

# Research on Computer-aided Design System of Artificial Wood Panel Pattern Based on CAD System

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## Abstract

Computer-aided design technology of artificial wood plate pattern in China's computer CAD system is constantly developing and applying, and in the road mapping, building survey has an important role, its development and promotion for China's construction of far-reaching significance. This paper expounds on the current computer aided artificial wooden plank the practical application of decorative pattern design technology, for the principle of computer aided artificial wooden plank pattern design technology is analyzed, and puts forward the ground of the stationary computer aided artificial wood sheet of decorative pattern design technology in actual production process, the application of technology were analyzed, and put forward computer aided artificial wooden plank trend of decorative pattern design technology in the application of the computer CAD system, in order to offer reader reference.

**Keywords:** CAD System Application Analysis, Road Mapping, Computer CAD system, 3 D Modeling;

## Introduction

The computer-aided design technology of artificial wood plate pattern is based on the laser ranging principle, which USES the scanning scope of the scanning mirror and the point cloud density to obtain the three-dimensional coordinates of each point on the target surface. It can obtain the texture information of the target point position in turn and restore the three-dimensional scene. In recent years, computer-aided design of artificial wood plate patterns has been paid more and more attention. Many scholars even think it is a new revolution of computer CAD system following GPS technology, which plays an important role in the application and data analysis of CAD system. As a new measurement method, computer-aided design technology of artificial wood plate pattern has also been widely used in the construction of various projects at home and abroad. It is more widely used in engineering design and mapping abroad, and more widely used

in the protection and mapping of cultural relics at home. And the computer-aided design technology of artificial wood plate pattern has important applications in topographic map mapping, timber quantity measurement, timber pattern design measurement and modeling<sup>[1]</sup>.

## 1. The technical principle and application classification of computer-aided artificial wood plate pattern design

### 1.1. Principle of pattern design technology in computer CAD system

The application of computer-aided artificial wood plate pattern design technology can be divided into two systems: fixed pattern design analysis and mobile pattern design analysis according to the different measurement methods. The former is similar to traditional computer CAD system of total station, but

is different from total station: fixed pattern design and analysis system designed by pattern analyzer, control system, digital cameras and post processing, the collection is not a discrete single point coordinate, but to build a "pattern design of the system," a scan range, the characteristics of quick speed, high precision, in the field also has a larger space<sup>[2,3]</sup>. On the other hand, the traditional mobile computer CAD system is based on the vehicle-mounted platform, which is combined by THE GLOBAL positioning system (GPS) and the inertial navigation system (IMU), and integrates with the fixed pattern design and analysis system technology for data collection and summary. The moving pattern design and analysis technology can obtain more reflected lasers and carry out gray matching for scanning points. Generally speaking, the movable pattern design and analysis technology is not stable, and the CAD system of pattern design is more stable and effective to a certain extent.

## 1.2. Application and classification of pattern design technology in computer CAD system

### 2.2.1. Practical application of pattern design technology

The practical application of computer-aided design of artificial wood panel patterns in computer CAD system includes four aspects: mapping of topographic map, calculation of wood volume and application and THREE-DIMENSIONAL modeling. The work of fixed computer-aided pattern design of artificial wood includes preparation before scanning, application and treatment of CAD system of pattern design, etc.

Before scanning, it is necessary to conduct an overall investigation of the environment in the fixed computer-aided artificial wood panel pattern design area and determine the position of the scanner and target. Ensure that the scanned data can effectively represent the measured area, and select as few stations as possible to reduce the amount of raw data processed<sup>[4]</sup>. During the scanning and measurement, the unique terrain in the measured area should also be

photographed and recorded, so that the later data processing can be more effective and the investigation can be carried out more comprehensively. As shown in Figure 1 below, the application of computer-aided artificial wood panel pattern design can be started from "uploading photos, feature labeling, deep learning, testing and verification, model downloading".



**Figure 1.** An example of computer-aided artificial wood panel pattern design.

The application of the CAD system of pattern design needs to be obtained through the fine scanning of the measurement station, and the target center is taken as the control center, and the three-dimensional structure of the target center is accurately calculated by using the total station without reflection. Not only can the coordinates of the target center be accurately obtained, but also the subsequent multi-station data can be better registered. The setting of the target should be evenly distributed and the distance from the scanner should be adjusted and improved. The matching criteria of pattern design need to set corresponding targets for control in different scanning areas, so that the adjacent scanning pattern design can control multiple targets and be used for pattern design in different areas. The relative and absolute atmosphere of the matching criteria are two parts. More importantly, the accurate measurement of the total station or other instruments should be established based on the coordinate system of a certain scanning station. The purpose is to obtain the precise coordinates of the target. After the collection and summary of pattern design and registration, the

most important operation is to process the data, and the processed pattern design is conducive to the precision of topographic map mapping, wood pattern design application, THREE-DIMENSIONAL modeling and other engineering applications<sup>[5, 6]</sup>.

### 2.2.2. Application of pattern design collection technology

From the practical application, the problem of pattern design collection technology mainly includes two aspects: the problem of computer-aided artificial wood plate pattern design equipment and the problem of professional personnel.

On the one hand, with the continuous advancement of China's new industrial situation, China's engineering precision measurement has been visible improvement and progress. For example, engineering precision measurement enterprises develop relevant engineering precision measurement control systems and optimize the design of engineering precision measurement with the concept of "New Moore Law". But on the whole project accurate measurement control mechanism of our country is still immature, largely fiber optimization application control system cannot implement, the staff was not established in the process of work more good engineering accurate measurement control consciousness, appear even the sense of responsibility is not strong, work careless, and so on and so forth. Due to the fact that the work of accurate measurement and control of engineering is neglected to a certain extent, the manpower and material resources invested by enterprises in accurate measurement and control of engineering are insufficient, leading to the failure of timely and effective cleaning and maintenance of data analysis equipment, and turning a blind eye to violations.



**Figure 2.** CAD system based artificial wood panel pattern design.

The operation of the accurate measurement in engineering aspects, on the other hand, remain scarce phenomenon of professional management talents, most of them because the job is difficult, is not to choose further study in this respect, leading to counterpart quality is low, the number of professional management talents that increased the accurate measurement in engineering in the process of running safety accident risk.

There are many reasons for this problem. First of all, most of China's accurate engineering measurement enterprises have not formed a reasonable and perfect measurement talent management system. For those who do not have professional management ability, it is risky to inspect and supervise the accurate engineering measurement. Secondly, as for industrial measurement, the management mechanism of most accurate engineering measurement is too rigid, which does not meet the needs of the development of the current era. At the same time, it lacks certain binding force and reward system, which is a great limitation for the development of professional management talents and is not conducive to the maximum development of measurement talents.

## 2. Application of computer-aided design of artificial wood panel patterns in computer CAD system

### 2.1. Application in topographic map mapping

2.2. Topographic map mapping is the overall topographic mapping of a certain area, which may include cliffs, broken walls and other areas that are difficult to be measured by conventional measurement methods. The topographic mapping of these areas can be done by using pattern design analysis technology, and the topographic mapping can be done without the traditional contact measurement.



**Figure. 3** Design of European and American style artificial wood panels

The process includes collecting, summarizing and processing the pattern design as well as extracting, editing and processing the geomorphologic features of the surface and integrating them into the topographic map.

### 2.3. Application in the calculation of wood volume

Traditional wood volume calculation USES GPS, level and other instruments of engineering mapping measurement, 3d coordinate calculation of the surface roughness characteristic points, and the construction of the wood volume calculation template. The disadvantage of this method is that the workload is huge, which requires workers to collect a large number of scattered points and make data statistics in the field. The collection interval is also large, and the accuracy is low. The use of fixed

computer-aided artificial wood plate pattern design technology can make the calculation of wood more convenient and accurate, can effectively reduce the intensity of field work, and improve the accuracy of calculation. The process includes the treatment of decorative pattern design, the construction of a certain amount of wood reference level, and the removal of characteristic landforms and features, so as to generate DEM and further measure the amount of wood.

### 2.4. Application in wood pattern design

Computer-aided artificial wood plate pattern design technology also plays an important role in the application of wood pattern design. It can effectively obtain the sample diagram and vertical and horizontal section of wood pattern design to check its stability and stability (as shown in Figure 4 below). The traditional measurement method has a large workload in the wood pattern design application, and the data processing automation degree is low, which also reflects the computer aided artificial wood pattern design technology has an important role in the contemporary road application.



**Figure 4.** Design of wood plate pattern based on CAD system.

Use computer aided artificial wooden plank pattern design technology can make field nearly four times the work efficiency of ascension, but its

application is also deficiencies: first pattern design analysis technology development time is short, the corresponding equipment are more expensive, a wide range of application is difficult to popularize, and decorative pattern design analysis application in various fields is still in the exploration; Secondly, computer-aided design equipment for artificial wood plate pattern still does not have uniform parameters of rotating shaft system in use, and its correction system and error are difficult to define. In addition, the computer aided artificial wooden plank pattern design technology for the processing of data very quickly, also has a large amount of data processing, but the corresponding software data exist error and unstable compatibility, if only rely on computer aided design of artificial wood wood decorative pattern plate pattern design technology may be a long processing cycle.

### 3. The necessity of combining the application of CAD system with the design technology of wood plate pattern

As the place where people live and work for the longest time, the environmental design of buildings has a real impact on people's health. With the continuous development of industrial social market economy, more and more construction problems begin to highlight. The environmental protection design of buildings is also faced with the erosion of toxic and harmful substances. On the one hand, high concentration of toxic and harmful substances intrude into the construction field, and some decorative materials contain a lot of formaldehyde. On the other hand, environmentally friendly design can cause unequal pollution of building air, which can reach the body through the skin (as shown in Figure 5 below).



Figure 5. Practical application of medium scale CAD drawings for wood design.

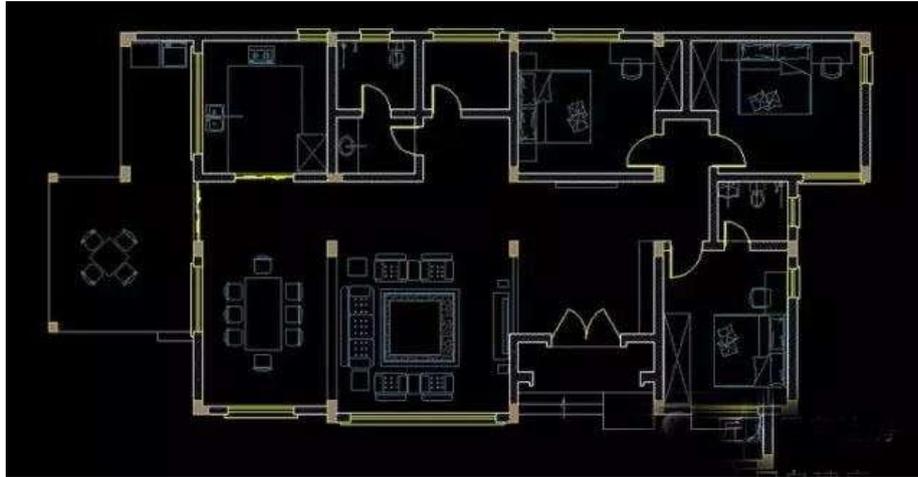
In addition, more and more radiations are used in decorative materials, as well as the continuous popularization of air conditioning and gas, people are more and more prone to "bad building syndrome". These toxic and harmful substances are even the inducement of cancer. Therefore, the combination of CAD system application and wood plate pattern design technology is very necessary.

#### 3.1. Problems existing in the application of contemporary CAD systems

##### 4.1.1. The safety production management system is not implemented

In the application of contemporary CAD system, owners often only pay attention to whether the unit they bid has profit change, winning the bid price and other aspects, but have a shallow understanding of the relationship between design and environmental protection buildings, and fail to realize the huge impact of design work on project construction. However, due to the lack of corresponding knowledge of production safety management, the owner has a vague understanding of the target that the project should achieve, often with great randomness, and is unable to put forward a more reasonable optimization of the design scheme (as shown in Figure 6). The corresponding "planning-only theory" and "construction-only theory" are the important reasons for the failure to implement the production safety management

system.



**Figure 6.**European villa system design based on CAD system.

The so-called "planning only theory" and "architecture only theory" mean that they can strictly follow the planning and requirements of government departments without paying much attention to the needs of customers in the market. This theory is mainly based on the perspective of urban development without fully considering the market competition and the market value of buildings. In this case, it is impossible to realize the building value to a large extent by designing according to the planning conditions, and at the same time, it may make the products gradually homogeneous with the competitors. But only the architectural theory does not consider the regional market differences, rather than from the project target positioning, but completely from the perspective of CAD system application.

#### *4.1.2. Excessive emphasis on design and neglect of environmental protection*

The professional design of architecture, structure, equipment, water and electricity is very important in the whole project design, but some design units do not pay attention to its importance, too much attention to design, ignore the environmental protection, as a result of increasing the project cost. If one of the 15 floors is about 26,000 square meters, the total construction area of the project is the basic floor,

similar to the layout standard of 98m<sup>2</sup> times;19m rectangle, the APPLICATION unit of CAD system expands the layout of 32.8m<sup>2</sup> at the excavation site from the 7th to the 13th floor for effect, and the reinforcement construction excluding the reinforced steel beam and steel column beam-column joints is used. The steel column is connected with the steel beam with bone beam, and the joint plate with 7T, which not only has high cost and cost, but also affects the project schedule.

#### *4.1.3. The building is closed and the energy saving effect is poor*

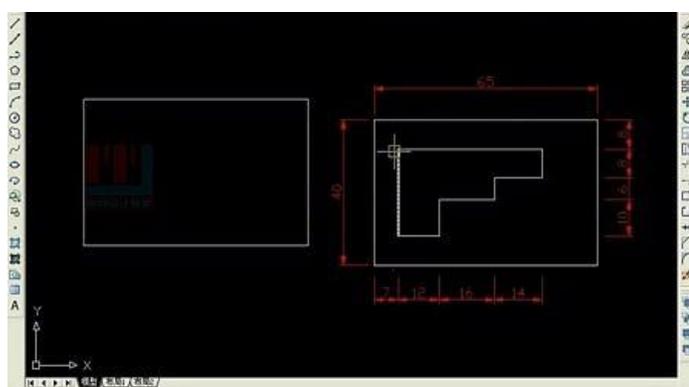
The main positioning of the building is aimed at the customer, and if the overall orientation of the customer does not change, the target of the positioning cannot be changed at will. The formation of green building and construction drawing design is the process of a multi-level valuation, and with the deepening of the design, the wooden plank of decorative pattern design is gradually obvious, once the design break through the limit, you need to adjust the quota design to meet objectives, the effective for public product or business for buildings, but for a market-oriented construction products are not completely to limit and contain the design of the product cost targets, but must carry on and close collaboration between buildings, so that the wooden

plank pattern design technology to get more reasonable adjustment.

#### 4. Application of cad system and optimization of wood plate pattern design technology

##### 4.1. Strengthen the integration of green and environmental protection concept from the design aspect

The primary process of building environmental protection design is the overall situation of environmental protection design, and if we integrate the concept of green environmental protection from the perspective of CAD system application, we can fundamentally reduce the impact of CAD system application on the environment. In the design and layout management of houses, environmental protection materials should be further screened, and environmental protection design should be carried out under the conditions allowed by the house structure. In environmental design, building the ground need to be determined according to the structure of the building is to adopt what kind of floor tile, metope design also want to consider is to use metope paint or wallpaper, etc., as far as possible to the selection of environmental materials, to ensure ventilation characteristics of house, try to avoid the phenomenon of toxic gas in the narrow space deposition.



**Figure. 7:** CAD pattern design for wood panel

##### 4.2. Design of building ventilation standard

Construction of environmental pollution is closely related to the building ventilation condition, and according to the overall air quality standards for design of building environmental protection of requirement, the little space of building construction ventilation level shall be not less than 30 cubic meters per hour, so when building environmental design need to be further from the viewpoint of space layout, strengthen the construction ventilation facilities configuration, as far as possible let the space of the building is in good ventilation environment.

##### 4.3. Improve the energy-saving effect in the application process of CAD system

Modern new housing construction is mostly based on the development concept of green and environmental protection, so in the overall energy-saving and environmental protection design of the house, it is necessary to use environmental protection building materials as much as possible. In the selection of materials, it is necessary to pay attention to the choice of environmentally safe materials, and actively guide consumers to choose such pollution-free green, healthy and environmental design materials. In the selection of adhesives, it is also necessary to choose materials that do not contain toxic and harmful substances, so as to ensure the overall air quality of buildings before and after the environmental design.

#### 5. Conclusion

As the current world to obtain three dimensional space data one of the most advanced technology, computer aided artificial wooden plank pattern design technology can provide supplement for traditional computer CAD system, and has a higher accuracy and faster speed, the characteristics of the greater distances, handling of information more quickly, can effectively improve the working efficiency of the field; The pattern design and analysis technology can be used to map and map the topographic map which is difficult to reach by traditional measurement. Computer aided artificial wooden plank decorative pattern design technology

including topographic map surveying and mapping, calculation of quantity of timber and content of the application and 3 d modeling, etc, as well as the rotating parameter uncertainty and its correction system and the error is difficult to define faults, so the computer aided artificial wooden plank decorative pattern design technology in computer CAD system still needs further research and development.

## References

1. Joshi K, Lauer T W. Impact of information technology on users' work environment: A case of computer aided design (CAD) system implementation[J]. Information & Management, 2008, 34(6):349-360.
2. Chen D, Cheng Y, Pang X, et al. Research on the architecture and modeling method of a fixture intelligent computer-aided design system[J]. Proceedings of SPIE - The International Society for Optical Engineering, 2005:70-75.
3. Hong-Xing Z, Yong Z. Overview of Research on Computer-aided Design Technology and System[J]. Mechanical Engineer, 2004.
4. Yongfeng L, Youtong Z, Hongsen T, et al. Research on 3-D Computer Aided Design of Rapid Manufacture for the Movement System in Diesel Engine Based on PRO/E[C]// Second International Conference on Information & Computing Science. IEEE Computer Society, 2009.
5. Liu T, Cui H, Li Y, et al. The Computer-aided-design (CAD) System Of Straight Bevel Gear Based On SolidWorks Software[C]// 0.
6. Yang P, Liu F, Liu Y, et al. Computer-aided design integration of a reinforced vibration isolator for electronic equipment's system basedon experimental investigation[J]. 2008, 35(5):489-498.