

Manufacture for living supplies of Chestnut wood(*Castanea crenata* Sieb. et Zucc)

Sa-Ick Kim^{†1}, Seong-An Lee² and Dong-Kooi Kim¹

ABSTRACT

This study was carried out to manufacture wooden vessels by small diameter wood and wasted wood of *Castanea crenata* Sieb. et Zucc, which has been largely planted in southern area. We made spice set, tea box set, cookie vessel set, bowl set and accessory set. With the development of edged tools, the human species has been able to fashion wood to change and enhance its environment - one only has to look at the history of all cultures to see examples of wooden artifacts and structures. Even with the development of synthetic materials and the progress of automated, mechanized production of wood and wood products, the raw material is still processed by traditional methods to meet a never-ending demand for products made from this most desirable natural material.

Chestnut wood has high added value and natural color grain and is very useful for wooden vessel. Thinned low grade trees can be used to produce wooden vessel. Therefore this result can promote thinning and produce good forestation.

Keywords : chestnut wood, wooden vessels , small diameter wood, lathe.

1. Introduction

Wood is a living material which has a very special significance in nature. Because it has played such an important part in people's life since times immemorial, it cannot merely be looked at as a simple raw material without saying a little more about it. No other material radiates as much warmth as wood(Wood working 2001). The progress of humanity from the primitive state to the present day's highly advanced technology has been closely associated with dependence on wood. The relative ease of working it and its almost universal availability have made wood an essential for human survival. Wood has been used for shelter, fuel, weapons, and tools since prehistoric times. As technology developed, wood came to be used for boats, vehicles, bridges, and as fuel for smelting ores and working metals.

The greater the technological advances, the more diverse and sophisticated the uses that have been found for wood. Today, in spite of the availability of numerous new synthetic materials, even the most highly developed countries would find it difficult to maintain their high standard of living if deprived of access to wood products. It is easy to demonstrate that the higher the level of economic development, the greater is the dependence of men on wood, not only in many of its conventional forms but also in a variety of less readily recognizable items, such as paper, films, and other wood-pulp products which are the very mainstay of its position as a renewable resource. The

Received for publication: May 19, 2009 ; Reviewed: Jul 15, 2009 ; Accepted: Nov 19, 2009.

1) Department of Interior Materials & Engineering Jinju National University, Jinju, 660-758, Korea.

2) Sancheong Gun County Office, Kyongnam, 666-807, Korea.

† Corresponding author: Sa-Ick Kim (Email: saick@jinju.ac.kr).

growing scarcity of petroleum in the world is forcing a reevaluation of the importance of wood as a fuel and as a source of basic chemicals to replace those now obtained from crude oil (Panshin and Zeeuw 1977).

The effects of lacquer - finishing to prevent discoloration of coloring chestnut wood coated with natural dyes from deteriorating factors such as lights (indoor, 500lux and out door 50,000_70,000lux), acid, alkali, and heat through measurement of color difference lacquer - finishing coating contributed to protection of intrinsic color of the natural dyeing woods in spite of severe treatment. In particular, dyeing liquor with alkali pH played a great role in prevention of light discoloration (Moon et al 2007).

In making a color natural wood of thinned small diameter tree and its utilization, color natural wood has high added value and natural color grain and is very useful for furniture making, interior material, object of art, overlaid material for the laminated wood, etc. (Chang and Lee 1993).

Park and Lee explored that studies on the manufacturing technique of wooden-bath made with thinned modified softwood. In this study The manufacturing cost of a wooden bathtub made with thinned softwood was counted about 184,057 won and this cost comes under one tenth of Japanese wooden bathtub made with *Chamaecyparis Obtusa* (Park and Lee 1997). Kwon et. al explored that fundamental study of new wooden material development with the domestic small timbers. In this study, temperature had a good influence on dimensional stability of softwoods, but not on density. Shrinkage of alkali treated woods decreased with increasing temperature (Kwon et al 1997).

2. Materials and Methods

Wood samples of *Castanea crenata* Sieb. et Zucc. were obtained from Danseong, Sanchong, Kyongnam, Republic of Korea.

2-1 Characteristics of Chestnut wood

A brownish red colour with a coarse texture, wide fibres and structure. Similar in characteristics to oak but with no visible silver rays. Sapwood has a much lighter colour than heartwood. It reacts with ferrous metals due to its high acid content. It can be split easily and is water resistant. Insects do not do it much harm. It is more easily worked than oak, although is difficult. It can be bent, and once dry is very stable.

Applications: Turned ware and tool handles, stairway construction. Used as an oak substitute in carpentry and turning. All types of furniture (tables, chairs, cabinets etc.), especially for outdoor use and also for kitchen furniture doors. Frequently used for coffins, wine barrels, posts and stakes (Woodworking 2001).

2-2 Air-drying

This method involves stacking up the wood neatly so that it can dry in the air. The pieces of wood to be dried are separated from each other by strips of wood so that the air can circulate around freely everywhere. Because air-drying takes a very long time, it is important to have large stacking areas. Air-drying is easy and cost-effective and produces excellent result, although sometimes there are problems with pest infestation and fungi. However, only a certain level of drying can be achieved this way, so air-dried wood is not immediately suitable for indoor use. The colour of wood does not change with this method of drying. The time it takes to dry depends on the climatic conditions, the type of wood and the thickness of the planks. Softwood takes about two years to dry while hardwood can take up to six years (Woodworking 2001).

2-3 Turning

Carving normally demands that a chisel or gouge be pushed into or across a stationary piece of wood. By using a lathe, the situation is reversed and the spinning wood moves against a tool supported against a rest. To provide adequate leverage, tools with extra long handles are best. Turning may be the only process involved, as is usually the case with bowls, dishes and post, but at other times the article turned may be further shaped or carved. Many turned items are destined to become components of larger structures such as chairs which may be assembled in another workshop(Bryan stentance 2003).

2-4 Raw and sawn timber

The term raw timber is used to designate debranched, debarked timber, sometimes sawn lengthways or merely split, but in any case timber which has not been further processed, This is used as a basic material for further commercialization. Sawn timber is wood sawn parallel to the axis of the trunk, into square or rectangular pieces such as beams, thick planks and boards, They may be sawn with a sharp edge (square edged) or left with a waney edge. In some parts of the world this is still done with reciprocating gang saws with one or more blades working either vertically or horizontally. Elsewhere, band saws are gaining ground(Wood working 2001).

3. Drawing the design and manufacture

Most of Korean wood products are wooden vessels. Wooden vessel is sacrifice rites article in Korea. We intended to make cookie vessel set, bowl set, spice set, tea box set and accessories set.(Fig.1,2,3,4,5,6,7)

1. Rule a centre line and then draw half the outline on a piece of card which will be used as a template.
2. Trace the half-outline of the piece on tracing paper.
3. Complete the drawing on the card by transferring the half-drawing from the tracing paper.
4. When the template is finished, the work can begin. The tools needed include chisels, gouges and callipers.
5. Mark the centre of both ends of the workpiece.
6. Fix the wood to the drive centre of the lathe.
7. Slide the tailstock centre up to the other end of the workpiece and clamp it in position. Adjust the pressure with the hand wheel.
8. When the workpiece has been fixed, position the tool rest and clamp it. The distance between the tool rest and the work should be about 5mm(3/16 in).
9. Switch on the lathe and make the first cut with the gouge to make the work cylindrical. This has to be done before shaping the pestle is begun.
10. Set the callipers to the overall maximum width of the pestle
11. Turn the cylinder until it is the same diameter as the opening of the callipers.
12. Take the various longitudinal measurements from the template.
13. Transfer these measurements to the workpiece with a pencil.
14. With the lathe turning, use a fine chisel to make grooves where the pencil marks define the overall length of the pestle. Leave a central core of at least 2 cm(25/32 in).
15. Rough out the curves of the pestle, following the measurements and checking the diameter with the callipers.
16. Shape the upper part of the piece, starting at the top and making the moulded shape.



Fig. 2. Cookie vessle set A.



Fig. 3. Cookie vessle set B.



Fig. 4. Accessories case set.



Fig. 5. Bowl set.



Fig. 6. Spice set.



Fig. 7. Tea box set.

4. Conclusions

This study was carried out to manufacture wooden vessels by small diameter wood and wasted wood of *Castanea crenata* Sieb.et Zucc , which has been largely planted in southern area since 1960s. The greater the technological advances, the more diverse and sophisticated the uses that have been found for wood. Today, in spite of the availability of numerous new synthetic materials, even the most highly developed countries would find it difficult to maintain their high standard of living if deprived of access to wood products. It is easy to demonstrate that the higher the level of economic development, the greater is the dependence of men on wood, not only in many of its

conventional forms but also in a variety of less readily recognizable items, such as paper, films, and other wood-pulp products which are the very mainstay of its position as a renewable resource. The growing scarcity of petroleum in the world is forcing a reevaluation of the importance of wood as a fuel and as a source of basic chemicals to replace those now obtained from crude oil.

Chestnut wood has high added value and natural color grain and is very useful for wooden vessel. Thinned low grade trees can be used to produce wooden vessel. Therefore this result can promote thinning and produce good forestation.

5. References

- Bryan sentence. 2003. Wood:56. Thames & Hudson Ltd, London.
- Chang, W. H., H. H. Lee. 1993. Making a color natural wood of thinned small diameter tree and its utilization. Journal of the Korea furniture society. 4(2): 31-36.
- Kwon, K. J., N. H. Kim, and H. J. Lee. 1997. Fundamental study of new wooden material development with the domestic small timbers. Journal of Korea Forest Energy. 16(1): 79-92.
- Moon, S. O., C. H. Kim and J. G. Kim. 2004. Study on effective use of aged chestnut woods as furniture materials. Journal of the Korea furniture society. 15(2): 54-62.
- Moon, S. O., C. H. Kim, G. Y. Kim, H. G. Jung, T. G Shin, J. G. Kim and C. Y. Park. 2007. Application of natural dyes for developing colored wood furniture(iii). Mokchae Konghak. 35(3): 79-87.
- Panshin, A. J. and C. D. Zeeuw. 1977. Textbook of wood Technology, Fourt Edition: 1-2. McGrow-Hill Book Company. Newyork.
- Park, H. J. and N. H. Lee. 1997. Studies on the manufacturing technique of wooden -bathtub made with thinned modified soft wood. Journal of the Korea furniture society. 8(1.2): 47-55.
- Wood working. 2001:11,22,24,26. Dumonte monte. UK. London.

Submission Information

Submission of Korean paper can be accepted for next Korean volume
21(1) before Nov 29, 2009.

Chief Editor, Journal of the Korea Furniture Society