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DESIGN WORKING OUT OF THE CONCEPTUAL CASE OF LEMESHNO-OTVALNIY PLOUGH ON THE BASIS OF GEOMETRICAL MODELING

Abstract: Design–project of the conceptual body of mould–board plough based on geometrical modeling. In article, it is considering design–project of the conceptual body of mould–board plough based on methods of constructive and projective geometrical modeling. The decision of task in view by a combination of several constructions is given. The problem is executed 2D and 3D modeling in system AutoCAD.

Keywords: working surface, combination of constructions, smooth plugging, constructive and projective geometrical models.

Statement of the problem. Applied in agricultural production plows-moldboard plow surfaces have different designs according to their destination. Each design has its advantages, the use of which is isomorphic to another design will result in some loss of perfection of this design. In such cases it is possible to combine the advantages of the considered structures into a new structure with necessary modifications [3,4].

Goals of the Article. Analysis of existing designs plows and research to improve them shows that the possibility of creating a new design consisting of a combination of two or more structures are not used enough and have good prospects. Among the many works devoted to this problem, as an example, the work relating to the construction of the plow [7], to complex technical surfaces [8] or improving body parts [9].

The wording of the purposes of article. Purpose of this development is the practical implementation of the results of simulation studies plowshare-dump surfaces [10,11,12], using the methods of geometric modeling [5,6] and industrial design [3,4], for their further implementation in production.

The main part. Among the main evaluation criteria plow depending on the geometric parameters of metal structures can be noted, manufacturability blade, as well as quality of work [1,2]. But combine all these qualities together is problematic, due to the complexity of the designed structure. The brief analysis of structures plows.

Statement of the problem of developing the proposed housing. As is known, the main working body of the plow - a body having centuries "perfected" form, with different parameters, is the determining authority in improving its design. For example, consider plows differing higher productivity and quality of work that do

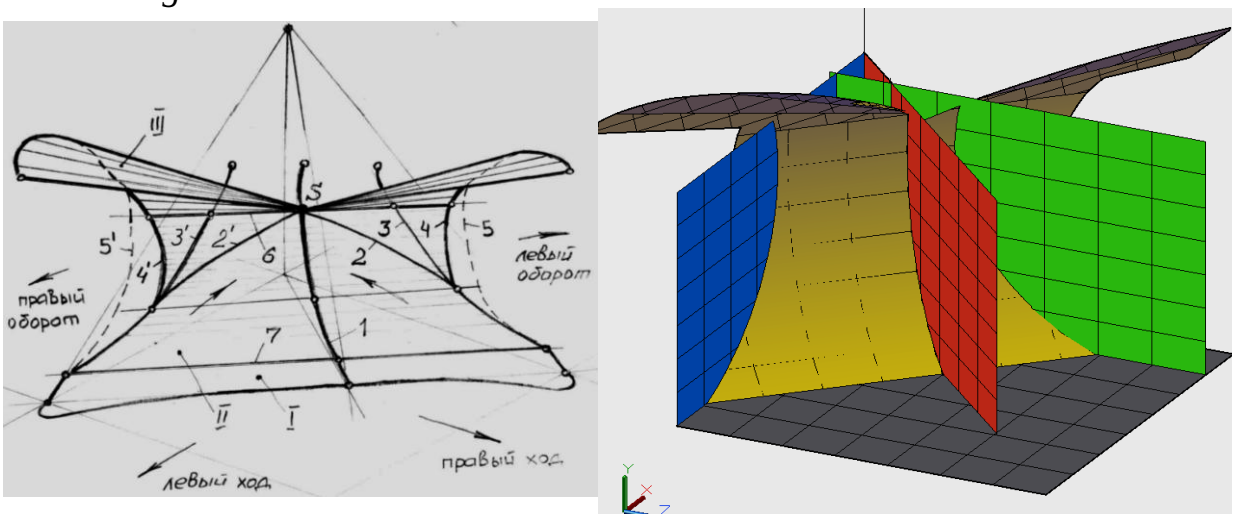
not require additional preplant farming activities after their application. But the presence of dual right-and left the winding enclosure design makes the road more metal and large tractive resistance, which is its drawbacks, as opposed to its advantages [1]. As you can see, the point Prityka advantages and disadvantages of this structure is its body having a working surface cylindroid working in the same direction. There flowsheet development plow bodies working in two (left and right) directions, but with a cylindrical working surface, which does not provide a satisfactory turnover formation [7]. Therefore, in agricultural production are considered common plow body with a working surface cylindroid having good performance and turns crumbly. But these advantages confronts the lack of them - the lowest non-developable surfaces manufacturability [1,2]. According to this reasoning, it follows that the combination of these designs combines the advantages of them and eliminating their disadvantages, gives a solution to this problem. Conceptual approach to this problem is reduced to the use of the advantages of working capital and the right of the winding plows cylindroid surface, creating design-development body satisfying the above requirements smooth plowing and overturning. To unsubscribe from the twin towers developed its design must perform the work in two directions and have the ability to relaying. Problem will be solved on the basis of the projection methods and constructive geometric modeling [5,6].

Constructive geometric model developed body. As you know moldboard plow-body surface is divided into three technological areas:

1st plot raises formation, cutting him where smooth stykovanie ploughshare and the bottom of the heap, even though they are physically separate parts logically constitute a work surface - *the ploughshare;*

2nd plot takes formation, crumbling it, where the middle part of the blade is involved - *the chest;*

Third section pushes layer, wrapping him where involved the upper part of the blade - *wing*.



Ill. 1. Design-development of design model body

As seen blade, although physically one piece is logically composed of two parts - the breast and wings. Consider the task of separating the surface into two parts of the blade, smooth the top of the connecting pieces and the blade

wing. Such a joint can be assumed, as it is also the bottom of the blade. As a result, we can easily approximate the complex cylindroid not developable surface, pieces of developable surfaces, namely, cylinder and cone [5,8]. Such a composite surface during the first will have a high manufacturability [2,11], in the second retains the relaying ability, and enables the development of a third body, working in two directions (Ill. 1). For this review, the component parts of the developed body. You can offer a new design double-plowshares when both ends are chisel-drawn shape alternately functioning as toe and tail. Thus, logically ploughshare will consist of three parts (nose, middle and tail), having the form of a conical ends closer to the middle of the plane, and the upper portion of the cylindrical surface. This may allow the entry of the toe in the monolith, cutting and lifting its intermediate portion, and sliding it with the tail portion with less resistance. Line interface between the upper part of ploughshare and feeding is common for both forming cylindrical surfaces. A cylindrical surface of the chest enclosure will equally work in the right and left side. In order to create body work in duplex mode, share the wing on the right and left sides. The trajectory of the top of the reservoir, passing over the surface of the blade, defines the boundary between the right and left wings. Line interface between the chest and wings is a common cylindrical surface forming simultaneously chest and the conical surface of the wings.

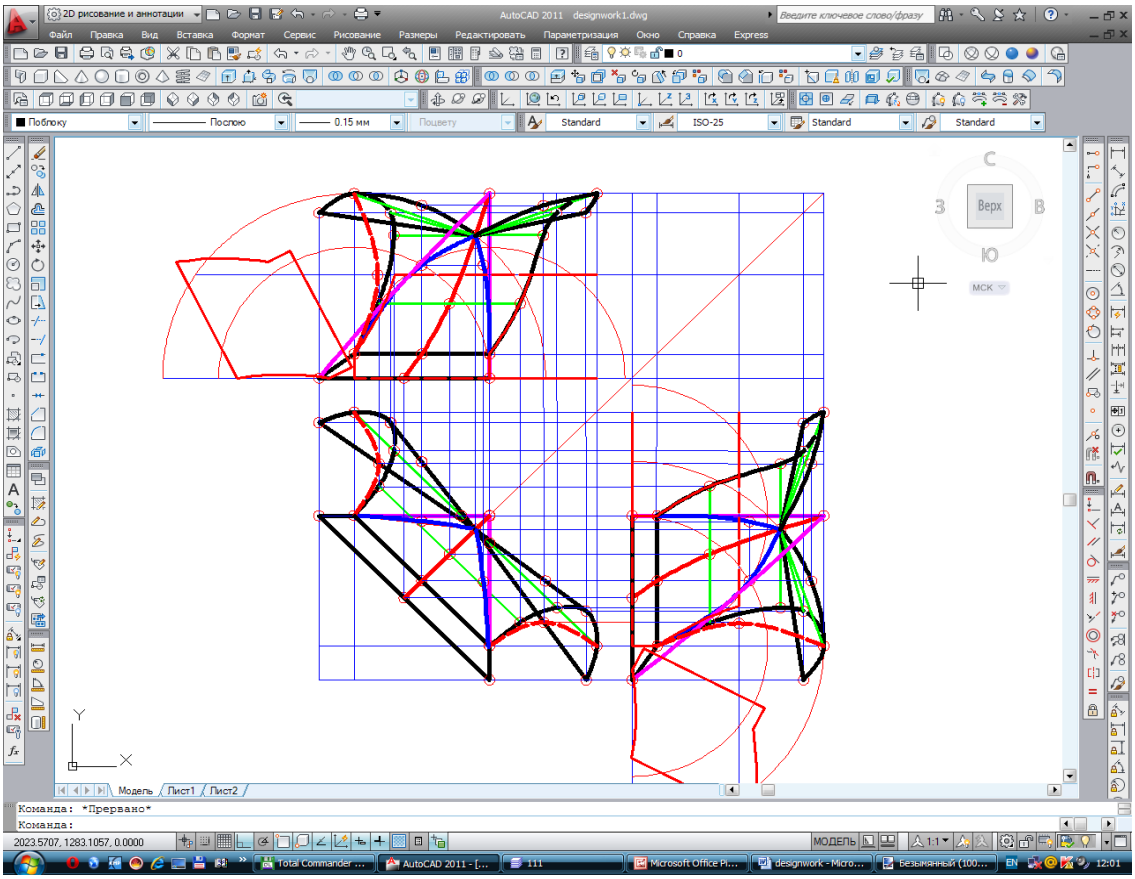
To body work equally in two directions form symmetrical design it. Since housing is a three-dimensional object, draw the plane of symmetry perpendicular to the blade plowshares, in the middle of it. Have a guide curve breast surface blade on this plane. Regulation of generators, as is well known, the tilt angle is defined relative to the furrow wall, in both working positions. Determined by the position of the wing upper generators. As a guide curve can define an arc of an ellipse, with girth at the top of the major axis, having this part of the surface of the wing, in order to give it the necessary slope wrapping [10,11,12].

The working surface of the housing developed are the following characteristic lines: ***1*** - guide curve - a line of specular reflection, ***2,2 '***- the right and left upper point of the trajectory of the formation; ***3,3'*** - right and left lines of intersection of the surface of the wall of the furrow, ***4, 4 '***- Fossa (field) sawed-off shotguns, ***5,5'*** - furrow trim housing prototype, ***6*** - line interface ploughshare and chest ***7*** - line interface breast and wings. ***S*** - top of the conical surfaces.

Projection geometric model developed body. To determine the contour lines developed body use projection modeling. Based on the methodology of traditional design scheme is applied wrapping layer and construct preliminary projection of the front and top species (Ill. 2).

Scheme have so that the top view is common to both types of mode front right and left turn around. Guide curve on the horizontal axis is the projection of specular reflection. Initially, therefore, enough to build one half of the projection body.Mirroring the second half and set the projection relationship, we find the second half on the front projection. Thereafter, the Fossa sawed-off, choosing the optimum cross-sectional shape on the wrapped layer. They are both sawn-off field for the reverse side. Optimizing cross-sectional shape of geometric modeling for

the design, get a diamond shape, that agro-technical reasons even has a number of advantages as "rhombic plowing" [1].



Ill. 2. Projection model developed body.

Conclusions. Proposed design development, as a geometric model provides management geometrical parameters developed housing that allows for sound design parameters plow body responsible in some agro-technical conditions. In this case, the goal of development can be considered completed as housing with double-sided work surface has the same parameters, thereby allowing a smooth plowing without double hulls. The second advantage can be noted from the surface of the composite pieces of developable surfaces having high manufacturability body. And third, the optimal diamond-shaped cross-section.

Prospects for further research. Conducted for this problem further research on constructive modeling and other organs. Research is underway to develop an algorithm aided design of the object. Planned engineering calculation of projected working bodies with moldboard plow-surface.

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Аннотация

Кучкарова Д.Ф., Жураев Т. Х. Дизайн–разработка концептуального корпуса лемешно–отвального плуга на основе геометрического моделирования. *Рассмотрен вопрос дизайн–разработки концептуального корпуса лемешно–отвального плуга на основе методов конструктивного и проекционного геометрического моделирования. Дается решение*

поставленной задачи путем комбинации нескольких конструкций. Задача выполнена 2D и 3D моделированием в системе AutoCAD.

Ключевые слова: рабочая поверхность, комбинация конструкций, гладкая вспашка, конструктивная и проекционная геометрическая модели.

Анотація

Кучкарова Д.Ф., Жураєв Т. Х. Дизайн- розробка концептуального корпусу лемішно- відвального плуга на основі геометричного моделювання. *Розглянуто питання дизайн -розробки концептуального корпусу лемішно- відвального плуга на основі методів конструктивного і проекційного геометричного моделювання. Дається рішення поставленої задачі шляхом комбінації декількох конструкцій. Завдання виконано 2D і 3D моделюванням в системі AutoCAD.*

Ключові слова: робоча поверхня , комбінація конструкцій, гладка оранка , конструктивна і проекційна геометрична моделі.