Секція: **Машинобудування**

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ADVANCED DESIGN TECHNIQUES IN MACHINE BUILDING

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ПРИКЛАДНІ ТЕХНОЛОГІЇ ПРОЕКТУВАННЯ В МАШИНОБУДУВАННІ

Ключові слова: Система автоматизованого проектування, тривимірне та двовимірне моделювання і проектування.
Keywords: Computer-aided design, computer-aided manufacturing, 3D, 2D, modeling and design.

Designing a machine today has not only been made virtual, but also the manufacturing can also be done with less or no human interference. This is due to the improved CAD software and CNC machines which has eliminated the days of paper and pencil drawings. The new system has given a digital solution to stress involved in copying and sending of designs, CAM makes it much easier to manufacture and make prototypes using 3D printers and NC machines.

CAD – Computer Aided Design includes any technique that use computers in the design process including drafting, stress analysis, motion analysis, modification and or optimization (F. Nyarko, 2014). Over the years CAD has come to refer more specifically to Computer Aided Design Drafting-CADD due to its common use by almost all engineers in the drafting process of a design, being it machines, dams and circuit designs. CAD software can be used to develop 2D and 3D accurate and scaled drawings of parts and assemblies of a design. Using 3-dimensional CAD software (Solidwork, AutoCAD, Siemens NX series and Sketchup), designers can create fully rendered 3D models of parts and assemblies for design, and designs can be tested virtually before being made from costly materials. An illustration of such design is shown in the figure.

CAM-Computer Aided Manufacturing is the use of software to control machine tools and related equipment in the manufacturing of a workpiece. CAM assists in all operations of manufacturing plant, including planning, management, transportation and storage. A wide range of process can be carried out automatically in both 2 and 3D format using NC (Numerical Control) machine; cutting, milling, welding, turning, engraving and even printing in solid materials. CAM is the stage that follows CAD in the manufacturing process; here the design is converted into machining paths for an actual model to be developed. 3D printers and NC machines are used to make prototype in a process called Rapid Prototyping (RP). RP is a term used to describe the process aimed at quickly creating a 3-dimensional physical part (prototype) from a virtual design (Mitch *et al*, 2007).

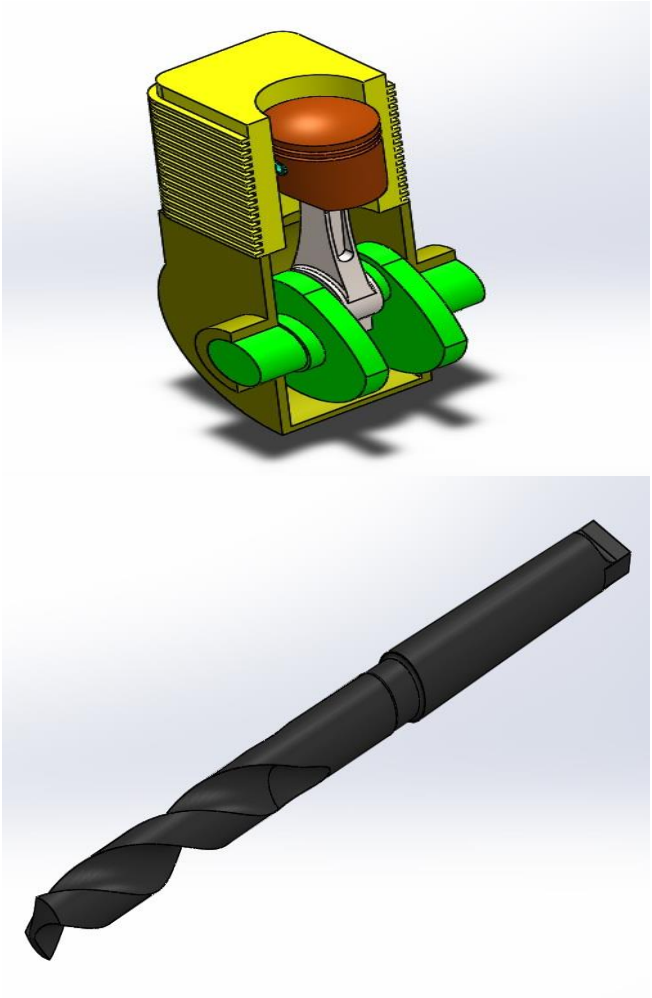

Figure1. The 3D model of a one cylinder engine assembly and a drill bit made with the use of Solidwork

CAD/CAM is a highly recommended process that every engineer should adapt to. Though it requires a skilled personnel to operate the high-tech machines involved, but it is the easiest and fastest way of building and modifying a machine. Unfortunately, computers are prone to viruses which can affect and corrupt the saved data. Antivirus software should be installed to protect the engineer from losing his files.

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