Research on 3D virtual display method of American style modern home furnishing

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Abstract. The theme of this paper is to design a 109 square meter three bedroom and two hall house with plane plan and 3D display of soft decoration. The purpose of this paper is to create a comfortable American style modern home environment for the householder. The key content of the home design is the design of the plan: including the removal of the wall, the plane layout, the ceiling size, the ground pavement, the lighting circuit and the erection Face; soft decoration: including sofa, dining table, chair, bed, cabinet, adornment and other material appearance and color matching.

1. Introduction

The innovation of this research topic lies in: 1. Simplify the lines of traditional American style column elements, so that the spatial vision has a better extension.2. Combine the pure color of molandi senior gray with the style of house and furniture to create a more healing interior space.3. Through the realization of the software, we use the plane drawing of AutoCAD to transform the house type and 3D drawing of 3DMAX to design the space display, realize the virtual roaming effect, and have a strong sense of immersion. On the basis of many times of communication, we modify it and put it into practice. Combined with the analysis of other home decoration cases, we think that the innovation point is feasible, and achieve the expected design goal.

2. Research content

1. According to the elements of modern American design style, carry out the plan of house type transformation in the space, plan the dynamic and static zones and the functions of each zone, determine the wall structure demolition and transformation drawing, layout plan, ceiling layout size drawing, ground pavement drawing, lighting circuit drawing and elevation drawing, so as to optimize and humanize the house type transformation.

2. To make the model, on the premise of unity, using the contrast theory, we can make three-dimensional models of living room, dining room, master bedroom, secondary bedroom, children's room, study, dining room and balcony respectively. In the process of making, we should pay attention to the following aspects: virtual reality contrast, color contrast, quality sense contrast, body contrast and light contrast.

3. After rendering the renderings, get the owner’s feedback on the furniture and soft decoration. The design of oneself carries on the introspection growth.

3. Design of American style home
3.1. Definition of American style
American style originated in the 17th century. Modern American style residence combines the advantages of housing construction in the world today, and then adds some humanistic elements, such as Americans are good at innovation, liveliness and freedom. It has become the most creative, humanized and advanced residence in the world, forming a unique romantic leisure style.
The schools of American style include: simple and practical American simple style; simple and elegant and elegant American new classical style; simple and natural and elegant American rural style.

3.2. The application of American style in modern home design
The modern American style is mainly simple, free and comfortable, and tends to light color system. With the help of rich lines, it will bring romantic and comfortable decoration effect, more in line with the layout design requirements of Chinese family houses. To sum up, the modern American style is simple and heroic, focusing on overall harmony, using a large number of synthetic stone and wood facing decoration, simple and bright space, retaining the texture and color of classical furniture, emphasizing the comfort of design and the elegance of sculpture, and focusing on the practicality of furniture.

Starting from the key points of different room space decoration, the elements of modern American style decoration are as follows: the guest restaurant is bright and simple open kitchen, warm bedroom layout, simple and practical study.

4. Research on methods and problems of virtual display of home space

4.1. Modern American space
plane space processing with CAD software. On the basis of being familiar with design data and building structure, space separation and reasonable organization of design space relationship are carried out, and then indoor dynamic and static lines are arranged according to the requirements of functional relationship and space modeling. Then determine the scale relationship of wall, floor, beam and ceiling.

1. Wall structure demolition drawing (see Figure 1-1 for details): we will demolish the main bedroom by changing the wall and the area in the middle of the kitchen is changed into a study; a door is opened between the kitchen and the balcony to enlarge the vision.

![Figure 1-1 wall structure removal and modification](image)

2. Layout plan: there is an area for shoes and bags in the foyer, and a bar is used in the dining room to separate the two; the main bedroom is only designed with makeup area.

3. Layout of ceiling: simple ceiling with concave shape is used; a light belt is reserved for the secondary ceiling; integrated ceiling with relatively low cost is selected for kitchen and toilet.
4. Ground pavement: the dining room adopts fancy and beautiful marble synthetic tiles; the three bedrooms choose solid wood floors of different colors, warm in winter and cool in summer. The non-slip ceramic tile with rural style is selected for toilet and kitchen.

5. Lamp circuit: the potential wiring indicates the control relationship between the switch and the lamp position, and the kitchen and toilet have reserved the vent area.

6. Living room elevation: it is composed of sofa wall elevation and TV wall elevation. The elevation is drawn according to the principle of orthographic projection, indicating the selected material type and general decoration shape.

4.1. 3D effect processing with 3DMAX software.
1. Production steps of renderings:
   ① The establishment and modification of the model.
   ② Set up materials for the model.
   ③ Combine subprojects as a single whole.
   ④ Choose the right angle to create the camera.
   ⑤ Light settings.
   ⑥ Render output

2. The rendering output of panorama needs to change the rendering parameters. Under the condition that the modeling environment remains unchanged, change the rendering parameter scale to 2:1, pull V-Ray down to the final camera setting, change the mode to spherical, change the degree to 360, and normal rendering output is OK.

3. Components of renderings:
Here, take the effect drawing project of the living room as an example, and the division of its subprojects is shown in Figure 4-1:

![Figure 4-1: composition of renderings](image)

4.2. Modern American decoration
Modern American houses choose the gray color, hazy and soft Morandi color system as the main color, adopt the TASS dry column type element door with simple structure; simplify the classical Rococo style elements and use them in the sofa background wall; use the linen style wallpaper in the bedroom to echo the Roman curtain, making the whole feeling of retro, but the bedding and bedside lamp are more simple and comfortable; the overall color of the children's room is the powder in the Morandi color system, such as bedding, curtains, computer tables, etc., the choice of bed body is Match a green, which makes the comparison between cold and warm, more comfortable; the restaurant and corridor area choose the wall in American style to replace the skirting board, and the color of the wall decoration painting is also a typical Morandi color system, with stronger integrity.

4.3. Modern American materials
Modern American materials are divided into two parts: effect drawing materials and actual decoration materials.

We use 3DMAX software to attach materials to the model. First, we need to edit the shader, adjust the image, reflection, refraction and solid color parameters of the material, then select the object to attach the material, click to assign the material to the model object, and you can see that the object is...
given the material in the view. Here we take the material parameters of latex paint and wood floor as an example.

Emulsion paint: generally used for walls, its reflection is very weak. The reflection solid color parameter is 238, close to black, and the reflection degree is very low.

Wood floor: the wood floor we choose is of high glossiness, and we also arrange it according to the vertical direction of 20 * 80cm in UV map processing.

Decoration involves a wide range of personnel, long cycle, complex process, so before design, we need to deeply understand the commonly used plate types and their uses.

5. Conclusion
This paper focuses on the actual needs of the homeowner and how to apply American style in modern home, confirmed the modern American style of decoration design, through the processing of modern American space, as well as the processing of modern American modeling, color, decoration, materials, lighting, and constantly through role exchange to make the design closer to home life. Nowadays, the demand for housing design is more concise, but it is eager to contain more stories at the same time, so I hope to make contributions to the interior design industry through careful design.

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