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**SPECIALIZED DEVELOPMENT PROGRAM FOR COMPUTER AIDED DESIGN
OF A SPHERICAL CUTOUT DISC**

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It is proposed modeling of manufacturing a spherical cutout disk heavy disk harrow working.

Keywords: *computer-aided design, software module unit, the numerical control software, interface, three-dimensional model*

Models of aggregates, concerning to perspective alternatives of leading the agriculture, are based on the deep understanding of processes, going on in nature and are directed on the improvement of the ground, renewal of it's nature prolificacy and creating of the stable landscapes. Each model, of course, is not absolute, has it's positive and negative features, is effective in the concrete ground-climate conditions and needs certain technical providing by new agricultural equipment, that wasn't produced by the factories of mechanical engineering at previous time.

Spherical cutting disc type BDT-7 aims to cultivate the land to a depth of 8 cm, which is very effective impact on the soil fertility.

Currently accepted technology of crops, based on multiple passes are heavier machine and tractor units. This leads to the fact that there has been an increasing dispersion of the upper and lower layers of soil compaction. Consequently, expanding the zone of wind, water and mechanical erosion, reduced fertilizer use efficiency and crop. Therefore, the current trend [1] of tillage and sowing machines are mainly determined by environmental requirements to protect the soil from excessive anthropogenic impact

A wide range of tillage [3] and sowing machines on the market, reveals a number of important global trends and prospects of development of this type of agricultural machinery. To maintain the quality of topsoil recently used tillage harrow disc. As an international practice shows, now days is a promising direction is used in Ukrainian farms.

Objects and the methods of the investigation

The object of study is the geometric area of the working body tillage machines.

The method of study is proposed a method of construction can minimize or eliminate the number of cycles associated with the specification of initial data. The practical significance of the results is to engineer - constructor opportunities to increase productivity and minimal build mistake given surface.

Formulation of the problem

When constructing the disc surface is proposed to use the programming language Delphi 7. The design was necessary to develop a software package whose main task – to create a model surface.

To input data are: the diameter of the disk D ; k – coefficient of proportionality; a – depth of processing; α – angle of the disk that forms the plane of rotation of the drive direction of motion tools, disc thickness δ , radius of curvature [2] operating surface R , the distance between adjacent disks b .

It should be noted that the diameter of the disk is calculated based on the desired depth of treatment and aspect ratio, and between disk diameter d , the distance between adjacent disks b , and angle settings a and with ridge c height dependence for vertical disc [3].

Results and discussion

Program Structure:

1. Block software module that is responsible for creating forms.
2. Block software module, which is connected to the program SolidWorks variables and variables to work with documents.
3. Block software module, which is responsible for checking the input conditions.
4. Block software module that is responsible for connecting and running SolidWorks.
5. Block software module that performs the details of a new template to default.
6. Block software module that specifies the name of the new details of the default file.
7. Block software module that is responsible for selecting the working plane to sketch projected.
8. Block software module that is responsible for the establishment of subsidiary lines, setting interconnection and Trunk Lines.
9. Block software module that is responsible for the construction of arches.

10. Block software module that is responsible for the construction of the second arc defined by a radius of curvature drive.
11. Block software module that is responsible for the construction of three-dimensional models.
12. Block software module that is responsible for output of error messages.
13. Block software module that is responsible for selecting information on the type of soil that can be processed with the initial input data.
14. Block software module that is responsible for selecting the information to the result of processing that can be entered during the initial disk parameters.
15. Block software module that is responsible for displaying information to the result of processing and the type of soil that can be entered during the initial disk parameters.
16. Block software module that is responsible for closing the program when you click «Exit».

A fragment program unit that is responsible for the construction of three-dimensional models:

```
Variant(swdoc).ShowNamedView2('*Триметрия', 8);  
Variant(swdoc).Extension.SelectByID2('Line5@Эскиз1', 'EXTSKETCHSEGMENT',  
0.269602525164891, -0.100128442902746, 0, True, 0, N, 0);  
Variant(swdoc).ClearSelection2(True);  
Variant(swdoc).Extension.SelectByID2('Эскиз1', 'SKETCH', 0, 0, 0, False, 0, N, 0);  
Variant(swdoc).Extension.SelectByID2('Line5@Эскиз1', 'EXTSKETCHSEGMENT',  
0.269602525164891, -0.100128442902746, 0, True, 16, N, 0);  
Variant(swdoc).FeatureManager.FeatureRevolve2(True, True, False, False, False,  
False, 0, 0, 6.2831853071796, 0, False, False, 0.01, 0.01, 0, 0, 0, True, True, True);  
Variant(swdoc).SelectionManager.EnableContourSelection := False;
```

...

1. Start the SolidWorks.
2. Run the software application.
3. In the workspace window enter the drive parameters that need to build (Figure 1).
4. Push the «Run building».

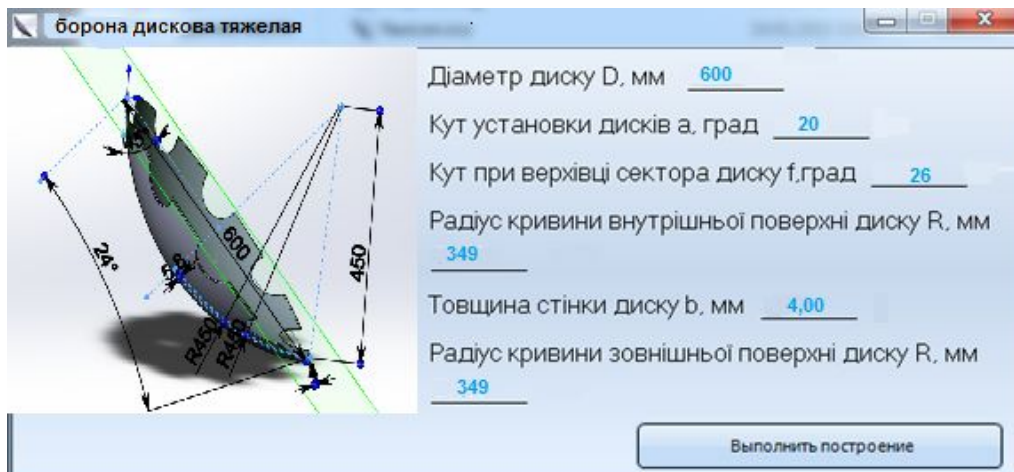


Fig. 1. Operating window

5. After you click «Run building» in the graphics area starts construction work surface disk:
 - read from the form of the original data and determined version of SolidWorks (English or Russian);
 - create a new file and plug ins required;
 - running build profile rotation and auxiliary elements
 - performed three-dimensional model;
 - implemented the construction of auxiliary planes;
 - running building openings;
6. The image of the three-dimensional model is introduced as a result of the program.
7. We derive a window with a message about the successful construction (Figure 2)

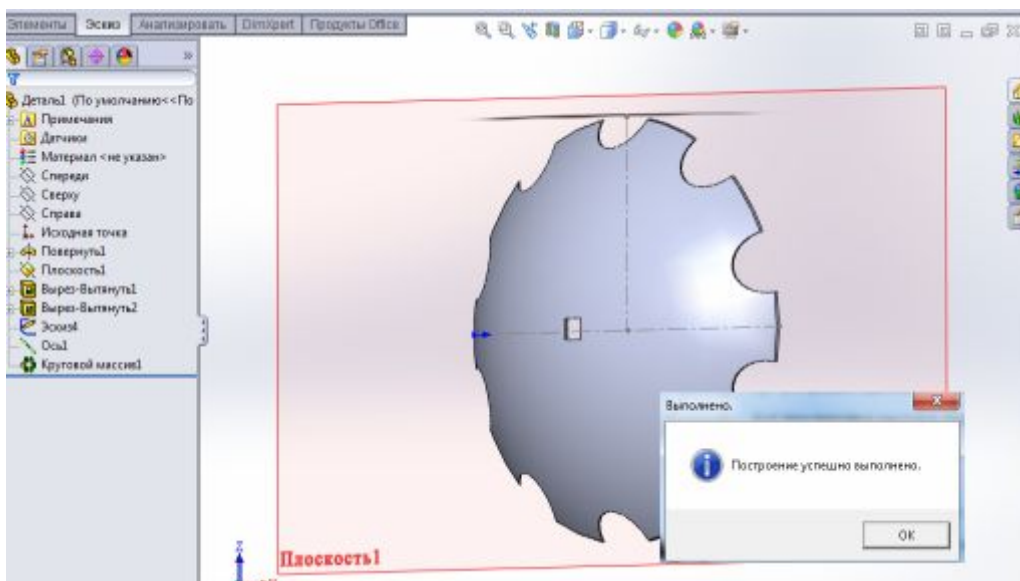


Fig. 2. Three-dimensional model

8. Provides information regarding the type of soil that can handle just built a disk, and handling characteristics of the soil (Figure 3)

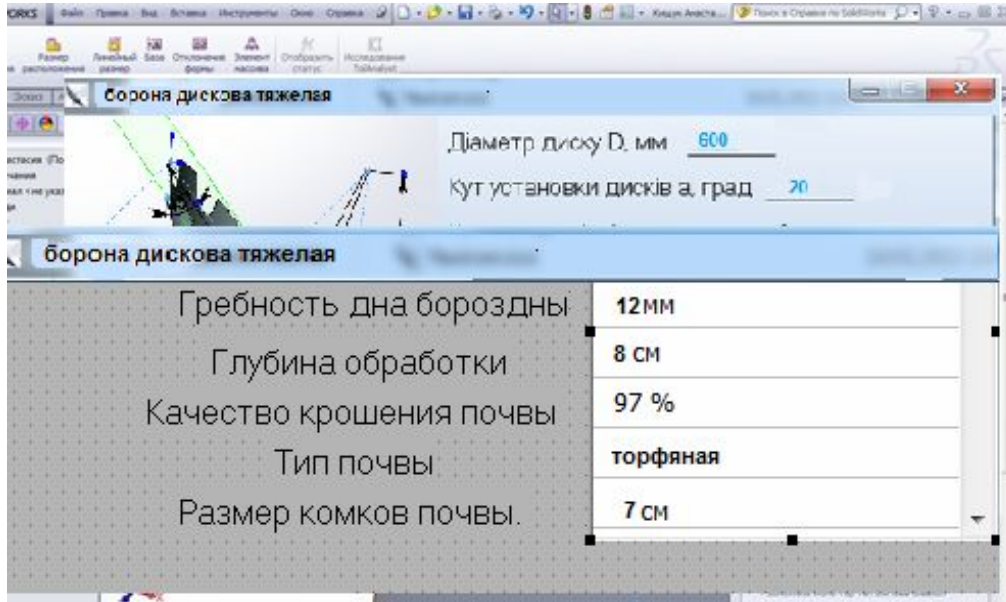


Fig .3. Display help information

Conclusions

It was tasked to develop a special program aided design carved spherical disk.

To solve the problem and reduce the costs of simulation details were created and developed the program interface, and an optional module of the program to display information about the simulated disk using Delphi7. This module is integrated into the application system design Solid Works, which allows you to visually observe the changes in the structure of parts during its restructuring and make the necessary corrections in the parameter changes.

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Розробка спеціалізованої програми для автоматизованого проектування сферичного вирізні диску

Пропонується автоматизоване проектування сферичного вирізного диску для борони дискової важкої.

Ключові слова: автоматизоване проектування, блок програмного модуля, числове програмне керування, інтерфейс, тривимірна модель

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Разработка специализированной программы для автоматизированного проектирования сферического вырезного диска

Предлагается автоматизированное проектирование сферического вырезного диска для бороны дисковой тяжелой.

Ключевые слова: автоматизированное проектирование, блок программного модуля, числовое программное управление, интерфейс, трехмерная модель