

## Research Article

### Study on the Old Ship-Wood Furniture Based on the Green Environmental Protection

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**Abstract:** Based on the idea of the green environmental protection, it analyzed the characteristics of the old ship-wood furniture including the green environmental protection, changing waste into treasure, unique styling and strong human flavor, to emphasize its properties of excellent environmental protection, unique original ecology and elegant artistry. Then it summarized the basic design principles of the environmental protection, the emotional design and the localization design. And then it discussed the low-carbon craftsmanship of the old ship-wood furniture from the three aspects of materials selection, processing tools and production process. Furthermore, it summed up out of the practical and commercial value, the aesthetic and artistic value and the environmental value of the old ship wood furniture. Finally, it presented that the development and promotion of the old ship-wood furniture which is the typical of the green design and manufacture of furniture can bring immense economic, social and ecological efficiency.

**Keywords:** Basic design principle, furniture characteristics, furniture value, manufacturing process, old ship-wood furniture, the green environmental protection

## INTRODUCTION

With the rapid development of society and the increasing improvement of the standards of living, people constantly improve the pursuit of the spiritual dimension when they enjoy material civilization. Now, the pursuit of the natural way of life has become a new fashion of the healthy lifestyle. On the other hand, the furniture industry is a traditional manufacturing industry. Modern not only have requirements towards the shape and function of furniture, but also environmental protection property of furniture, which is conducive to good health. And green furniture design and manufacturing has become a pass which furniture enterprises can obtain to enter the international furniture market and the necessary conditions to participate in international competition. In order to find effective methods to solve environmental pollution fundamentally for the furniture manufacturing, domestic and international academics and business are doing a large number of studies of the green furniture manufacturing model-green design and manufacture, which can meet the environmental requirements of energy saving, low consumption and low or no pollution and they point out that the green design and manufacturing is the only way to sustainable development of the furniture manufacturing industry (Zhang, 2002). In abroad furniture industries, people are actively looking for green materials, green energy and green design database, knowledge base and other infrastructure

technologies to produce green furniture for protecting environment friendly and saving resource efficiently (Liu, 2000). Government departments in many foreign countries have come up with the "GREEN PLAN" with the theme of protecting the environment to substantially increase the industrial standard in furniture industry. For example, In California, the government enacted the legal document which explicit required for the formaldehyde limits in future furniture products reduced to about half of the E1 standard in German. And In Japan, F4 Star standards more stringent than European standards were performed in 2009. However, the furniture industry in China is not optimistic. Small and medium-size enterprises account for the majority among the furniture companies. And be lacking in environmental awareness due to finances and technologies, most of the design and manufacturing in small and medium-sized furniture companies are at high consumption and high pollution stage with the consumption of large quantities of timber, deforestation and waste of energy. Many furniture products cannot meet the environmental standard and consequently emit the pungent odor and release the harmful gases. Part of the furniture companies use inferior products which with the volatile harmful substances such as formaldehyde, benzene, toluene, ammonia, radon and vinyl chloride, etc., flooding the market to induce the serious illness and to do considerable damage to human health in order to simply pursue economic interests (Wu, 2006). Currently, some domestic universities and research institutes with the

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Fig. 1: Old ship-wood furniture



Fig. 3: Old ship-wood yard furniture



Fig. 2: Abandoned old wooden Ship



Fig. 4: Old ship-wood dining room furniture

support of the State Science and Technology Commission, the National Natural Science Foundation and other relevant departments conduct a wide range of researches and explorations on green design and manufacture. And the green furniture related researches have been made many achievements, but still cannot meet the needs of green furniture. The green old ship-wood furniture (Fig. 1) is made up of wood materials dismantled down from the discarded old wooden boat (Fig. 2) by simple processing. Its properties of excellent environmental protection, unique original ecology and elegant artistry fit the modern pursuit of the natural way and the concept of life, which is a single show of folk furniture. Therefore, the systematic study on the old ship wood furniture based on the perspective of the Green Environmental Protection can draw people's attention to promote the old ship-wood applied in the field of furniture design and manufacturing, which will ultimately drive forward the development of green furniture.

#### THE CHARACTERISTICS OF THE OLD SHIP-WOOD FURNITURE

**Green environmental protection:** Materials are the material foundations to implement the functions of the products. Using green materials to design furniture has played a decisive role in the pursuit of environmental protection in today. The materials of the old ship-wood furniture come from the abandoned old wooden ship, through seawater immersion, scouring of waves and exposure in the hot sun for the decades or even

centuries in the process of wooden ship traveling, the texture of which becomes clear and hearty, the structure of which becomes natural and plain but tough to wear and which has other properties, such as natural waterproofing, pest control, anti-corrosion and so on. Its manufacture is mainly by hand, which not only reduces energy consumption, but also greatly reduces emissions of carbon dioxide and other gases to fully reflect the good green features. Using old ship wood to make furniture, to some extent, alleviate the supply and demand contradiction of solid wood to make the furniture. At the same time the old ship-wood which is a product of nature, with biological angry and spirituality, become the ties to maintain the sustainable development of "Human-Machine-Environment" after people careful picking and processing. Therefore, the old ship-wood furniture is green and unique original ecological and the green environmental protection is one of its core charms. For example, Old ship wood yard furniture (Fig. 3), Old ship-wood Dining room Furniture (Fig. 4).

**Turning waste into treasure:** The usual approach to deal with the abandoned old wooden ship is to be used as inferior firewood. But because of the strong smoke and the smell of oil, they have often been the people's dislike. Today, through simple to process to make the old ship-wood to become a furniture material, the waste of the old the wooden parts have been revived to constitute the unique charm of the old ship-wood furniture. This Practice not only solves the problem of recycling of old wooden ships, but also produces the

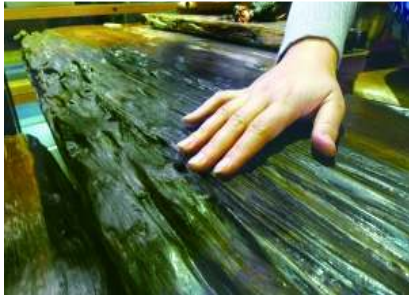


Fig. 5: Unique texture



Fig. 6: Unique rivet holes

high value-added old ship-wood furniture through designer's clever conception. It not only keeps in line with the trend of green, but also responds to national initiatives to vigorously promote to construct the "resource-saving, environment-friendly "society and to turn waste into treasure.

**Unique furniture shapes:** Each piece of old ship-wood furniture is unique in the world. Firstly, it is the uniqueness of the furniture materials. The old ship-wood retains pale yellow color and reacts with the rivets after long term immersion in sea water resulting in the formation of rust and then the rust continues to penetrate wood over time leading to the formation of the natural black texture (Fig. 5), as well as the irregular drilling which rivets left (Fig. 6). Those natural imprint make the old ship-wood full of unique temperament and artistic charm. The formation of defects is a unique property of the old ship-wood, using which to design furniture to be unique for each one. Then it is the unique nature of the production process. To be the parts of wooden ships, even the same components are different from each other because of the size, color and decadent extent resulting in processing according to the selected materials. Producers use unique furniture shape to show the functions of the old ship-wood furniture to achieve the organic unity of the natural and artificial beauty. At the same time this process is different from the mass production of industrial standardization. It doesn't have design diagram and standardized manufacturing processes, just as artistic creation to show the uniqueness.

**Strong human flavor:** People having requirements to Products are always the gradual process of development, which are from the "quantity" to "quality" and then to "feeling". Especially because of the technical homogenization recently, there is a growing focus on a variety of mental cultural factors behind the practical function (Shi and Ouyang, 2008). After the temper of nature, old ship-wood become thick Powerful, tough and resistant grinding and along with the surface hole to achieve special defects beauty. Old ship-wood is the body components of the wooden ship once and then become today's furniture parts bringing a strong sense of the vicissitudes of history and people give the old ship-wood auspicious meaning. It contains the incomplete beauty and the indomitable and antique temperament giving soul inspiration and human care. Therefore, the general designers always set functional design as the key point to meet people's spiritual needs. Use the old ship-wood not only to achieve the old ship-wood furniture, to pass out of its symbolic meaning, but also to reflect its aesthetic value.

#### THE BAISC DESIGN PRINCIPLES OF THE OLD SHIP-WOOD FURNITURE

**The principle of environmental protection:** When we design the old ship-wood furniture, the concept of eco-design should be used based on the material properties of the old ship-wood. That is taking full advantage of the natural texture and color of the original materials design the old ship-wood furniture. And design and manufacturing should be considered at the same time and we should try to combine the ancient and modern technology according to the shapes of materials to reduce materials waste and energy consumption. Besides, we should choose non-polluting connection methods to design furniture structure and simultaneously combine other environmentally friendly furniture materials. Although these requirements may not be able to be achieved at the same time, but when design the old ship-wood furniture, we must establish the concept of green design and synthetically consider all these aspects, in order to carry out the reasonable choice to provide design ideas for the green old ship-wood furniture.

**The principle of emotional design:** Design objects not only should meet the users' material requirements, but the mental functions of which become increasingly prominent, which determines a major trend of the development of product design which is emotional design (Hu and Zheng, 2010). Taking advantage of the maximum value of the old ship-wood to make furniture not only in its properties of waterproofing, anti-corrosion and durability, but which contains the incomplete beauty and the indomitable and antique temperament giving soul inspiration and human care.

Furthermore, because of the different textures, colors and a variety of rivet holes, we cannot design the same old ship-wood furniture which was full of artistic features and personalized manifestation. In the personalized times, Personality differences inevitably lead to the diversification of their emotion when selecting products and diversification of emotion will inevitably promote the diversification of products (Zhang, 2010). Therefore, when design the old whip-wood furniture; we should focus on the symbol, artistry and personality characteristic of the old ship wood furniture to let people get the spiritual pleasure and enjoyment due to the emotional interaction with furniture.

**The principle of localization design:** In the post-industrial era, product design is changing from physical design to invisible design, from material design to non-material design change and from an emphasis on the technological culture of the form and function to the humanistic culture of the non-material and multi-reproduction (Feng, 2010). In order to make old ship-wood furniture maintain the vitality, the design must be marked with the imprint of the national culture. Just as the scholar Lu Xun said, “The more national, the more worldwide”. So we should absorb international advanced design concepts and technologies and integrate the essence of China’s traditional culture to let the old ship-wood furniture design develop towards the direction of going beyond the traditional old boat wood furniture and being full of the spirit of the times and national characteristics based on material properties of the old ship-wood.

#### OLD SHIP-WOOD FURNITURE MANUFACTURING PROCESS

The manufacturing process is the means of recognizing, using and modifying materials, which together with materials constitute the technical conditions of design. And manufacturing process is the prerequisite for product design (Jiang, 2010). The entire production process of the old ship-wood furniture is an integration of the beauty of material natural and artificial process. Mostly work are done by hand from material selection to furniture accomplish. In this process, low energy consumption, less pollution and its prominent green environmental protection are unmatched by other furniture companies’ high-carbon mass production.

**Choice of materials:** The wooden ships can withstand the erosion from the sea and the sea breeze for dozens or even centuries, which have great relationships with materials. Used for large ships, there are many high-quality species, which mostly have high density and hardness, including Queensland Austin, Tokyo, teak,



Fig. 7: Logs dismantled from the ship



Fig. 8: Classification of the old ship-wood

elm, Merbau, iron Lei, etc. (Fig. 7). The election process of materials for Old ship-wood furniture is complex and exploratory. In the selection process, paying particular attention to observe the morphology of the old ship-wood and conceiving the possible shape characteristics of the old ship-wood furniture so as to the material classification (Fig. 8). After the accomplishment of the materials election, there is no need for anti-corrosion, pest control and other protective treatment. It is only to simply deal with the rivets so that they couldn’t damage manufacture cutting tools in the process of Old ship-wood furniture manufacture.

**Processing tools:** The processing tools of the old ship-wood furniture are general woodworking tools. Commonly used tools include the marked measurement tools, such as Ink Fountain, Carpenter Pencils, Steel measure tape, Angle square; Cutting tools, such as Knives, Hand saw, Panel saw, Chainsaw, Chisel; Slot tools, such as the hand drill, electric drill; other tools, such as clamp, hammer, etc. Different processing tools have their own characteristics. Producers should select the appropriate processing tools according to the shape of the furniture components and conceivable furniture structure. Taking into account selection and use a variety of tools in the different processes, which can indirectly reflect the unique properties of the old ship-wood furniture. Therefore, the appropriate choice of tools is particularly important in the process of production of the old ship-wood furniture.

**Production process:** Generally speaking, according to the design engineering drawings (including parts

## THE VALUE OF THE OLD SHIP-WOOD FURNITURE



Fig. 9: Copper decorations



Fig. 10: The structure tied up with strings

diagram, assembly drawing, burdening drawing), the modern furniture usually can be combined into furniture through the process of burdening, spare parts processing and assembly. This systematic, standardized production processes can achieve mass production, but the products are copies and a lack of personality. In the production process of the old ship-wood producers have to process the materials based on the size, the thickness, the degree of weathering varies of each piece of the old ship-wood. Creatively thinking of producers, the changing form of the material and the use of different processing tools resulting in the design process of the old ship-wood furniture can't be completed until the assembly is completed. The old ship-wood furniture manufacturing process is not complicated, in general, the main processes include preflattening of the shape, cutting, grinding, assemble. Preflattening of the shape is the longest and most creative process, producers need to determine the position according to the actual situation (such as the shape, size, etc.) of the materials. For example, the prototype which is a block deck, can be used as a desktop directly; original engine shaft can be used as the arm of the sofa. Producers must regard the green environmental protection as a precondition when consider the structural connections of the old ship-wood and consider its decorative. Based on meeting the structural requirements of the premise we can choose green decorative connection, such as traditional Copper decorations (Fig. 9), the traditional furniture of mortise and tenon joint, beautiful Structure tied up with strings (Fig. 10). All of the above, the series of work help to create the green and unique old ship-wood furniture.

The furniture is a common physical form that can meet the needs of people's lives. The furniture has been placed by the emotion and spirit of people about the aesthetics, the nature of life and significance, etc. Therefore, the furniture is not a simple object, but a cultural form (Liu and Zou, 2007). So is the old ship-wood furniture. It not only has practical and commercial value, aesthetic and artistic value, but also has environmental value.

**Practical and commercial value:** The achievement of products' functions is based on the materials, are manifested by the modeling and are Supported by the structure (Zheng and Liu, 2007). Old ship-wood furniture has a unique shape. By introducing ergonomics, considering the relationship between people and products and referring to people's habits and behaviors to design the size, Using the frame structure and green and decorative way of connection in order to ensure the reliability of the furniture, which not only meet people's material needs, but also to meet the spiritual needs of people. It has practical value. Towards the business needs, the old ship-wood furniture can be viewed as a kind of daily necessities to meet people's daily demand. Besides, it can be viewed as an elegant work of art with the rich connotation. So it can be used in a large number of indoor and outdoor spaces. Its commercial value is evident.

**Aesthetic and artistic value:** The artistic value of the furniture to a certain extent is the performance of the aesthetic value of the furniture, which also shows the significance of the art of furniture as a special kind of art vector (Zhang *et al.*, 2010). The old ship-wood furniture is different from the furniture of the ordinary industrial production due to the important factor of Aesthetic and artistic value. Each piece of the old ship-wood furniture has a unique shape and the form of expression do not rigidly adhere to traditional sculpture, decorative patterns and the laws of aesthetics and ideals are expressed in the form of furniture modeling making the old ship-wood furniture not only has a strong practical function, but also Its decorative arts expression is demonstrated most vividly. If placed it in a particular environment, it could be able to create special artistic atmosphere and comfortable space.

**Environmental value:** Materials used by the old ship-wood furniture are from the abandoned old wooden ship, which have excellent green properties. Old ship-wood furniture production process carrying out low-carbon production, not only keep in line with environmental protection of the trend, but also is a response to national initiatives-vigorously promoting

energy conservation and turning waste into treasure. On the other hand, the old ship-wood as a product of nature, through people's picking and processing, become the old ship-wood furniture with natural and artificial beauty. It can echoes the certain interior space and live in harmony with the external natural environment and ultimately to achieve the harmony of "Human-Machine-Environment".

### CONCLUSION

Resource conservation and environmental protection have become the hot issues of common concern (Fu, 2010). The design and manufacture of traditional furniture taking economic benefits as central work is steering both to meet the needs of people and to consider environmental green design and manufacture. Even the accelerating pace of city life and the presence of environmental pollution problems making people call for the original ecosystem and pursuit of the natural way of life. In this context, the old ship-wood furniture comes into being. Its excellent environmental performance, unique artistic design and strong human flavor are increasingly being accepted. Using the abandoned old wooden ship as green furniture materials and through the designers' clever conception and then practicing "low-carbon" manufacture, the old ship-wood furniture not only makes good practical and commercial value, aesthetic and artistic value, but also has excellent environmental value. So development and promotion of the old ship-wood furniture can produce huge economic, social and ecological benefits. It has wide prospects and great development space, which will be conducive to promoting the development of green furniture industry and the construction of Chinese "resource-saving and environment-friendly" society.

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