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GEOMETRIC MODELING ASSEMBLY OF HYDRAULIC SERVO STEERING GEAR

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Abstract. In this paper is giving geometric modeling of hydraulic servo steering gear with useing of computer's maintenance system Solid Edge. CAD program's round is useing for modeling on component's level, while CAA program's round is applaying for modeling assemblie's structure. CAD/CAA models is delivering as product constitution hydraulic servo steering gear with his subassembly.

1. INTRODUCTION

In the theoretical preview, modelling reliance on area exploration as like as: generating causal - orientations of model produce, compendium and detailed project by primitives, modelling of primitives on level of components and assembly structure, integrated CA modules and generate specificated model from general.

The application of hydraulic servo steering gear primarily started on lorry, dray and bus, then on median hardly with trend apply and on easer motor vehicle. The base function servo steering gear realise necessity momentum for swerve controller's cycle. On the figure 1 provide base elements of hydraulic servo steering gear 5033. [1-2]

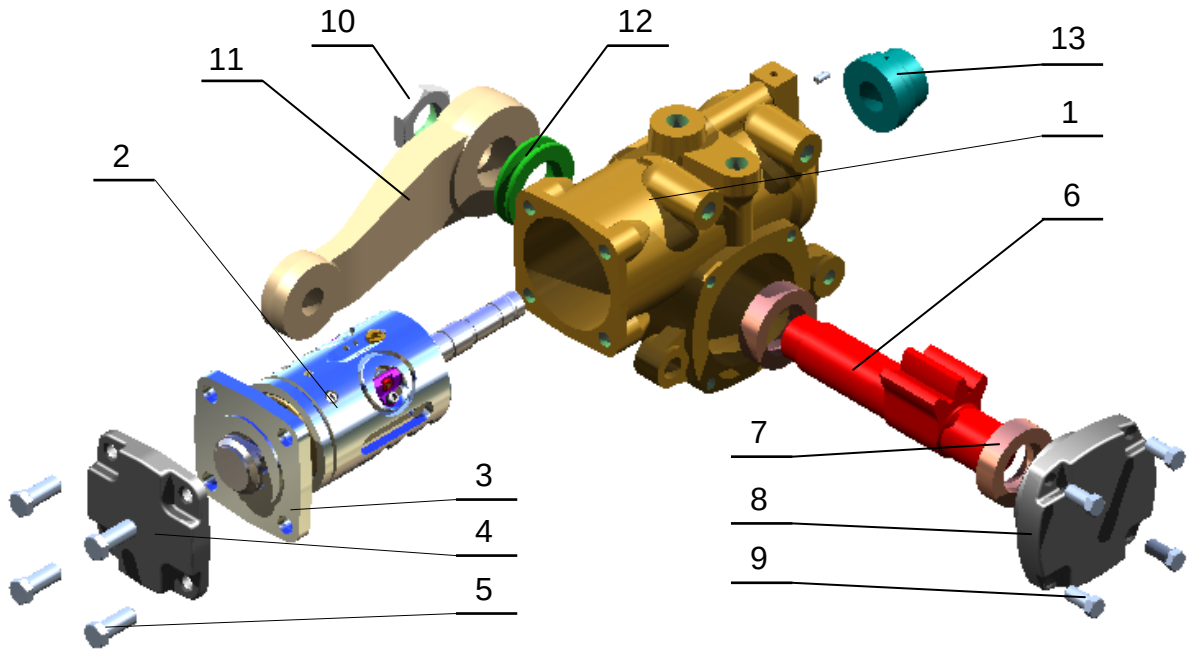

Fig. 1. *The base elements of hydraulic servo steering gear [2]*

Legend:
1 – shroud of hydraulic servo steering gear, 2 – valve set, 3 – cover, 4 – cover of shroud, 5 – paddle-wheel lenght, 6 – segment shaft of controller, 7 – packing, 8 – cover of shroud, 9 – paddle-wheel short, 10 – nut, 11 – lever, 12 – shim, 13 – shutter

2. CAD/CAA MODELING

The evolution of programme packet in area simultaneous designed of product and technology start at third millennium very much get on meaning. This is looking in the very register possibility exchange reference between model which constitute simultaneous approach of designed. On this method attained that information from CAD (Computer Aided Design) model direct transfer in modulus from CAE (Computer Aided Engineering), CAM (Computer Aided Manufacturing) and other. [3]

Solid Edge is computer's maintenance system for modelling products (CAD/CAA/CADD) develop on the base Stream technology. The process of designed product in Solid Edge doesn't allude just production virtuoso prototype of product, than and assimilation practice which process of engineer's designed manage to precision solution without errors.

When designed components in the Solid Edge, whole geometric form compatible construction's mode. The programme detentions construction's elements available when wonts add or modify profile or hidden it from respect while work on another parts of designed.

At analysis process of designed family products start off this product get assemblie's structure which have components on undermost level elementary assemblie's level. This is indicate than getting elements associate relation generate extremely multitude of combination products and built in components, apropos multitude of variant. The according to definition variant product have different format than somebody with have the same pedigree and standing in intimacy structural relation. [3]

The simultaneous controlling of process designed product and technology appropriate variation have for purpose that assimilate product different level necessary customer and that, in the extremely, own sale realize appropriate profit.

The same of present definition family product: grup of related product. The related components of family product i.e. variation product realize of structure that product. The structure of product describe components (composite, function,…) from which product constitution. The variation of related product have to collective structure on the certain level, i. e. have to collective elements and relations or with point of view functional or assembly. Between to variation of product undermost level elements and relation in his structure doesn't possible subcategory. [3]

As example to modeling of family products from product-representative illustrated on the figure 2 and this is snail shaft. The design of snail shaft ran in Solid Edge Part.

Fig. 2. *The snail shaft [4]*

The paramount part of productive process is assembling subassembly in the readymade product. The primary function of assembly is assemblage of components in subassembly and assembly and form finaly product with definite reference. At all components repress own geometric's response, apropos response of quality wherewith realize propriety perform of production.

The assembly environment enable consolidate relations between parts. This relations automatic maintain across of process design that would protect decision of design.

Solid Edge dispose of modulus for design mechanical assembly which enable design very complex assembly structure which compose of multitude components and subassembly. The assembly environment CAA (Computer Aided Assembly) content crew for fitting parts normals assemblie's technics.

3. CAD/CAA MODELING OF HYDRAULIC SERVO STEERING GEAR TYPE 5033

In the base analysis of form primitives assembly start at function specify composite. On the base of functional application neediness identification support of function, apropos executive for level on which define primitive, than form framework of subassembly or assembly. [3]

The define of assembly base on postulate of design for assembly DFA which primary strategy of simultaneous design. The target this strategy produce easier and cheaper products, according someone authors DFA (Design for Assembly) regurd of key successful work in the competitively environment.

The next step in modelling hydraulic servo steering gear is modelling subassembly, as element multi-level in hierarchie's structure products in assembly environment Solid Edge.

The modelling of subassembly shroud (figure 3.) base on assembling elements subassembly shroud: cover of shroud, screws and shutter in the assembly environment of Solid Edge. [4]

The modelling of subassembly segment shaft (figure 4.) in environment of assembly implication concatenation: segment shaft, two bearing, lever, pulley and nut. [4]

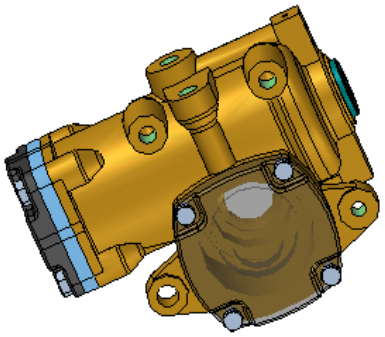

Fig.3. *Subassembly shroud*

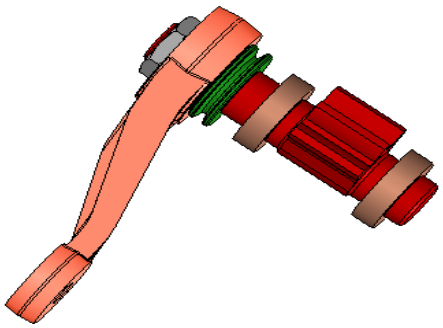

Fig. 4. *Subassembly segment shaft*

The modelling of subassembly valve set (figure 5.) comprise integration of elements valve, worm's shaft, nut with wicket, valve of return effect in the assembly environment of Solid Edge. [4]

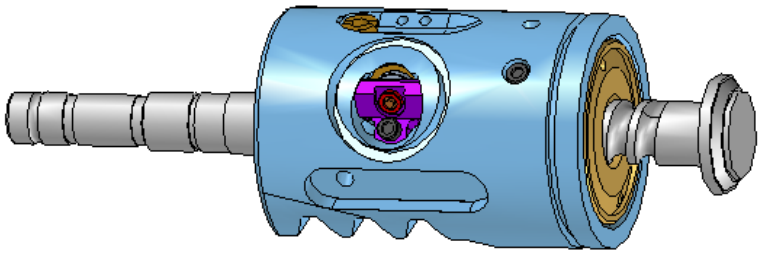

Fig. 5. *Subassembly valve set*

In the end as final process in the assembly environment occur modelling constitution of hydraulic servo steering gear (figure 6.) that presentation rearmost element hierarchy's structure observe hydraulic servo steering gear.

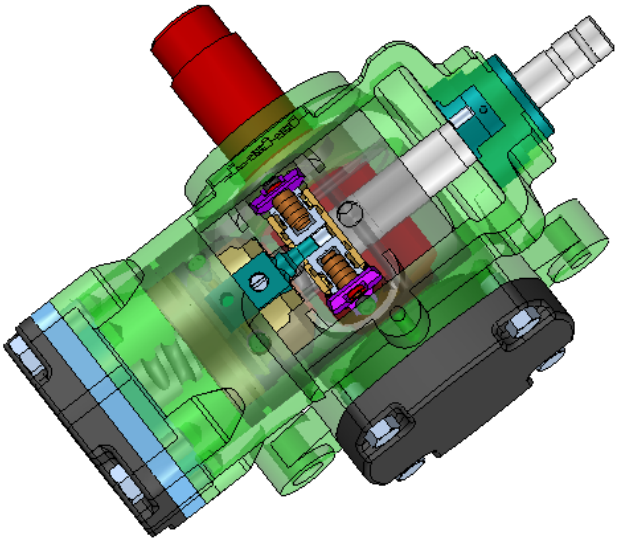

Fig. 6. *Constitution of hydraulic servo steering gear*

Integrated design assembly's structural products according CAD/CAA technology provided on example of hydraulic servo steering gear indicate on large ascendancy designer on addition quality products and remission costs of design and assembly. The primal purpose in the process integrated design assures quality's cooperation designer products and technology of assembly. Integrated and cooperation practise postulate from efficacy usage of pilot practise. When cooperation skip than loss signification on quality products and addition costs of production.

5. CONCLUSION

The one of mode magnify quality of process design product and technologies base on usage and development CA technology and theirs integrated to compendium's simultaneous engineer's. the modelling of product is compendium from presentation everything engineer's information necessity in process design product and represent the base of integration. The computer's design enable production on computer so that exploration run on them instead on realy model. In the tend faster and qualities perform great and versatility's demand from market, needs realise reduction destination time for procreation variation or entirely new product. Respect previously induce theme of this work is hydrailic servo steering gear.

REFERENCES

[1] Minic M.: *Sistems for controll lorry motor vehicle*, Belgrade, Serbia, 1992.
[2] Eric J.: *Final work*, Faculty of mechanical engineering in Kraljevo, Serbia, 2004.
[3] Babic A.: *Technology of assembly*, Faculty of mechanical engineering in Kraljevo, Serbia, 2005.
[4] Obucina V.: *Final work*, Faculty of mechanical engineering in Kraljevo, Serbia, 2005.
[5] PRODUCTION PROGRAMME - TECHNICAL DATA, PPT Trstenik, Serbia.
[6] R. Rajamani, *Vehicle Dynamics and Control*, University of Minnesota, USA, 2005.
[7] T. Gillespie, *Fundamental of Vehicle Dynamics*, SAE, 1992.
[8] S. Bendat, E. Pierstol, *Analysis and Measuring Procedures*, Wiley Interscience, Moscow, 1994.
[9] Th. Meitinger, C. Breitfeld, *Simulation des dynamichen Verhaltens von Zahnstagen - Hydrolenkugen*, 1998.
[10]J. W. Fitech, *Motor Truck Engineering Handbook*, SAE, Warendalle, USA, 1993.
[11]M. Demic, *Analysis of Influence of Design Parametars on Steered Dynamics*, 26 (1996.), pp. 343-379
[12]Eric J.: *Master work*, Faculty of mechanical engineering in Kraljevo, Serbia, 2007.