

# IMPLEMENTATION OF AN AUTOMATED DOCUMENTED IN TEACHING TECHNICAL DOCUMENTATION

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**Abstract:** This report examined the means of automated design and analysis of technical documentation in CAD environment. Based on the analysis is to develop a methodology for course work in the discipline technical documentation using CAD systems for students of all engineering disciplines. The introduction of CAD products CAD early in training will enhance student motivation for their use - further in the education process in diploma projects.

**Keywords:** ANALYSIS, AUTOMATED, CAD PRODUCT DESIGN, TRAINING

## 1. INTRODUCTION

The mounting requirements for the design, manufacture of parts and assemblies, and free use of their forced use of new tools. One of these tools in order to automate the process of design and design documentation of technical products are CAD / CAM systems.

Increasingly their widespread requirement to put higher education institutions to be covered in the training of students in the classes provided for the execution of assignments in this course Technical Documentation.

Aided design is carried out with different systems in complexity, scope and application areas. Modern CAD systems are designed for the design of components, assemblies, devices, development of new and modernization of existing technical documentation. CAD systems have options for creating 2D and 3D geometric model of the project [1].

The most widely used in the learning process graphic system AutoCAD, due to their advantages in terms of projection drawing and the requirements of the standards for the development of design documentation [2]. CAD high-end systems are increasingly used in production and in the training of planners and designers [3]. This is Tuck as they provide very good opportunities for design, modeling, documentation and manufac of parts and assemblies in CAD / CAM environment. All this gives grounds to say that the question of the implementation of automated design training students in the discipline Technical Documentation is particularly striking.

This work relied on an approach to training students in design automation in the CAD environment through the implementation of a volume of the tasks in the course " Technical Documentation " (TD).

The main tasks are:

- Analyzing the technical documentation and graphic CAD systems;
- Justification appropriate CAD / CAM systems for training of students of mechanical specialties;
- Development of methods for the use of CAD systems in the performance of assignments;

To perform the tasks used programming systems automated design AutoCAD and Solid Works.

## 2. Analysis of technical documentation in CAD environment

With the help of CAD systems automation design is done in an easy and simple way, leading to maximum gain .

By CAD products to automate the design process reduces the time to build sites which in turn allows engineers to direct his attention to innovate. Through the rapid development of digital prototypes can detect any errors before they are sent for production. Thanks to creative approaches that accelerate and facilitate the production process, AutoCAD is the most widely used of this class CAD systems to create a drawing [4].

The program's functionality helps to conceptualize and visualize projects developed to accelerate the implementation of the tasks. Through embodied in it means of parameterization of the drawings are decreases timing verification and editing projects. The associative interface makes working with the program attractive, easy to learn and use, and helps to increase the overall productivity in the design.

Technical drawings play an important role in all areas of engineering i.e. engineering design is based on drawings. The accuracy of implementation is supported by means of the graphic based CAD systems. To make the 3D image using two-dimensional drawing requires specific knowledge, skills and technical idea, ensuring sufficient precision to enable the product to be designed and put into production. These are subject specific knowledge of engineering drawing and technical documentation.

Most - widely used graphical and training systems engineering students are:

- Low grade - AutoCAD;
- Midrange – Solid Works, Solid Edge and Inventor;
- From - class - Pro Engineer, CATIA;

Possibilities for constructing documentation that give us CAD systems:

- By modeling engineering components, which allows for the geometric description of the object by concepts such as opening, rib and more. To this end, student learning is on the system Solid Works.
- In the process of designing the main burden falls on the creative process rather than the creation of drawings;
- Design starts directly with dimensional modeling of parts and the device as a whole;
- Drawings generated nearly completely automatically by the system as can be created as options as needed, and complying with the relevant standards of a country;
- Changes in structure or design of such devices is not necessary to always start from the beginning, since the models can be changed;
- Possibility to exchange data with other systems using standardized graphics file standards;

## 3. Development of methodologies for the discipline technical documentation using CAD systems

In the course work in the discipline technical documentation necessary Freshmen to acquire basic knowledge and skills to work with graphic systems AutoCAD and Solid Works. Acquired basic knowledge will be useful for the design of coursework in the subjects taught in the upper courses of mechanical engineering.

The system is oriented to Solid Works parametric modelling and assembly of complex products with a large number of details. It includes tools for: the creation of sketches, modelling and documentation of parts and assemblies, creating presentations and the availability of additional applications. Learning the basics of graphical system would benefit students at - in its further their course and diploma projects.

Advantages of the system Solid Works are:

- A quick and easy performance of the geometric shape of the projected object;
- Developing spatial reasoning through three-dimensional modelling of parts;
- Visualization of the interaction between the constituent parts and the operation of the assembled ones place, a dynamic model;

Based on studies on the use of CAD systems in order to satisfy market needs in the education of students in exercises coursework in the discipline to be included:

1. Depicting a third image, given two appropriate sections and sizing in a programming environment AutoCAD ( Fig. 1 ) ;
2. Displaying 3D image of the detail of item 1 ( Fig. 2 ).
3. Drafts of average - intricate detail of the kind using software Solid Works ( Fig. 3 ) ;
4. Implement drawing of assembled ones place product Solid Works ( Fig. 4 , Figure 5 and Figure 6 ) ;

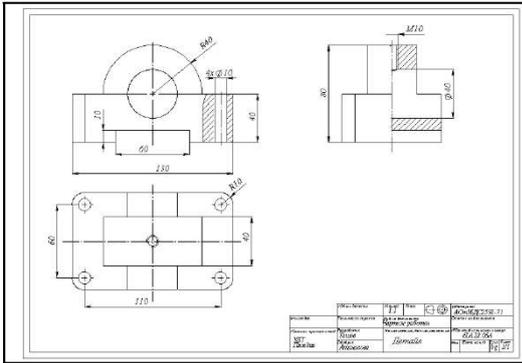


Fig. 1 Depicting a third projection, given two

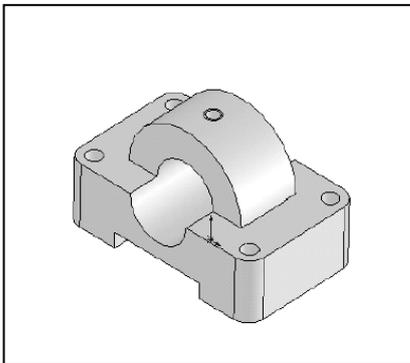


Fig. 2 3D image detail

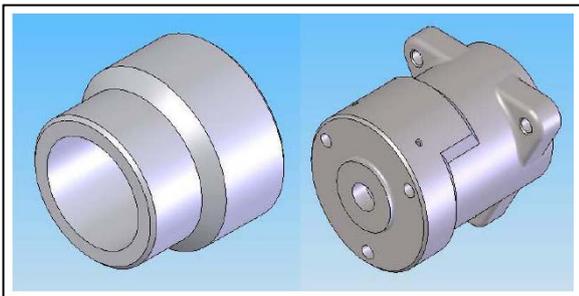


Fig. 3 Geometric model of simple and medium - the intricate details of nature

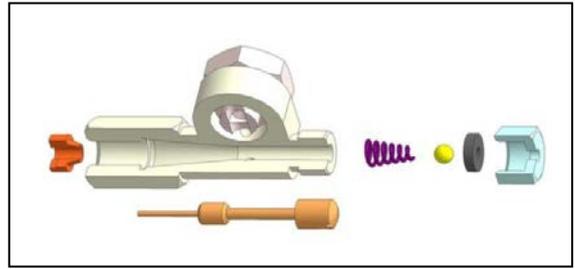


Fig. 4 Components of the assembled ones place

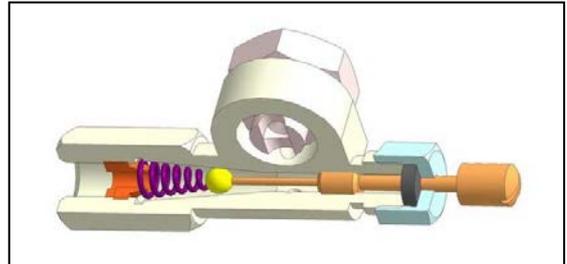


Fig. 5 A longitudinal section of an assembled ones place

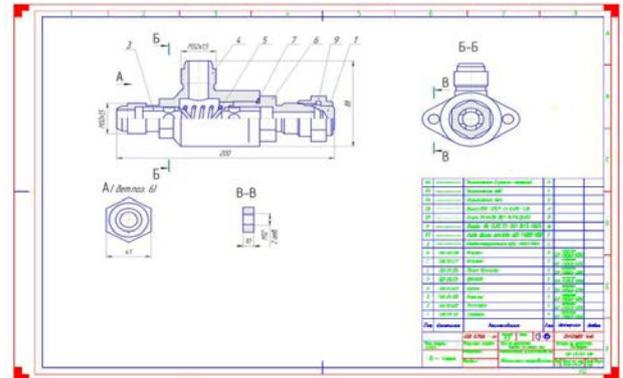


Fig. 6 Drawing of the product "Valve"

Fig. 5 is a section view of an assembled ones place of the product "Valve" on a given secant plane through graphics system Solid Works. Cut gives a good idea of the mutual arrangement of the individual elements of the piece and its assembly. The base is necessary to develop a design drawing of the assembled ones place that facilitate the development of spatial reasoning of students shown in Figure 6.

Opportunity to develop the imagination of students in a drawing detailing the general appearance is of great importance in the preparation of the course, since courses in design - above courses need to be able to read and analyze drawing different designs mechanical products.

#### 4. CONCLUSION

Everything said above - we can conclude that:

1. Needed - a good cross-curricular link between general and specific subjects taught in mechanical engineering courses at universities to introduction of CAD systems in the learning process.
2. Through the introduction of CAD products CAD early in training will enhance student motivation for their use - further in the education process in diploma projects .
3. Utilizing graphical systems design is undoubtedly an advantage for future professionals in their independent or joint professional work.

## 5. LITERATURE

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