Study on the Role of Computer CAD Software in Interior Design

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Abstract. With the continuous progress of economy and science and technology, some computer-aided software has changed the traditional working mode of contemporary interior design. CAD computer-aided software is often used in interior design to help the work. This paper mainly introduces the outline of CAD-3D software, expounds the main functional characteristics of CAD and the main functional characteristics of 3D technology, and finally focuses on the application of CAD-3D in interior design.

Keywords: Interior Design, Cad-3D Software, Functional Features, Role

1. Introduction

With the realization of interior design function and the continuous improvement of people's material living standard, modern interior design has a greater development prospect: especially with the application of computer software CAD-3D in interior design, the effect of interior design is improved. Computer software is used CAD-3D improve the effect of interior space design, which accords with the current requirements of design effect. These two kinds of computer software make the interior design effect diagram appear in the computer three-dimensional, improve the designer's work efficiency, facilitate the customer to raise the objection to the design at any time, and realize the effective communication between the two sides.

2. Overview of CAD-3D software

2.1. CAD software

CAD means computer aided design, also known as Auto-CAD, is Automatic computer aid design shorthand, the main function of this software is to carry out three-dimensional solid modeling, auxiliary graphics design in the computer, is the famous Autodesk American company products, and it is used in various fields, in interior design is mainly used to make plans.

2.2. 3D software

3D is the abbreviation of 3D-max, which was developed by a subsidiary Discreet company of Autodesk, which for the first time moves various software that can only be implemented in graphics workstations into private computer hard drives. In interior design, it is mainly used to build models.
3. CAD main functional features
The main functional characteristics of the CAD generally include the following aspects: First, for the drawing of plane graphics; Second, to edit and modify the graphics; Third, to realize the transformation of different formats of graphics, so CAD has a strong data conversion function; Fourth, CAD can support multiple operating platforms; Fifth, CAD can be used in combination with many other software, such as PKPM software, Bridge Doctor software and so on.

4. 3D-max main functional features
The main feature of 3D-max is the combination of new sublayer surface subdivision (subdivisim) surface and polygon geometry modeling.

Includes a new rendering tool that integrates dynamic coloring (ActiveShade) and element planting (RenderElements) features. Meanwhile, 3D-max put forward the perfect connection between mental ray, Renderman and advanced friendship dye, and fully realize the more perfect planting effect. 3D-max Design's application in interior design is mainly improved by leaps and bounds in lighting processing [1]. Its lighting function is mainly through the research and treatment of the sun and sky to analyze the sun, sky and even artificial lighting. It can be directly used in the visual port of various colors and light intensity and weakness to simulate. 3D-max has super powerful function, very simple and convenient operation technique, it is the most professional drawing tool for interior design decoration effect.

5. Application of CAD Software in interior design

5.1. Modeling

5.1.1. CAD drawing
CAD as the first choice of architectural drawing tools, it itself has points, lines, marking and other drawing tools.

For the sketch of the initial stage of the project design, the structural engineers often use the CAD software to produce the structural design drawings of different component parts. Taking the box bridge design as an example, as shown in figure 1, figure 2, respectively, the longitudinal section of the bridge structure and the corresponding cross section of the steel bar schematic diagram, the box beam section size, steel bar layout form are drawn in CAD. People can clearly understand some basic data of the structure itself.

![Figure 1](image-url)
5.1.2. Plane rendering evolved into three-dimensional spatial rendering
The modeling process in the computer is equivalent to the perspective line draft in the hand-drawn effect diagram.

The difference is that there is only one special point of view in hand-drawn manuscripts, but the effect model in the microcomputer can be viewed from different angles to get the pictures viewed from different viewpoints until the designers and customers feel satisfied [2]. In the interior design effect diagram, some objects need to be presented by three-dimensional model, which can be directly synthesized to achieve.

5.2. Rendering and retesting
This function is equivalent to the coloring process of manual drawing. The sketch relationship of various things in interior design and the mass feeling of the object to be represented need to be expressed separately when hand-painted coloring.

And the CAD-3D rendering process through the lighting to express the sketch relationship in interior design, it gives the interior design model to reflect the function of material. All these processes are implemented through 3D-max of this software. 3D-max is the application software of Windows98 and WindowsXP platform [4]. Its rendering time is shorter and more effective than other software. They can all achieve light and shadow tracking, as long as the designer can carefully carry out the perfect operation. In the interior design effect can really show the quality of things, including the characteristics of a variety of light, such as shadow, reflection, as well as highlights and reflection, etc.

After the rendering model is completed, the software can provide the complete basic data of the drawn model, which can be used to detect whether the design is reasonable. For example, the load-bearing beam added in the interior design meets the limit state of bearing capacity (the formula is shown below). Input the data from the CAD software into Table 1 below, and other software will automatically calculate the shear force value, and get the corresponding curve figure as shown in Figure 3, and then analyze whether it is reasonable.

\[ S_{ud} = \gamma_d S \left( \sum_{i=1}^{m} \gamma_{Q_i} G_{ik} + \gamma_{Q_i} L_{ik} + \Psi e \sum_{i=2}^{n} \gamma_{Q_i} Q_{ik} \right) \]  

(1)
5.3. Material endowments
In 3 D-max, the designer operates according to different things and different material requirements by using 3 D-max software instructions.

In order to achieve the most realistic effect of interior design, we should note the designer's attention to the data and size of various materials in the process of giving the material, so that the lighting arrangement can be perfectly studied, and the material can be given to the things [5]. The size of the drawings to be painted can not be changed, and the computer interior design effect can only be determined before rendering.

5.4. Late treatment
After rendering the graphics, there are many image files that have not been added.

In this case, the image needs to be processed later. Of course, post-processing is a long process, but post-processing plays a great role in improving the design effect of graphics [3]. Therefore, post-processing is also a very important link in interior design. Before the discussion and analysis of architectural decoration engineering under computer-aided drawing software, we should fully understand the origin and development of architectural decoration. In the 1980s, with the deepening of China's reform and opening up and the development of economy, the pursuit of beauty was rising, especially in the living and living environment. As a result, there is a beautiful scale of architectural design. At the same time, the development of social design field is accelerating, almost all products need to be carefully designed to meet the market, design into a very popular industry and almost all mass products need to be designed. For the architectural decoration is the indoor cooperation outdoor environment artistic breath, the atmosphere embodiment, the concrete architectural decoration design needs to cater to the indoor and outdoor living environment demand at the same time, develops each aspect design plan work, including the indoor and outdoor form, the wall, the door, the light, the home arrangement, the decoration material, the home appliance furnishings and so on design and the plan.

Table 1. Basic data input.

| Section Position | X (m) | Maximum bending moment (kN·m) | Minimum bending moment (kN·m) | Maximum shear force (kN) | Minimum shear force (kN) |
|------------------|-------|-------------------------------|-------------------------------|--------------------------|--------------------------|
| Bearing          | 0.5   | -58.7                         | -845.7                        | 7992.7                   | 1915                     |
| Variable cross-section | 2.3   | 12378.8                       | 2280.7                        | 6632.2                   | 1044.5                   |
| 1/4 Section      | 14.5  | -41813.3                      | -16484.9                      | -15.5                    | -5158.5                  |
| 1/2 Section      | 29    | -24123.2                      | -136195.7                     | -6965.5                  | -13316.2                 |
| 3/4 Section      | 43.5  | -194577.6                     | -367225.7                     | -14085.9                 | -22347.6                 |
| Variable cross-section | 54.5  | -389699.6                     | -630583                       | -20172                   | -30123.8                 |
| Variable cross-section | 56.5  | -414398.6                     | -665253.4                     | -21422                   | -31725.5                 |

Figure 3. Shear diagram.
Based on the whole, the decoration layout of the household type not only meets the needs of the head of household, but also adopts the marble of the European line as the main tone in the whole interior decoration. Strengthen the atmosphere and texture of indoor space at the same time create a warm home feeling. The top of the living room is set off by the plasterboard ceiling with elegant pattern, the ceiling is set up with the elegant chandelier as the foil, the interior design comes out the floor window, and selects the elegant curtain which accords with Jane ou to cover up, the interior creates the full comfortable dripping space sense organ [4]. The TV background wall is echoed by simple beige single side wall and transparent glass on the back side. The black and white TV set in front of the background wall is harmonious with the whole. The wall on both sides of the floor window is painted with white latex paint to reflect its texture. The floor uses the wood color floor to create the warm home feeling. The sofa is placed in front of the TV set with four brown velvet sofa mats on the sofa, and the background wall of the TV set is decorated with soft leather studs. Around the use of modern techniques to simulate vine ornaments for limited decoration, fully reflect the sense of spatial hierarchy and modern sense. The dining room and kitchen adopt the open form, set up the exquisite wine cabinet, connect the guest restaurant to form the space opening, reflect the public area open and clear, constitute a modern visual center.

6. Summary
All in all, the application of CAD-3D software in interior design is a very complex process. As a result, we need to have a clearer understanding of the application function of CAD-3D software in interior design.

The CAD is rich in function. Through its own powerful drawing, editing commands and marking of graphic dimensions, it can draw or edit a variety of complex two-dimensional graphics, and for three-dimensional drawing, modeling and model rendering can also be implemented on the CAD. At the same time, 3D-max is a three-dimensional drawing software with the most users in the world. Its advanced technology and function are its greatest guarantee. One of its features is that 3D modeling is powerful and has very good expansibility, and has considerable advantages in making animation. Many excellent plug-ins improve their own functions perfectly [6]. High compatibility with other related software, such as CAD, can further material and lighting processing, can support DWG files, simple and convenient operation. The advent of CAD software, it greatly improves the efficiency of drawing and makes up for the shortcomings of some manual drawing, which brings great convenience to the users of interior design. As computer software CAD-3D is more and more widely used in interior design, higher requirements have been put forward to interior design staff at this stage. The application of computer software CAD-3D in interior design brings a lot of convenience to interior design. Therefore, the role of computer software CAD-3D in interior design of laboratory is of great practical significance at present.

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