DESCRIPTIVE GEOMETRY AND MODERN POSSIBILITIES IN THE PROCESS OF STUDYING IT

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ABSTRACT

The article discusses the modern possibilities of computer technologies in teaching descriptive geometry.

Keywords: Higher professional education, professional competence, methodological support, modern computer technologies, animation effects, the principle of visibility, stimulation to conscious understanding, electronic textbooks and teaching aids, interactive three-dimensional models.

INTRODUCTION

In the preparation of technical specialists, the study of descriptive geometry plays an important role. In technology, drawings are the main means of expressing human ideas. ..in order to correctly express your thoughts with the help of a drawing, knowledge of the theoretical foundations of constructing images of geometric objects, their diversity and the relationship between them is required, which is the subject of descriptive geometry.

In addition, the study of descriptive geometry contributes to the development of students' spatial representations and spatial imagination [1] - qualities that characterize a high level of engineering thinking and are necessary for solving applied problems.

Materials and methods

In the preparation of technical specialists, the study of descriptive geometry plays an important role. ..in technology, drawings are the main means of expressing human ideas. ..in order to correctly express your thoughts with the help of a drawing, knowledge of the theoretical foundations of constructing images of geometric objects, their diversity and the relationship between them is required, whichis the subject of descriptive geometry...In addition, the study of descriptive geometry contributes to the development of students' spatial representations and spatial imagination [1] - qualities that characterize a high level of engineering thinking and are necessary for solving applied problems.

Three-dimensional graphics are widely used in solving problems of descriptive geometry when projecting spatial geometric objects on the projection plane (Fig. 1, 2).

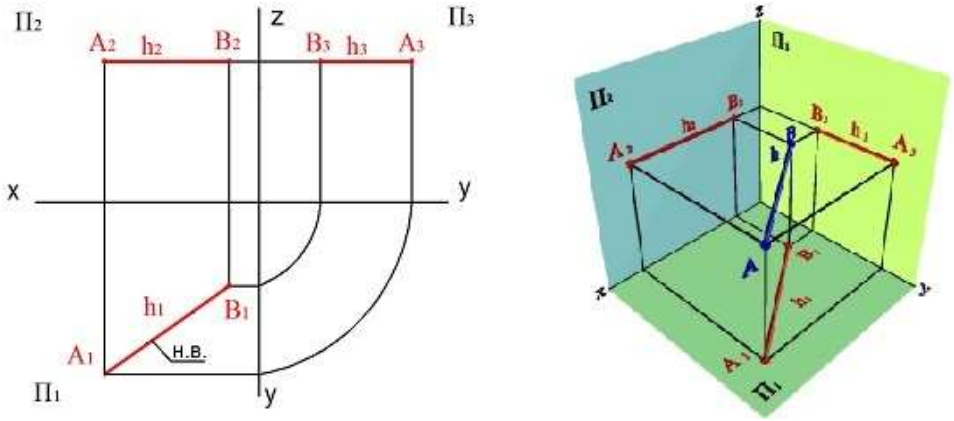

Figure 1. Horizontal straight line

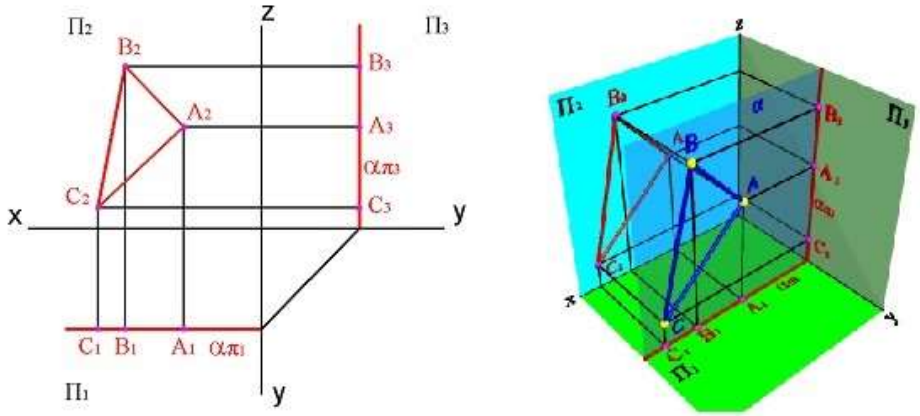

Figure 2. Frontal level plane

Using animation effects, you can demonstrate the sequence of their projection, more clearly see the relative position of various geometric objects in space. ..for a better perception of the material, it is possible to show simultaneously both the spatial model of the geometric object and its complex drawing (Fig. 1, 2). When studying descriptive geometry, graphic material can be demonstrated in a large volume. ..this makes the lesson more interesting, and the material more accessible and memorable.

With the help of modern computer technologies, it is possible to present a step-by-step solution to a problem in dynamics. For example, Figure 3 shows a step-by-step construction of the line of greatest inclination of the plane of the triangle ABC to the horizontal plane of projections

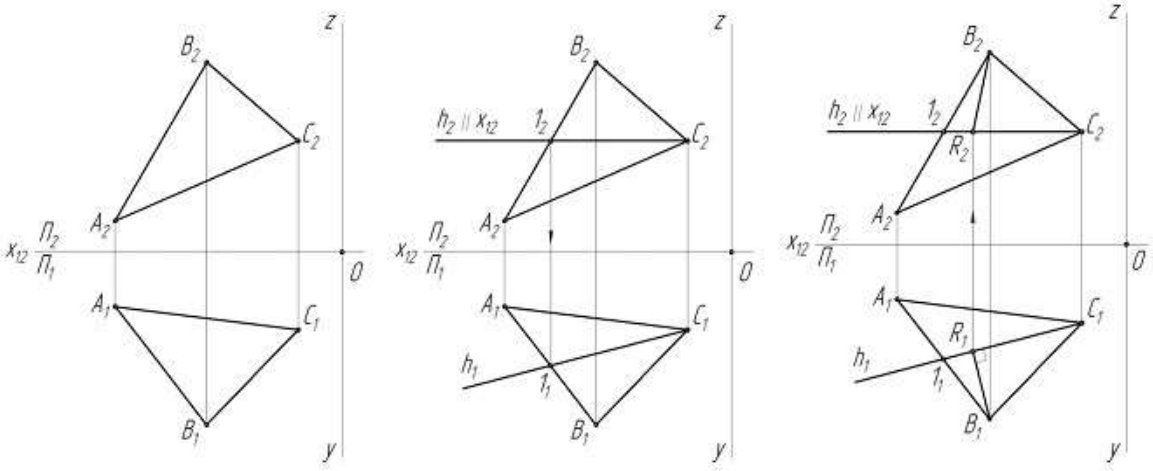

Figure 3. Construction of the line of greatest slope

Performing actions in solving certain problems in dynamics increases the ease of perception of multi-stage geometric constructions. ..all auxiliary constructions that characterize the course of solving the problem can be hidden, which will make it easier to read the drawing, and also restored to trace the logic and check the correctness of the executed image.

Simplicity and clarity are the main features of the developed methodological illustrative material. Without deviating from the traditional method of presenting graphic information, visualization of educational material is carried out using modern information technologies [6].

Result and discussion

In the modern learning process, the development and use of electronic textbooks and teaching aids is also relevant [7]. ..an electronic textbook on descriptive geometry should contain a large number of illustrations, animations showing geometric objects, as well as an explanation of the material with a step-by-step illustration of algorithms for solving graphic problems. ..almost any concept in descriptive geometry is easier to illustrate than to describe in words. The advantages of electronic publications are their mobility, availability of communication with the development of computer networks, constant updating of information material. ..the use of electronic textbooks provides an opportunity to obtain any information in various accessible forms, which are most suitable in each specific case and taking into account the individual abilities of students

Modern computer technologies make it possible to introduce interactive three-dimensional models into the electronic edition (Fig. 4) [8].

The spatial model can be viewed from any side, turning and rotating it, to reveal the internal outlines and fully reveal the shape, you can make any section of the 3-D model, By setting the position of the secant plane, all this equips students with concrete ideas about geometric shapes.

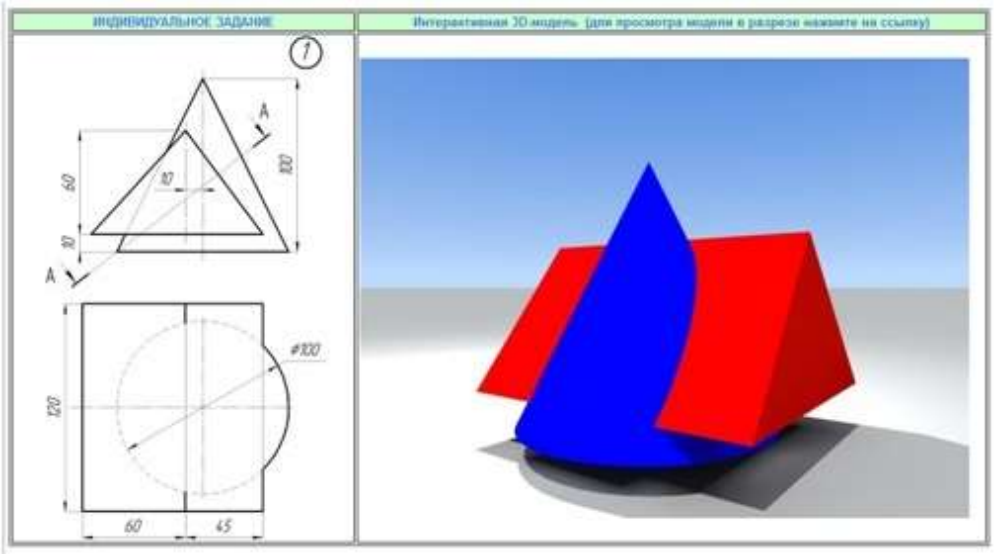

Figure 4. Interactive 3D model in the e-tutorial

The visibility and interactivity of the electronic edition can significantly increase the interest of students in the discipline being studied, the level of orientation on the topic and the degree of mastering the material

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