

Computerized design and production in the 21st century

W poprzednich odcinkach zajmowaliśmy się przeważnie sprawami, które każdy adept języka angielskiego powinien znać. Dziś skoncentrujemy się na zagadnieniach będących w sferze zainteresowania naszego ośrodka szkoleniowego **Well Done Technical Center**. W szczególności przyjrzymy się nowoczesnym procesom projektowania i produkcji, wykorzystującym specjalistyczne programy komputerowe CAD/CAM oraz obrabiarki sterowane numerycznie CNC. Łatwiej będzie zrozumieć poniższy tekst, jeśli najpierw zdefiniujemy podstawowe skróty i pojęcia:

CAD: computer-aided design (dosłownie: komputerowo wspomagane projektowanie)

CAM: computer-aided manufacturing (komputerowo wspomagane wytwarzanie)

CNC: computer numerically controlled (komputer sterowany numerycznie)

CMM: coordinate measuring machine (koordynująca maszyna pomiarowa)

OEM: original equipment manufacture (wytwarzania oryginalnego sprzętu)

outsourcing: obsługa zewnętrzna; zlecenie zaopatrzenie obcym

subcontractor: podwykonawca; zewnętrzny dostawca wyrobów i usług

cost-effective: tani, opłacalny (nie brzmi tak sknerowato jak wyraz „cheap”)

3-D: three-dimensional (trójwymiarowe)

postprocessor: software providing final processing to data, such as formatting (oprogramowanie finalnie przetwarzające dane, np. formatowanie)

Teraz proszę wgryźć się w następujący anglojęzyczny tekst. Oczywiście korzystanie ze słownika jest jak najbardziej dozwolone!

Initially, manufacturing companies produced all their own products and parts. A good example was Henry Ford's car factory in the Detroit suburb of Highland Park, Michigan. The design, manufacture and assembly all took place at a single site, where even iron ore was turned into steel, and special sand was brought in to become the glass panes used to make car windshields. That is no longer the case. Nowadays, companies find it more cost-effective to obtain parts from subcontractors. Usually, only the assembly of the end-product takes place on the premises of the company (GM, Ford, Toyota, IBM, Siemens, Motorola, etc.) whose brand label a given product bears. We should add that modern design and manufacturing makes the production process even more profitable. Drawing boards and T-squares are definitely a thing of the past!

CAD programs make it possible to design and draw a 3-D model of a car, airplane or other product, calculate its endurance and create the technical documentation needed to

produce it. The next stage is the manufacture of parts by specialist companies that use CAM programs for that purpose. CAD files are fed into the CAM program, and re-drawing is not necessary. This enables full control and supervision of the machining process. The programmer conducts a complete simulation of the machining process on a computer, thereby saving machine time and eliminating the risk of collision.

On the basis of the model's graphic representation, these programs create a tool path along which the machining tool travels. Depending on the desired technology, this may be a metal-removal tool, laser, electric arc, water-injection nozzle or electrode bore. A postprocessor generates what are known as G-codes and M-codes, the language in which all commands are issued to the machine tool.

If CNC machine tools are being used, the program is relayed to the machine's controller, where it is read and executed. Since matter gets deformed, a tool's length and diameter can change and that must be compensated for to achieve a product with the desired parameters. Such compensation takes place within the machine itself by means of devices which constantly monitor the dimensions during the production process.

The object must be properly secured during the machining process. Depending on requirements, this may be achieved with simple clamps or sophisticated power devices. Operators are being increasingly replaced by industrial robots. But both the clamps and the robots need to be designed, produced and programmed, so new jobs are created. But these are jobs requiring high qualifications.

The manufactured parts are measured by a CMM which compares the finished product with the CAD model representing the sought-after goal. The entire CAD-CAM-CNC-CMM information-relay process takes place electronically. It is true that machine tools may be manually programmed for simple, one-off tasks. In other words, the programmer introduces the program directly into the machines control or may use the Conversational CAM program found directly on the machines control panel (very popular in Mazak machines). In general, however, modern manufacturing requires highly skilled specialists who feel at home in a sophisticated IT environment.

And that is where **Well Done Technical Center** comes in. Whether you are interested in working as a designer, technologist, machine-tool programmer or operator, we have what you're looking for. If you plan to purchase machine tools and go into business for yourself, this is where you can acquire the necessary knowledge. We offer specialist CAD courses focusing on Autocad and Solid Works, CAM courses specializing in Mastercam and Esprit as well as courses in how to set up and program CNC machine tools.

For more information please contact: www.WellDoneChicago.com
