

USING OF 3D-MODELLING AND RAPID PROTORYPING TECHNOLOGIES DURING THE DESIGN OF CONSTRUCTIONS OF BLOCK-MODULE SURFACE CUTTINGS

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The results of the development of constructions of block-modular surface cuttings based on the results of 3D-modeling and rapid prototyping application are introduced.

Usage of the latest technologies of 3D-modeling and rapid prototyping as well as usage of modern photopolymer materials during the production of prototypes of cutting tools is getting a popular topic in machine building.

The proposed constructions of block-module surface cuttings consist of 80% common parts [1]. They include holders, clamps, pins, dentils, binders, etc.

Using 3D parameter-oriented models of master parts of the construction is an essential reserve for increase of construction effectiveness in CAD systems environment.

The interest to the study of these technologies and materials can be described as a possibility of «growing» of 3D-model constructions of block-module surface cuttings developed in different graphic software products such as SolidWorks (Autodesk), SolidEdge (Autodesk), Inventor (Autodesk), Pro/Engineer (Autodesk), Catia (Dassault Systemes) with further overall conducting researches and their production in machine building industry.

The task to construct a modification of block-module surface cutting for processing at high cutting speeds was set. It requires the systematization of its shape for the improvement of aerodynamic properties and balancing possibility.

To analyze the functionality of block-module surface cutting construction of a streamline shape is possible through 3D-model building and its prototype production. As a final stage of 3D-modelling it is necessary to export the model to a «.stl» format using software.

The specified format is recognized by high-tech devices of 3D-printer Mojo which supports high standards of FDM technology [2].

Using the rapid prototyping technology leads to decrease of the process engineering duration; increase of manufacturing flexibility; cross-cutting use of the technologies, integration with CADD or CAD.

The main stages of creating block-module surface cutting of a rational shape are introduced in Figure 1.

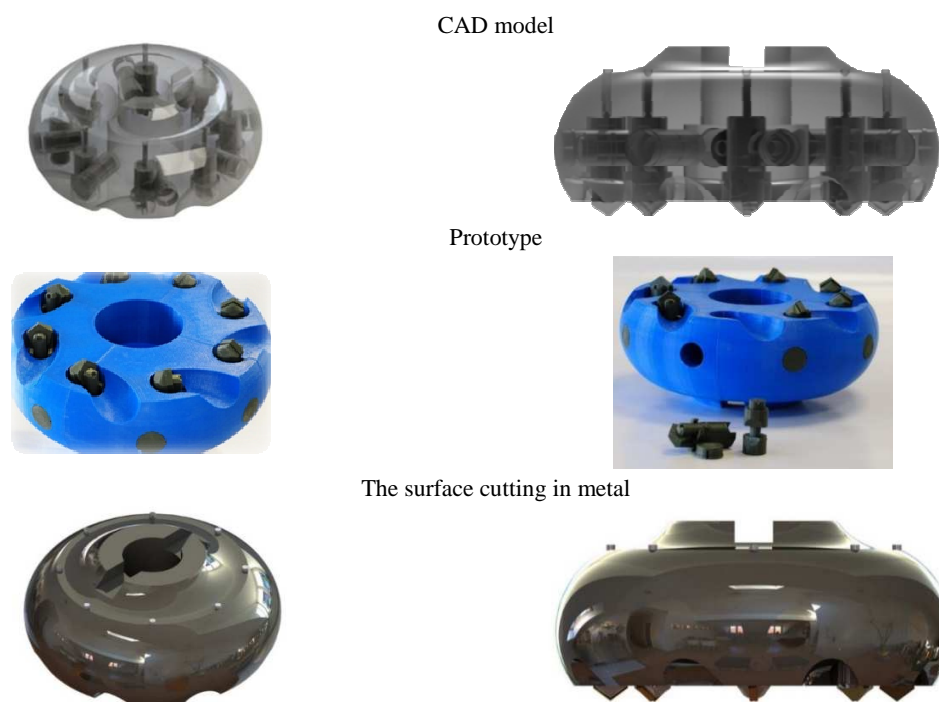


Fig. 1. Main stages of creating block-module surface cutting construction of a rational shape

The prototyping of constructions and basic elements of block-modular surface cutting has a broad scope of application. First of all, 3D-printing technology is used for experimental models of different elements which are included in the structure of assembly work. Also the rapid prototyping is necessary during the change of detail form, modernization and restyling; for exclusive developments; experimental models. In this case 3D-printing makes it possible to avoid financial and economic expenditures for production tooling.

The received prototype gives the opportunity to see what the model looks like in real life. Thus, it is possible to evaluate all advantages and disadvantages during the design stage, to decrease the probability of the production of low-quality or defective detail.

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