6th INTERNATIONAL MULTIDISCIPLINARY CONFERENCE

CAD MODELING, MOULDS EXECUTION FOR VULCANIZATION NONMETALLIC ELEMENTS OF NEW ELASTIC COUPLINGS

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Abstract: *The paper presents new constructive forms of nonmetallic elements being in component of two constructive variants of elastic couplings with nonmetallic elements, CAD modeling of necessary moulds for vulcanizing of these forms, as well as executed forms and moulds behind designing process.*

Keywords: *elastic couplings with nonmetallic elements mould, modeling, designing, vulcanizing.*

1. INTRODUCTION

In component of new elastic couplings with nonmetallic elements there are news constructive forms of nonmetallic elements, realized from various qualities of rubber [2,3]. For execution of these nonmetallic elements, it was necessary the designing of some moulds through these to be realize news constructive forms vulcanizing of elements from rubber. In this scope, in first stage it was realized the CAD modeling of nonmetallic forms, there to it was modeled and projected respective moulds, seeing and economy of material.

2. PRESENTATION OF MODELDED AND EXECUTATED MOULDS FOR NONMETALLIC ELEMENTS

The computer utilization permits a easy realization of drawings by any type. Realization of three-dimensional drawings presents a series of advantage relatively two-dimensionally drawings, these advantages being sensitized thus:

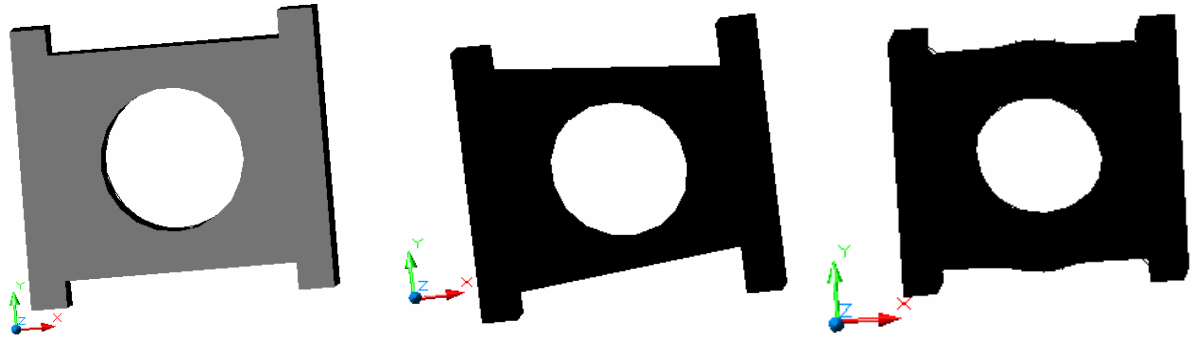
- It permits the realization of sights and sections multiple of model, presented by different angles of sight, ensuring thus a easy agreement of model.
- It permits the realization of virtual representation a model in which will shows the object (the piece, the assemble).
- It isn't else necessary the creation of prototype models or model sketch.

- Both 2D and both 3D models may be represented in realist photographic imagines which is propose final form of object (piece, assembly), can serve as prospect, catalog drawing.
- The represented object in 3D spatial may be ulterior takeover or worked with another specialized program.
- It permits the establishment for one 3D model of one mechanic proprieties series (mass, weight, weight center, inertial moment).
- In case of 3D assembles, to may effect exact measures of some distances or angles between different component elements.

The modeling of solids describes the bodies in your full, based-se on existent of ACIS model (an 3D modeling system), from program frame, which ensure an increase of velocity by modeling of solids.

The CAD modeling and used moulds designing for vulcanizing nonmetallic forms it was realized in Catia V5R8 soft [1]. The *Catia* Soft *is an modern system which include entities of high level named features, these with direct scope introduction in model and a signification of geometric form.*

Through this soft it may project, realize, modify and model pieces in three-dimensional space. Those three forms for which it was necessary to design the moulds are present in Fig. 1 [4,5].



a *b* *c*

Fig. 1 *The nonmetallic forms of new elastic couplings*

The mould is compose from four component pieces (superior cap, intermediary inner – I, II, III, bolt, inferior cap), the modeling of these may be visualized on continuation. In figures 2, respective 3 is presents the 3D modeling of superior cap, respective of inferior cap.

In figure 4 is presents the three-dimensional modeling of bolt. For production of those three distinct forms of nonmetallic element, it was necessary the designing of three intermediary inners (I, II, III). The 3D modeling of those three intermediary inners (I, II, III),

it may be visualized in figures 5, 6, respective 7 and in Fig. 8 is presents subassembly between inferior cap and bolt.

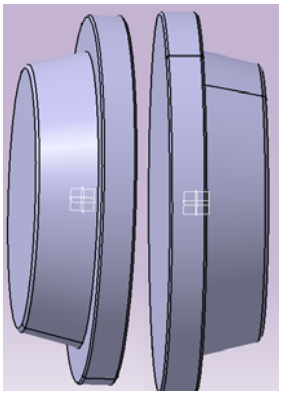


Fig. 2 *Superior cap*

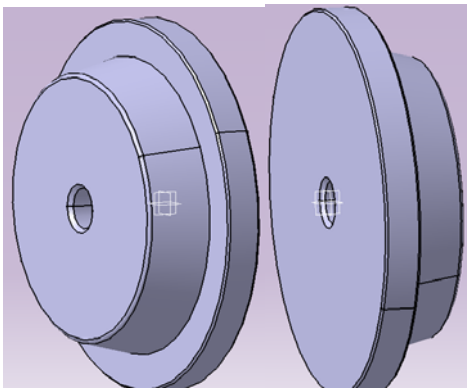


Fig. 3 *Inferior cap*

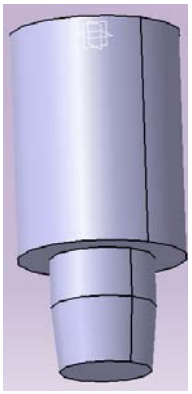


Fig. 4 *Bolt*

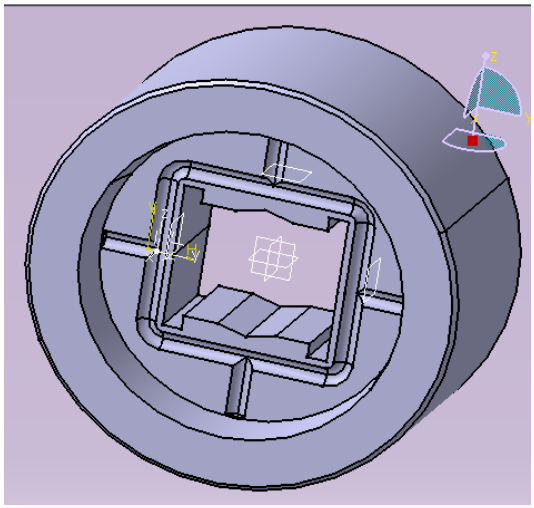


Fig. 5 *Intermediary inner I*

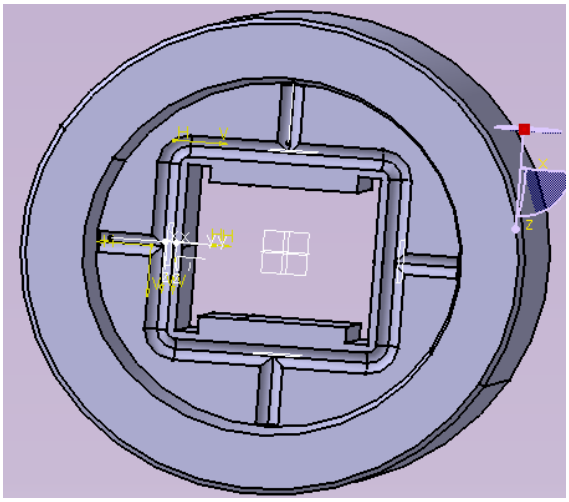


Fig. 6 *Intermediary inner II*

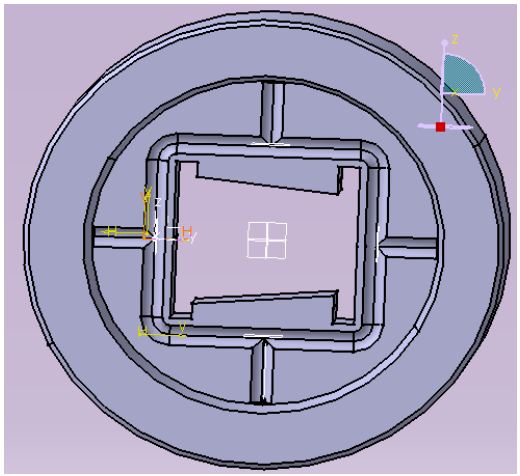


Fig. 7 *Intermediary inner III*

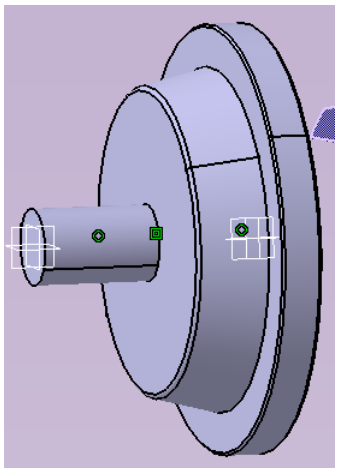


Fig. 8 *Subassembly between inferior cap and bolt*

The figures 9, 10, respective 11 are presenting three subassembly: Fig. 9. Subassembly between inferior cap, bolt and intermediary inner, Fig. 10. Subassembly between inferior cap, bolt and intermediary inner II and Fig. 11. Subassembly between inferior cap, bolt and intermediary inner III. In Fig. 12 it's present the assembly between those four elements of mould (inferior cap, bolt, intermediary inner –may be I/II/III- and superior cap).

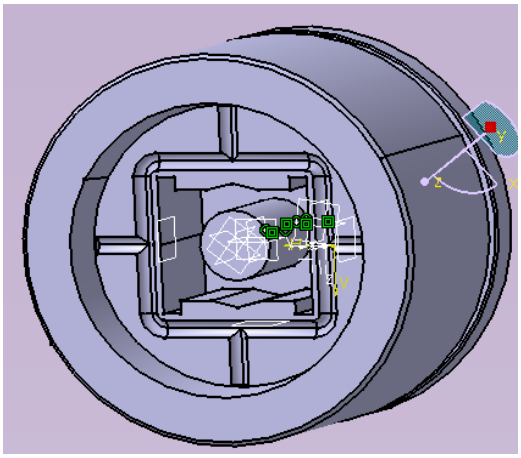


Fig. 9 *Subassembly between inferior cap, bolt and intermediary inner I*

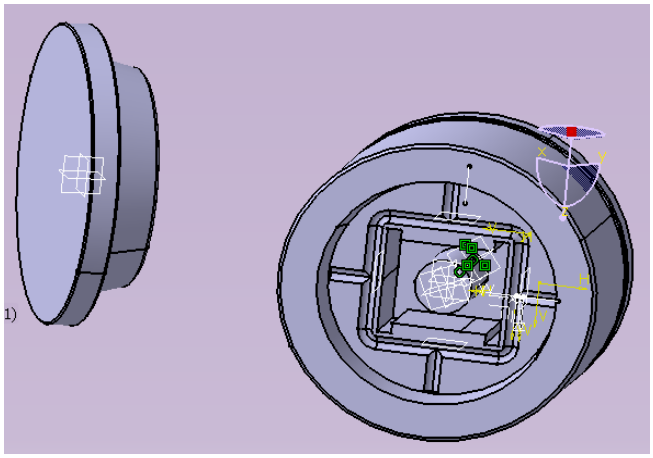


Fig. 10 *Subassembly between inferior cap, bolt and intermediary inner II*

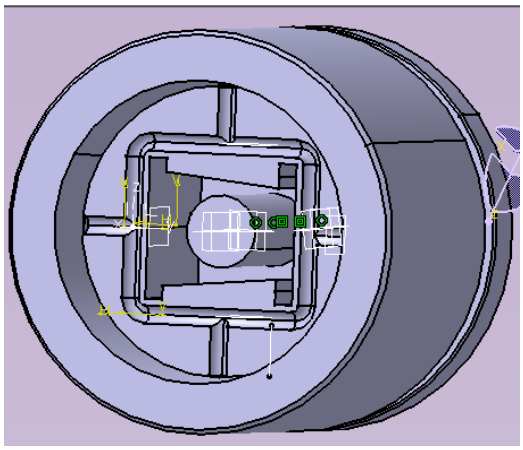


Fig. 11 *Subassembly between inferior cap, bolt and intermediary inner III*

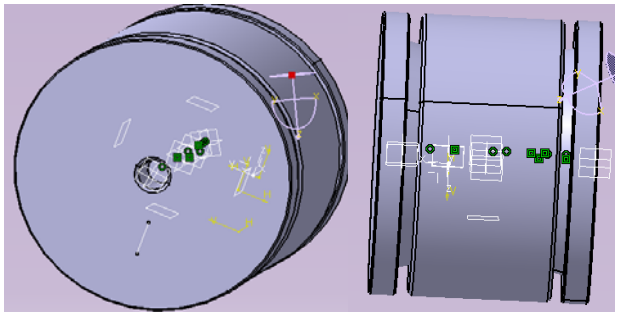


Fig. 12 *Assembly between those four elements of mould*

In follow of three-dimensional modeling and assembly's component elements of mould, it realized execution drawings of respective elements, as well as assembly drawing of each mould. Then it was possible passing at practice execution of each mould. So, in Fig. 13 it's present executed component elements of mould: superior cap 1, intermediary inner 2 (existent in three constructive variants - I, II, III – correspond those three constructive variants of elastic nonmetallic forms) and the bolt 3 introduced through pressure in inferior cap 4.

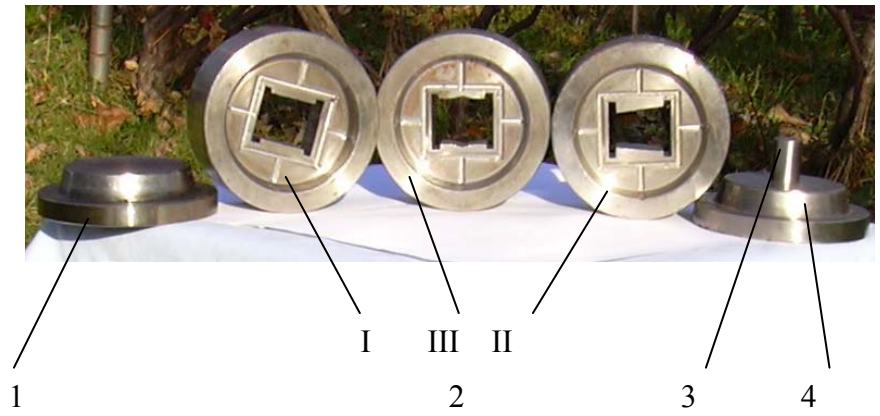
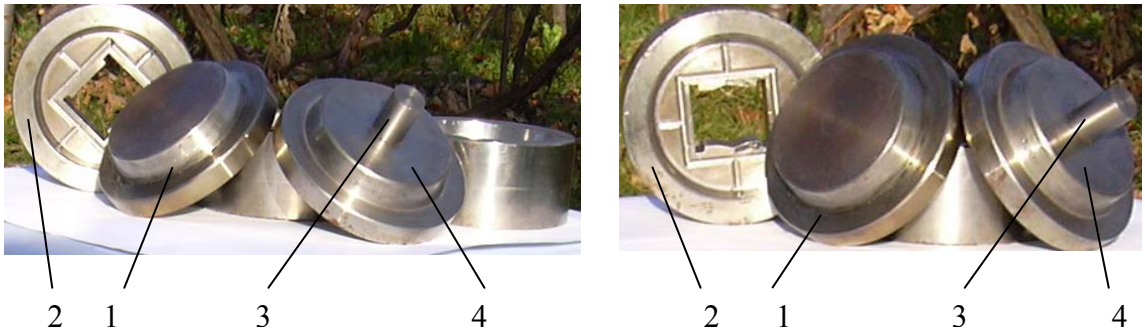


Fig. 13 *Executed component elements of mould*



a *b*

Fig. 14 *Two constructive variants of mould*

In figure 14 are present component elements of mould in sight of obtain first nonmetallic constructive form (Fig. 14, a), respective for obtain the third nonmetallic form (Fig. 14,b). Figure 15 is present the stages what may crossing in sight of component elements assembly of mould for obtain the second nonmetallic form. So, in Fig. 15, a is presents component elements of mould in obtain scope of second nonmetallic form, figure 15,b presents partial assembly of component elements (on the inferior cap 4 - in which is introduces force on bolt 3 – it's install intermediary inner of mould, and figure 15, c presents view of mould assembly.

a b c

Fig. 15 *Stages of assembly and view of second constructive variant's mould*

After execution of those three constructive variants of mould, in continuation it was tuned to vulcanization of nonmetallic forms, which was realized from three rubber qualities (N.R. - natural rubber , N.B.R. - butadiene – acryl-nitrile rubber and E.P.D.M - etylene-propylene dienic rubber.

3. CONCLUSION

From those presented in paper, it may be formulate the following conclusions:

- the designed couplings transmits the torsion moment and they are elastic couplings, which realize damping vibrations and shocks and may take over radial deviations;
- the CAD modeling, modeling from features used the Catia soft, has the following advantages: permits a correct and quickly construction of pieces in 3D space, permits tracking down and instant remediation of constructional error, the realized modifications (2D and 3D space) are immediately transpose in 3D space, each stage of work is records and visible in arborescence, permits material application and quickly determination of volume, piece mass in function of applied material.
- those three constructive variants of mould have small dimensions and to designing of these it was followed the material economy and diminution their weight.
- at designing of new form, for mould may be designed just one intermediary inner.
- the nonmetallic element may be confection from various materials with different hardness.

4. REFERENCES

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