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A Glimpse at the Roles of CNC Machines in Engineering

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Perspective

CNC (Computer Numerical Control) is a machine tool control technology that automates the process. It uses programmable logic to control the machine tools' functions using data in the form of letters, numbers, symbols, words, or a mix of these. By adding electronic gadgetry to a standard milling machine, Richard Kegg, in collaboration with the Massachusetts Institute of Technology, built the first CNC machine in 1952. As the realm of computers, computer-aided design (CAD), and computer-aided manufacturing (CAM) has advanced, CNC machines have gotten increasingly complicated. CNC technology has now been applied to practically all sorts of machine tools, including metal cutting, metal forming, and other machine tools. This is due to the fact that CNC machines provide a slew of benefits, like increased production, improved precision, and reduced operator skill requirements, to name a few. Machining a profile like an ellipse on cylindrical tasks on a traditional Turning machine necessitates the use of specific form tools and competent workers. Such projects may be easily produced on a two-axis CNC turning machine by breaking such profiles into small segments and creating part programmes for each small segment that add up to the profile.

Using the Canned cycles given by the CNC controller manufacturer, component programmes for cutting various profiles on cylindrical tasks can be created quickly. Bore machining on a traditional boring machine necessitates the use of a size-specific boring tool. Internal and exterior thread machining on bores and outer diameters is also time-consuming and requires trained operators. Bores may be easily manufactured on a CNC machining centre using a deep shoulder end mill and the CNC controller's Circular Interpolation capability. Internal and exterior thread machining on bores and outer diameters is also time-consuming and requires trained operators. Bores may be easily manufactured on a CNC machining centre using a deep shoulder end mill and the CNC controller's Circular Interpolation capability. Using a thread milling cutter and the Helical Interpolation capability of the CNC controller, it is relatively easy to machine both internal and external threads of any size. Innovative machining of both cylindrical and prismatic pieces will be discussed in this article. Numerical, alphabetical, and other symbols are used to control machines. A collection of alphanumeric commands in the suitable format must be submitted into a CNC Machine for it to manufacture a task or a part. These commands are processed and turned into signals that provide control of the machine. A part programme is a series of directives that documents the sequence of operations to be done on the CNC machine. To carry out manufacturing activities, a part programme is a thorough set of alphanumeric commands or instructions integrating axis movement data, technological data (speed, feed, etc.), auxiliary and tool functions. The CNC controller converts these alphanumeric instructions into control pulses, which result in machine movements and other functions. Machining of numerous components or parts is essential in engineering industries that manufacture a variety of goods. The various components could be spherical or prismatic in shape. The cylindrical parts could be shafts of varying diameters and lengths that require different profile machining. Bores and threads of varied diameters may need to be machined for the prismatic pieces. The parametric programming technique was utilised to machine various cylindrical and prismatic parts on several CNC machines in this work. The advantage of parametric programming is that it can be used for machining projects of varying sizes, with only the parameters' values needing to be changed. This may be taken care of during shop floor machining, and no new component programme is necessary for the machining of each job.

As a result, we can see that with the introduction of CNC machines, machining of complex profiles on cylindrical components, as well as machining of bores and threads on prismatic parts, can be done quickly and easily without the use of form tools. For the benefit of engineering industries, this has opened up new opportunities.

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