any problems or issues that arise during production.
- Interpret sketches in order to provide a quality finished product.
- Operate and set up CNC machine.

Since any particular component might require the use of a number of different tools – <u>drills</u>, <u>saws</u>, etc. – modern machines often combine multiple tools into a single "cell". In other installations, a number of different machines are used with an external controller and human or robotic operators that move the component from machine to machine. In either case, the series of steps needed to produce any part is highly automated and produces a part that closely matches the original CAD.

References

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