

Research and Application of Modern Furniture Materials under the Concept of Sustainable Development Based on Big Data

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Abstract

The development of information technology promotes the continuous progress of modern furniture industry, and the diversification and personalized development of market demand make modern furniture meet people's needs, but also in line with the concept of sustainable development, reduce the number of furniture, save space, avoid the waste of space and resources. Based on this background, this paper first studies the current situation of modern furniture design based on the concept of sustainable development, and then analyses the specific application of common materials in modern furniture. Finally, the application strategy of modern furniture materials under the concept of sustainable development based on big data is given.

Keywords: Modern Furniture Materials, Sustainable Development, Big Data ;

1. Introduction

With the development of big data information technology, modern furniture industry has gradually obtained rapid innovation and iterative development. Secondly, with the deepening of the society's attention to the ecological environment, the pursuit of the concept of sustainable development in modern home furnishing industry is also constantly advancing. In the process of evolution and development of modern furniture materials, people gradually focus on furniture talent, as shown in Figure 1. It can be seen that the application of materials based on the concept of sustainable development has become an important heading direction of modern furniture.

On the one hand, with the continuous improvement of people's living standards and the continuous progress and development of society, energy-saving and environmental friendly furniture materials and intelligent furniture materials under the condition of big data have become the emerging

development trend. And with the increasingly stringent environmental protection policy, furniture manufacturing industry is facing fierce market competition, but also facing a series of adverse conditions such as cost reduction, environmental protection improvement. On the other hand, the acceleration of urbanization makes the furniture industry have a broad market prospect. Furniture industry has been growing steadily, but also facing a series of environmental problems, mainly in the recovery and renovation of furniture, as well as furniture materials processing and processing process brought a series of environmental impact.

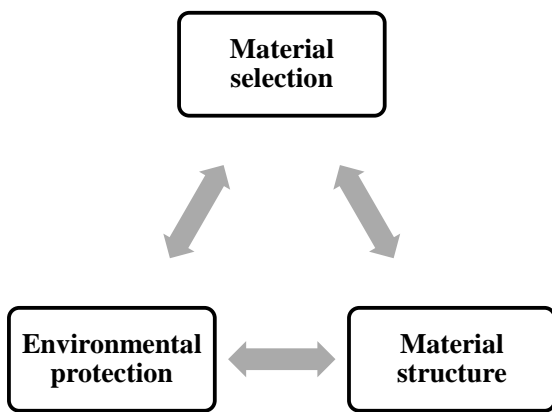


Figure 1. Key elements of modern furniture application.

Based on the above background, on the one hand, the application and research of modern furniture materials should meet the rapid development needs of the market; on the other hand, it should also pay attention to minimize the impact on ecology and environment^[1]. For example, the use of non-renewable materials should be minimized, recyclable environmental protection materials should be used as far as possible, and the treatment process of materials should be improved to reduce the damage to the ecology. With the bondage of big data and the realistic conditions of sustainable development, the materials of modern furniture are not only restricted by the furniture form and structure, but also need to improve the structure and production technology of furniture materials through advanced design elements and design forms, so as to improve the form, function and use mode of modern furniture. Generally speaking, the application of modern furniture materials under the concept of sustainable development based on big data is mainly carried out in several ways as shown in Table 1 below.

Table 1. Application forms of modern furniture materials.

Aspects	Forms	Functions
Material recovery	Application of recyclable materials	Creating new forms and their values
Furniture packaging	Convenient to disassemble, stack and fold	Reduce the application of packaging materials

	furniture	
Furniture structure	Intelligent design	Reduce the application and waste of furniture raw materials
Furniture form	Lightweight design	Reduce transportation costs and resource waste

The relationship between the product modeling design and material development of modern furniture is more and more close. As the material basis of modern furniture product modeling design, furniture materials with the continuous development and application of new technology greatly promote the development of furniture industry. In addition, the application of new technology makes new materials constantly developed, which has a profound impact on the structure and shape of furniture products, making furniture products not only more in line with people's diversified functional needs, but also more able to meet the requirements of ecological sustainable development concept of environmental protection.

In a word, with the progress of technology and the deepening of market demand, the increasing demand of multi-functional furniture requires that modern furniture not only meet people's needs, but also conform to the concept of sustainable development, reduce the number of furniture, save space, and avoid the waste of space and resources. Therefore, the study of modern furniture materials based on the concept of sustainable development based on big data has important practical value.

1. The situation of modern furniture design based on the concept of sustainable development

With the continuous development of global economy, people create huge wealth and scientific and technological civilization, but also have great damage and impact on the ecological environment and living environment, which is embodied in the waste and predatory use of resources, as well as the pollution and deterioration of the ecological environment. At present, there are still serious problems in the development of many industries, which contains great damage and loss. As people

gradually realize the important role and value of ecological environment protection, all walks of life have begun to explore the design based on environment and ecological protection, and has become one of the important development trends of modern furniture industry design.

At present, the design methods and methods of modern furniture industry based on the concept of sustainable development are still in the process of continuous improvement, but their environmental protection design ideas and sustainable development design ideas have become the basic consensus and practice criteria of all modern furniture designers and practitioners, and gradually become the future development trend and direction of modern furniture industry.

1.1. Green design of modern furniture based on the concept of sustainable development

Green design of modern furniture based on the concept of sustainable development originates from people's reflection on the environment and ecological damage caused by modern technology and culture, reflecting the concern of modern furniture industry on ecological environment. On the other hand, the increasingly stringent environmental protection standards and requirements of the industry also make the development of modern furniture logistics based on reducing the application of materials, paying attention to recycling and reuse at the design level or the practical application level of materials, as shown in Figure 2 below.

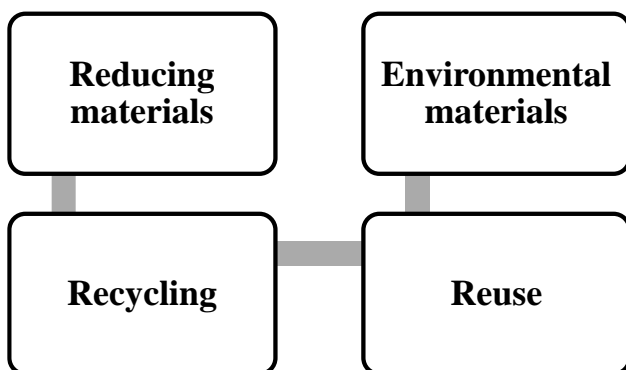


Figure 2. The characteristics of MOOCS education.

At present, the green design of modern furniture based on the concept of sustainable development is not only a simple change of design style, but also the adjustment of working methods of modern furniture industry and the great change of industry operation strategy. It comes from people's reflection on the environment and ecological damage caused by modern technology and culture under the background of big data technology, which reflects the concern and responsibility of modern furniture industry for ecological environment and the urgent demand of society for sustainable development concept.

1.2. Ecological design of modern furniture based on the concept of sustainable development

Ecological design of modern furniture based on the concept of sustainable development is a relatively new design concept in modern furniture industry^[2]. Among them, designers and practitioners of modern furniture should build the form and function of modern furniture based on ecological principle and ecological concept, so as to make the design, production, processing and recycling of modern furniture meet the requirements and needs of ecological environment protection in the whole life cycle. In addition, it should put the ecological concept into the whole process of modern furniture, so that the constructed furniture products can be integrated with the ecological environment friendly.

1.3. Ecological design of modern furniture based on the concept of sustainable development

Ecological design of modern furniture based on the concept of sustainable development is a relatively new design concept in modern furniture industry. Among them, designers and practitioners of modern furniture should build the form and function of modern furniture based on ecological principle and ecological concept, so as to make the design, production, processing and recycling of modern furniture meet the requirements and needs of ecological environment protection in the whole life cycle. In addition, it should put the ecological concept into the whole process of modern furniture,

so that the constructed furniture products can be integrated with the ecological environment friendly.

In addition, the ecological design of modern furniture based on the concept of sustainable development is an optimization and upgrading of its green design. It transforms the traditional production mode of modern furniture into an ecological production mode^[3]. The process of this change is shown in Figure 3 below, so as to realize the ecological cycle of modern furniture design.

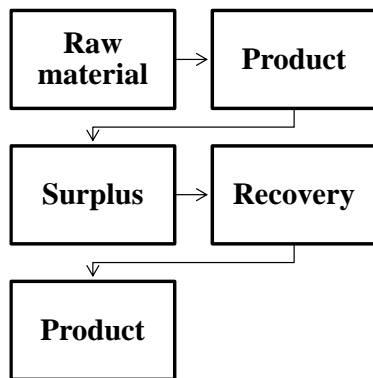


Figure 3. The process of modern furniture ecological design.

The modern furniture constructed by ecological design concept is generally made of recyclable materials, and the appearance and function are often designed with simulated ecological style color, so that consumers can gain a kind of sensory experience participating in environmental and ecological protection in the process of purchasing and using these furniture products, so as to promote consumers' awareness of environmental protection based on modern furniture products.

1.4. Circulation design of modern furniture based on the concept of sustainable development

Based on the concept of sustainable development of modern furniture recycling design as a new design concept, which is also known as recycling design, that is, in the design process of modern furniture, the recycling of products and raw materials should be fully considered, so as to minimize the impact of the treatment process after the life cycle of the product on the environment. The material selection and application of modern

furniture based on recycling design concept can realize high-end recycling and recycling.

In addition, based on the concept of sustainable development of modern furniture cycle design can effectively save energy and raw materials, reduce environmental pollution, so that modern furniture can be repeatedly used, forming a virtuous cycle of furniture product design and use. For example, furniture products such as shelves and desks based on waste paper recycling can not only meet the functional needs of products, but also have good design sense, simple assembly and convenient use, so as to minimize the waste of raw materials. Figure 4 below shows a furniture chair based on a wood fiber material instead of plastic. This material has replaced many green designs, and this performance is very good, which can promote the application of this material in a wider range.



Figure 4. Typical furniture products based on recycling materials.

1.5. Modern furniture combination design based on the concept of sustainable development

Based on the concept of sustainable development, modern furniture combination design is an upgrade and optimization of advantage cycle design, which unifies and combines the functions of modern furniture products, so as to design a multi-purpose and multi-functional replaceable furniture module^[4]. Modern furniture based on combination design can not only meet the diversified and multi-functional needs of users, but also save the use of raw materials, reduce the interference and damage to the environment, and realize the recycling of modern furniture products.

In the design process of modern furniture based on the concept of sustainable development, green design and ecological design are the main embodiment of the development direction and trend of modern furniture materials. The design based on cycle and combination is the optimization and upgrading of green design and ecological design, so as to better promote the harmonious coexistence of furniture industry and environment, and achieve the goal under the concept of sustainable development^[5].

2. Research and application of modern furniture materials

With the continuous improvement of people's attention to health, more and more people pursue the health and environmental protection of furniture materials. In this context, wood materials have been widely used and respected in modern furniture industry due to its many advantages. At present, there are many kinds of wood applications in modern furniture materials, mainly including the application and selection of several forms as shown in Figure 5 below.

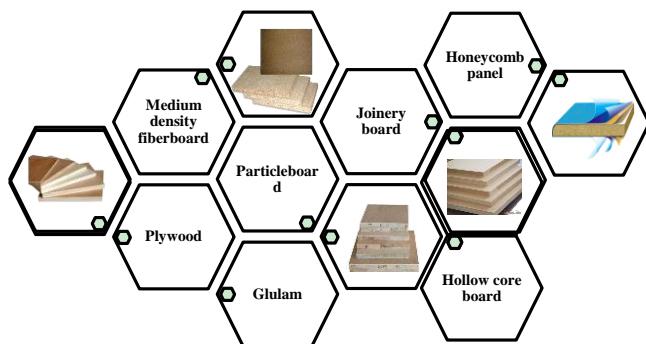


Figure 4. Typical wood materials of modern furniture.

2.1. Application of wood materials in modern furniture materials

In modern furniture materials, wood materials mainly include plywood, particleboard, medium

density fiberboard, blockboard, honeycomb board, hollow core board and integrated wood, etc. plywood is a man-made board made of logs which are cut into veneers by rotary cutting or planning, and then coated with glue, arranged in a crisscross manner and hot pressed^[5]. Particleboard a wood-based panel made of wood particleboard made of non woody plants and hot pressed with glue. Fiberboard is a kind of wood-based panel made of wood after fiber separation, forming and hot pressing. Blockboard is a kind of solid board with glued veneer on its two surfaces.

Honeycomb board is a kind of man-made board which is made of paper glue to form hexagonal honeycomb paper core and then impregnated with glue liquid to solidify and set. Hollow core board is a kind of wood-based panel, which is composed of hollow core wood frame filled with plywood waste, and then glued on both sides of the frame with more than two layers of veneer or plywood. Glulam is a new type of wood-based panel, which is formed by lengthening, widening and laminating. The specific characteristics, advantages and disadvantages of these different wood materials and their typical applications are shown in Table 2 below

Wood materials	Types	Features	Application
Plywood	Manmade board	Water resistant Dimensional	Cabinet and door Decorative panel

		stability	Bending member
		Beautiful texture	
		Dimensional	
Particleboard	Manmade board	stability	Wooden doors
		Free formaldehyde	Toys
		Strong pungent	Table, cabinet
		taste	
Fibreboard	Manmade board	Fine-grained	Furniture, wooden
		Dimensional	doors,
		stability	Panel furniture
		Dense edges	Frame
		High strength	
Joinery board	Manmade board	Dimensional	Furniture
		stability	Decoration
		Good machinability	
Honeycomb panel	Manmade board	Save wood	Stress free furniture
		Simplify process	parts
		Insect resistant	Door panel, side
			panel
		Light weight	
Hollow slab	Manmade board	High strength	Shaped plate parts
		Dimensional	Panel
		stability	
		Save wood	
Glulam	Manmade board	Simplify process	Furniture, wooden
		Dimensional	doors, Panel furniture
		stability	Frame

Table 2. Specific characteristics and application of different wood materials

2.2. Facing materials and edge sealing materials of modern furniture

The decorative materials and edge sealing materials of modern furniture mainly include veneer, thermosetting resin impregnated paper, high pressure decorative laminate, synthetic resin impregnated paper, plastic film, printing decorative paper and pre coating decorative paper^[6]. Among them, veneer is a kind of veneer made by various methods with wood as the base material. Melamine impregnated adhesive paper is a kind of material which is soaked in resin adhesive and then dried to a

certain degree of curing. It has several advantages as shown in Figure 5 below.

The fireproof board is made of base paper by resin processing. The main physical properties are shown by the resin characteristics. After molding, it has good luster, transparency, high surface hardness, and has heat resistance and hard properties after thermosetting. Edge banding materials are usually made into strips or coiled materials in advance, with or without glue on the back. At present, modern furniture also uses a large number of materials such as plastics and alloys to make edge banding of various shapes, which are directly embedded in the side of panels.

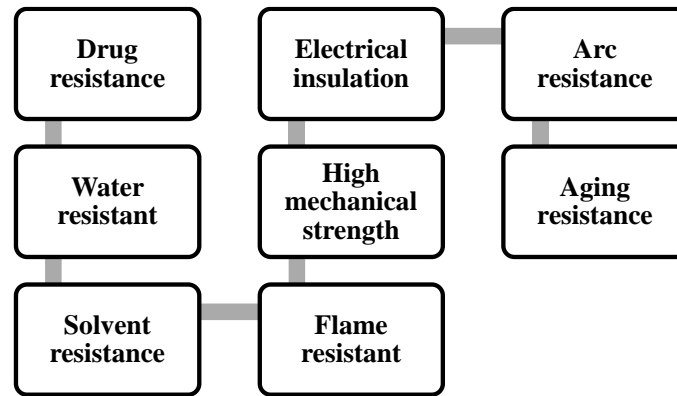


Figure 5. Typical characteristics of modern furniture facing materials.

2.3. Other common accessories and auxiliary materials of modern furniture

Other common accessories and auxiliary materials of modern furniture mainly include metal, glass, textile and leather, connectors, covering and edge sealing materials, adhesives and coatings and other related materials^[7]. It has the advantages of good optical properties in modern furniture. Through welding, bolts, concave and convex groove joint fixation and bending molding, metal materials become modern furniture prefabricated accessories, structures, brackets and other modeling auxiliary materials. Glass material is also the common accessories and important auxiliary materials of modern furniture.

In addition, the application of textile and leather as common accessories and auxiliary materials in modern furniture can effectively improve the stiffness of auxiliary accessory materials represented by metal and glass, and make the indoor space environment soft, friendly and warm based on its role of softening space. Not only that, the application of textile and leather materials also enhances the artistic appeal of the environment, and combines with hard materials to form a space of contrast and harmony.

2.4. Covering materials and coatings of modern furniture

There are traditional veneer veneering, printing decorative paper veneering, synthetic resin veneering and other materials veneering. After cutting, softening, planing or rotary cutting, veneers of different thickness, pattern and color are

produced. The edge sealing materials used in modern furniture include wood strips, composite laminated impregnated paper, plastic molding edge banding, etc.

The adhesives used in modern furniture can almost meet the needs of various bonding processes, including polycondensation resin adhesive, polymerized resin adhesive and synthetic rubber structural adhesive. The commonly used adhesives for wooden furniture mainly include polyvinyl acetate, phenolic resin, aldehyde resin and polyurethane adhesives. In addition, the commonly used coating materials of modern wooden furniture mainly include grease coating, oil-based coating, shellac coating, polyurethane resin coating, polyester resin coating, nitrocellulose coating and waterborne resin coating.

3. Application of modern furniture materials under the concept of sustainable development based on big data

3.1. Sustainable development concept of modern furniture based on big data

With the development and iteration of information technology era, people's demand for modern furniture presents diversified and personalized characteristics. At present, consumers' demand for modern furniture is not only focused on product function, but also emotional level. Therefore, modern furniture designers should meet the functional and emotional needs of consumers based on the concept of sustainable development^[8]. Thanks to the development of big data technology, modern furniture design industry can use big data analysis to

integrate analysis and management of consumer behavior demand and consumption preference, so as to make modern furniture products more in line with the consumption characteristics of consumers and bring them better consumption experience.

In addition, with the deepening of the ecological concept of sustainable development, relevant furniture industry standards and environmental protection requirements have been formulated from the national level. Based on the Internet big data technology, the public can have a more comprehensive understanding and cognition of the concept of sustainable development of modern furniture, so that all the public can supervise the implementation and implementation of relevant environmental protection policies of modern furniture industry, and enhance the awareness of sustainable development of the whole industry.

Based on big data technology, it can vigorously promote the concept of sustainable lifestyle to the public, guide the whole people to follow the environmental protection policy, and integrate the ecological concept of sustainable development into the public awareness. Specific to the public's consumption concept of modern furniture, the infusion of sustainable development concept based on big data technology can make consumers form correct consumption concept, and the selection and use of furniture can start from the perspective of green environmental protection, and regulate their behavior performance.

3.2. Factors influencing the application of modern furniture materials

With the increasingly stringent requirements of ecological environmental protection on modern furniture industry, how to reduce the impact on the ecological environment in the process of processing and use has become an important factor that modern furniture designers must consider when selecting materials. Therefore, modern furniture should choose new materials that are easy to handle and recyclable in the process of selecting furniture materials. And the materials chosen should be easy to handle and recyclable to make waste disposal

easier. Secondly, it is necessary to reduce the use of materials, reduce the consumption of resources and improve the production efficiency of furniture products through lightweight design.

The selection of modern furniture materials is the key and premise to protect the environment and realize the sustainable development of ecological environment. The design of modern furniture products based on the concept of sustainable development should be able to re-apply waste materials to the design. For this reason, manufacturers of deadlock should do both sales and recycling, and form a benign interaction between modern furniture product design and technology development while protecting the ecological environment. The selected materials should also reflect the cultural atmosphere of the environment and the coordination of furniture products, so as to meet the needs of people in the design environment, integrate environmental factors into the cultural environment of modern furniture product design, and bring consumers more excellent sensory experience.

In addition, the selection of modern furniture materials should choose environmentally friendly biodegradable new materials, and adopt appropriate design language to reflect the ecological nature of the products. Thus, it forms unique design semantics and wins the attention and favor of consumers. Reasonable use of limited resources, in modern furniture products to seek innovation, reduces the pollution and waste of resources.

3.3. Selection of modern furniture materials based on the concept of sustainable development

Based on the concept of sustainable development, modern furniture should choose green raw materials as far as possible, in order to achieve the purpose of easy recycling and recycling. First of all, the selected materials should be able to reduce the emission of harmful substances, in order to protect the health of consumers in the process of using furniture, reflecting the most basic principle of people-oriented. Secondly, the modern furniture based on the concept of sustainable development

requires that the application types of materials should be reduced as far as possible, so as to reduce the complexity of recycling and processing links after furniture scrapping, and establish standardized and replaceable implementation standards to reduce the waste of furniture material resources.

In addition, it is necessary to select and use materials scientifically and reasonably based on the use characteristics and application scenarios of furniture. For example, metal materials, due to their strong corrosion resistance and recyclability, are usually used in public places with long-term use and large flow of people. And the furniture that uses at home often chooses ligneous material, coriaceous and cloth art material so as to enhance the affinity and warmth of furniture. In modern furniture, recycled materials and recycled materials should be selected and used to further improve the utilization efficiency of materials.

3.4. Material application of furniture based on the concept of big data sustainable development

In the era of big data and information, with the deepening of the concept of sustainable development, it is necessary to comprehensively use a variety of means and strategies in the field of modern furniture to realize the landing of modern sustainable development concept. First of all, to promote the environmental protection of modern furniture materials, it should use green materials to reduce the damage of furniture materials to the ecological environment. Secondly, it should simplify the design process of modern furniture, select and use materials that can be modularized, so that modern furniture can realize the modularization of parts and monomer, realize the multi-function of furniture by changing different modules, reduce the frequency of furniture replacement and reduce the waste of materials.

In addition, it is necessary to build sustainable design thinking based on big data technology, and analyze consumers' habitual use behavior through big data technology, so as to accurately transmit the green environmental protection concept of sustainable development to consumers through

modern furniture works. Through this means, the modern furniture design thinking to green environmental protection and sustainable development of the direction of continuous change, to achieve more advanced emotional exchanges with consumers.

4. Conclusion

In summary, with the bondage of big data and the realistic conditions of sustainable development, the materials of modern furniture are not only restricted by the furniture form and structure, but also need to improve the structure and production technology of furniture materials through advanced design elements and design forms, so as to improve the form, function and use mode of modern furniture. The furniture industry is also facing a series of environmental protection problems. On the one hand, the application and research of modern furniture materials should meet the rapid development needs of the market; on the other hand, it should also pay attention to minimize the impact on the ecology and environment.

Based on the research of modern furniture design based on the concept of sustainable development, this paper analyzes the green design, ecological design, cycle design and combination design of modern furniture based on the concept of sustainable development. Then it studies the specific application of modern furniture materials, including the application and types of wood materials, the application of metal materials and other commonly used accessories and auxiliary materials, coatings and so on. Finally, the application of modern furniture materials under the concept of sustainable development based on big data is studied. The influencing factors, selection principles and material application strategies of modern furniture materials are given.

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