Application of Bambusa emeiensis and its derivative materials in interior design

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Abstract. At present, the environmental protection and sustainability of decoration materials need to be improved in the environment of energy shortage. In recent years, the industry of bamboo decorative materials has developed rapidly, but the use of bamboo is more focused on scattered bamboo species such as Phyllostachys heterocycle. With strong natural fiber, Bambusa emeiensis can be processed into different patterns, colors and shapes. It is an ideal material for architectural decoration. A large number of Bambusa emeiensis materials are used in interior design, which can not only alleviate the tension between supply and demand of decorative materials, but also play an important role in the national major strategies such as rural revitalization and green development. This paper takes Bambusa emeiensis and its derivative materials as the main research object, discusses the design principle of Bambusa emeiensis in interior design, and the application of Bambusa emeiensis and its derivative materials in interior design.

1. Introduction

The sustainability of materials is an issue of great concern in global development. Using new environmental protection materials is an important trend of interior design. Bambusa emeiensis has a fast timber cycle and meets the requirements of sustainable development and green design. With strong natural fiber, Bambusa emeiensis can be processed into different patterns, colors and shapes. It is an ideal material for architectural decoration.

2. Theoretical research and application status of Bambusa emeiensis and its derivatives in interior design

2.1. Research background

In the face of the global energy crisis and the aggravation of environmental problems, the development and application of renewable materials resources are strengthened. At present, the use of Bambusa emeiensis materials is mostly limited to product design, architecture and landscape. There are few researches on Bambusa emeiensis and its derivative materials in interior design. It is hoped that the research on the application of Bambusa emeiensis and its derivatives in interior design can provide new ideas for the design innovation of Bambusa emeiensis in interior design in terms of theoretical aesthetic value.
2.2. Research status of Bambusa emeiensis and its derivatives
In the design theory of bamboo, Wang Changjin's "general theory of Chinese bamboo culture" makes a systematic description of the aesthetic image and aesthetic image of bamboo from the cultural perspective, which has a high theoretical significance for inheriting and carrying forward the cultural belonging of bamboo. "Dongyang bamboo weaving", edited by Gong Mingwei, elaborates the application of bamboo materials and traditional bamboo weaving, bamboo carving and bamboo carving techniques. "The construction of bamboo", edited by Tan Gangyi and Yang Liu, comprehensively analyzes and summarizes the biological properties, material properties, construction properties of bamboo as well as its construction methods and node structures as building materials. In general, the research of bamboo is mainly in architecture, landscape and product design, less in interior design.

3. Property analysis of Bambusa emeiensis and its main derived materials
The initial moisture content of Bambusa emeiensis was 58%. Compared with other bamboo species, Bambusa emeiensis had the lowest initial moisture content. Because of its longer slub and better homogeneity of material properties, Bambusa emeiensis has obvious advantages in derivative processing. The average fiber length of the slub is longer than that of Phyllostachys heterocycla and other scattered bamboos, and the compressive strength and bending strength are better than those of Bambusa intermedia Hsueh et Yi and Phyllostachys heterocycla (as shown in the table 1).

|                      | Compressive strength/MPa | Modulus of elasticity/GPa | Modulus of rupture/MPa | Shear strength/MPa |
|----------------------|--------------------------|---------------------------|------------------------|-------------------|
| Phyllostachys         |                          |                           |                        |                   |
| heterocycla          | 76.91                    | 10.200                    | 160.20                 | 17.30             |
| Bambusa intermedia Hsueh et Yi | 82.55            | 23.254                    | 213.70                 | 15.89             |
| Bambusa emeiensis    | 89.78                    | 22.940                    | 239.97                 | 17.44             |

Therefore, the paper products processed by Bambusa emeiensis are obviously better than other bamboos in wrinkle resistance, burst resistance and folding resistance. Because of the small initial moisture content and the characteristics of compression and bending resistance, Bambusa emeiensis has more advantages than other bamboo species in plate processing.

4. Application of Bambusa emeiensis derivative materials in interior design

4.1. Bamboo pole
The bamboo pole of Bambusa emeiensis retains the original material characteristics of bamboo, has fine toughness, and shows different bending ability according to different types. It can be used for space structure design and partition design in interior design. For example, in the bamboo house design, Kengo Kuma uses bamboo poles to strengthen the interior structure, separate the space and organize the space.

4.2. Bamboo slice
Bamboo slice refers to the longitudinal splitting of the original bamboo tube to form a number of flakes of bamboo. Bamboo slice has strong flexibility and is processed by slicing the bamboo pole to form curve and curved surface. Bamboo slice refers to the longitudinal splitting of the bamboo tube to form a number of flakes of bamboo. Bamboo slice has strong flexibility and is processed by slicing the bamboo pole to form curve and curved surface modeling. There are two ways of bamboo chips: manual processing and mechanical processing. After processing, bamboo chips have various forms of expression. They can be woven and concatenated to form the material of line and surface, and can be
widely used in many fields. Bamboo chips can be used as the top interface, side elevation, ground surface of the structure in interior design.

4.3. Bamboo strips
Bamboo strip is to divide the bamboo into thin strips. Bamboo strip is mainly used for decorative materials. Bamboo strips are woven into surface materials, which can be used as decorative materials in interior design. With various compilation techniques, bamboo strips can form different texture effects with different patterns. After dyeing and bleaching, the woven patterns are more abundant. The material made of bamboo strips can be widely used in partition, carpet, curtain, background wall, sofa cover fabric and so on in interior design.

5. Application of Bambusa emeiensis derivative materials in interior design

5.1. Bamboo plywood
Bamboo plywood is made of yellow bamboo strips, adhesive and laminated by various processes. Bamboo plywood has fine compressive strength and toughness, and its hardness and tensile strength are much higher than that of wood. Bamboo plywood is divided into bamboo curtain plywood, bamboo woven plywood, bamboo plywood, etc. It can be used for floor paving, wall decoration, ceiling and other decorative materials in interior design.

5.2. Bamboo composite board
Bamboo composite board is divided into bamboo plastic composite board, bamboo wood composite board, bamboo glass reinforced plastic composite board, etc. The board is made by hot pressing and gluing with bamboo bamboo strip and fiber as raw materials and other composite materials. Composite materials make up for the shortcomings of single material, and retain the natural texture of bamboo, which is widely used in the interface decoration.

5.3. Bamboo wallpaper
Bamboo wallpaper uses Bambusa emeiensis as the main raw material, which is processed into bamboo pulp and then made into wallpaper. The texture of bamboo pulp is soft and delicate, especially the long fiber of Bambusa emeiensis. Its processing advantage in bamboo wallpaper is obviously better than other bamboo. Bamboo wallpaper has strong stability, environmental protection and non-toxic, washable, longer service life than ordinary wallpaper, and rich decorative effect. In the interior space design, it can be widely used in the wall decoration of living room, bedroom and study.

5.4. Bamboo integrated board
Bamboo integrated board is made of bamboo strips or pieces after drying, mould proof and other processes, and then glued and pressed. Bamboo integrated board retains the natural characteristics of bamboo in texture and color, and its strength is significantly higher than that of bamboo composite board and bamboo plywood. It can be used not only for interface decoration materials, but also for structural support.

6. Application of Bambusa emeiensis furniture in interior design
Bambusa emeiensis furniture has a strong design expression, a variety of weaving techniques, and the tensile strength of Bambusa emeiensis material performance is strong, which can fully meet the load-bearing needs of furniture, and can be widely used in the field of interior soft decoration design.

6.1. Chairs
The fiber of Bambusa emeiensis is long and has strong flexibility. The tensile strength of Bambusa emeiensis s is is high, which meets the load-bearing requirements of the Chair. The bamboo strips of Bambusa emeiensis s can be woven into the back and surface of the chair. The texture is artistic and rich
6.2. Beds
Bambusa emeiensis weaving has a strong practicability in traditional Chinese furniture. In the traditional furniture such as arhat bed, shelf bed and Babu bed, the decorative surfaces such as bed surface and enclosure are all made of bamboo, which can not only protect privacy, but also provide ventilation and lighting, and also have a strong artistic decorative function.

6.3. Cabinet furniture
Bambusa emeiensis can be directly woven into cabinet furniture, such as bedside cabinet, bucket cabinet and other small cabinet, and can also be used as decorative panel to decorate the door and surface of large cabinet.

6.4. Others
Bambusa emeiensis is widely used in other kinds of furniture, including tables and screens. Among the screen furniture, the bambusa emeiensis weaving has the characteristics of combination of virtual and real, diversified patterns, practicality and artistry.

7. Design principles of bambusa emeiensis and its derivative materials in interior space

7.1. Functional principle
The use of bambusa emeiensis and its derived materials in interior design should fully meet the functional requirements of space. In the aesthetic function, it integrates the texture, luster, color and other factors of bambusa emeiensis a material, so as to bring people aesthetic pleasure and show the unique artistic characteristics and cultural connotation of bambusa emeiensis. In the use function, combined with the physical and chemical properties of bambusa emeiensis, the material has the functions of anti-skid, wear-resistant, easy to clean, heat absorption, sound insulation and so on, which meet the needs of people's daily life.

7.2. Regional principle
For the selection of bambusa emeiensis materials, local materials should be fully considered, such as bamboo board and bamboo furniture in Anji, Zhejiang Province, and bamboo weaving in Qingsheng and Daoming, Sichuan Province. This can not only effectively utilize resources, reduce transportation and labor costs, but also revitalize local rural economy, inherit and disseminate regional culture.

7.3. Economic principle
The planting cost of bambusa emeiensis is low, the yield is large, it is easy to process and the timber cycle is fast. In the interior design, the use of bambusa emeiensis materials should be considered to reduce construction pollution. For the processing of bambusa emeiensis, the utilization rate of materials should be improved and the cost of materials should be saved.

7.4. Sustainable Principle
The sustainability of materials is a concern in the global development. The adoption of new environmental protection materials is an important trend of interior design. As a kind of interior decoration material, Bambusa emeiensis has obvious advantages, which meets the requirements of sustainable development and green design. With the innovation of science and technology, the processing products of Bambusa emeiensis affinis derivative materials will be diversified and become an important new sustainable decorative material in interior design.
8. Conclusion
China is rich in Neosinocalamus affinis resources. The resources of Neosinocalamus affinis are used as interior design structural materials, interior interface decoration materials and interior soft decoration design materials. The derivatives of Neosinocalamus affinis materials are integrated with the architectural decoration market to expand the market value of Neosinocalamus affinis.

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