



# Training Manual for Bamboo Craft

## Module IV: Furniture





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## Module IV: Furniture

# Preface

Bamboo is an ancient woody grass widely distributed in tropical, subtropical and mild temperate zones. Traditionally seen as the “poor man’s tree”, in recent years bamboo has risen to a high-tech, industrial raw material and substitute for wood. Although the commercialization of planted bamboo has been slow, it is becoming an increasingly important economic asset in poverty eradication, economic and environmental development (FAO, 2005).

Bamboo is a group of perennial evergreens in the true grass family Poaceae and includes the largest members of the grass family. There are more than 70 genera of bamboo divided into about 1,450 species, of which only around 50 species are routinely cultivated (Hunter, 2003). Native bamboo grows in many parts of the world, including East Asia, Sub-Saharan Africa and the Americas. Bamboo is not limited to tropical climates, with some species able to withstand frost and survive in Northern Europe. It is an extremely fast-growing plant, with some species obtaining growth surges of 100cm per 24 hour period. Most bamboo species grow to their full height within a single growing season. Over the following seasons the walls of each culm (or stem) dry and harden, reaching maturity within 3 to 5 years.

Bamboo has traditionally been used for basic construction and scaffolding, woven mats, basketry, incense sticks, and a wide variety of other handcrafted items. The utilization and trade of bamboo sector is dominated by a large informal sector comprising farmers, artisans, and family-owned cottage industries located in remote villages. Bamboo has been used as the primary raw material of the pulp and paper industry of North East India for many years. It is increasingly being exploited as a wood substitute for a range of industrial products including particleboard, bamboo mat boards, and bamboo mat corrugated sheets. Bamboo is cultivated in a small scale in homesteads but most of the material that is processed into finished products is extracted from state owned forests.

## **How to use the manuals**

In order to promote vocational skill development through the use of technology enhanced learning, and open educational resources, training contents have been developed for training artisans / workers to enhance the quality and introduce new line of products with higher value addition that has acceptance in high-end markets.

Module 4 is designed to provide a pictorial step-by-step elaboration on the various applications of bamboo to create diverse products. It describes methods for making furniture such as partition screen, stool, sofa, etc out of bamboo. This manual can be used as a reference material for trainers, trainees and artisans who are learning to work with bamboo. An audio-visual guide has also been developed for the manual in order to enhance understanding. It is advisable to use both resources to derive the most of the manual.

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# 1. Introduction

**B**amboo being a woody grass, with strong fibre and long culms, is one of the best natural materials for making furniture. Owing to the fact that bamboos exhibit various varieties like solid bamboo, hollow bamboo with various widths, etc; it makes it ideal for making good quality furniture. Nowadays there is a high demand of bamboo products for residential uses, schools, in the tourism sector, etc. Artisans have explored several types of bamboo from various regions according to its availability.



A chair is being assembled by the artisans.



An artisan making bamboo furniture.



An artisan doing the surface finishing on bamboo.

## 2. Tools & Raw Materials

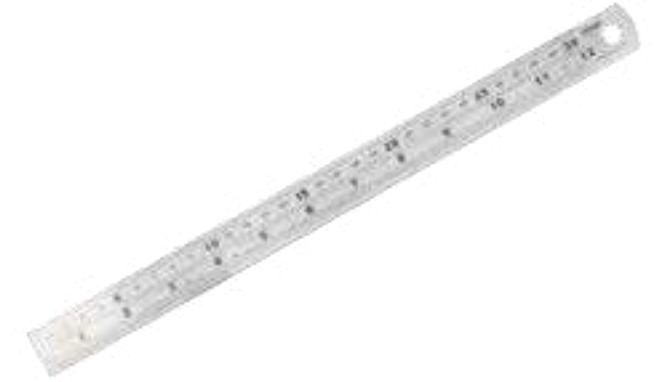
There are various tools used for working with bamboo especially for making various furnitures. The most important tools used are given below for reference. Many of these are required for various purposes related to making products. The process starts from measuring to cutting, splitting, drilling, bending, grinding etc. The material used for making furnitures should be selected carefully and treated well before using it.



**Tool 1:**Right angle



**Tool 2:**Measure tape



**Tool 3:** Steel ruler



**Tool 4:**Angle scale



**Tool 5:**Measure tape





**Tool 6:** Knife



**Tool 7:**Hand saw



**Tool 8:**Mallet and hammer



**Tool 9:**Cutting plier



**Tool 10:**Half round file



**Tool 11:**Nose Plier



**Tool 12:**Marking tool



**Tool 13:**Flat file



**Tool 14:**Various chisels



**Tool 15:**Mortise chisels



**Tool 16:**Various Files



**Tool 17:**Hand planer



**Tool 18:**Hand held bamboo splitter



**Tool 20:**Bench vice

**Tool 19:**Bench vice and 'C' clamp



**Tool 21:**Jack planer



**Tool 25:**Hand held grinder



**Tool 22:**Hot air gun



**Tool 26:**Hand held grinder



**Tool 23:**Power drill



**Tool 27:**Hand held jigsaw



**Tool 24:**Sabre saw

## 3. Product Making

# Partition Screen

Thin solid bamboo is an ideal material to make partition screens for interior space. In restaurants, bedrooms, living rooms, sitting lounge etc. where semi-privacy is required, this partition can be utilised. The same technique can be adapted for making modules for fences, treeguards, gates etc. The size, colour and finish can be changed as per therequirements.



Step 1: Straightening solid bamboo by heating and pushing on jig



Step 2: Heating and straightening process.



Step 3: Cooling the surface of bamboo with water



Step 4: Remove the nodes using a grinder.



Step 5: Smoothing the surface of bamboo with the help of sander



Step 6: Mark equal intervals on the surface for equal length bamboos



Step 7: Cut bamboo into equal sizes



Step 8: Make a 30 cms mark on the bamboo



Step 9: Similarly mark on all the bamboos



Step 10: Drill on the bamboo at the mark



Step 11: Mark 25 mm. on 12 mm aluminum pipe. It is used as a spacer between the members ofscreen



Step 14: Paint the aluminum pipe pieces.



Step 15: Components are ready for assembly.



Step 16: Put the threaded rod through the bamboo.



Step 12: Cut the aluminum pipe on the mark



Step 13: Sand the edges to smoothen it



Step 17: Put the aluminum pieces between the bambc



Step 18: Keep adding the bamboo on the rod.



Step 19: Lock with a nut on one end of the rod.



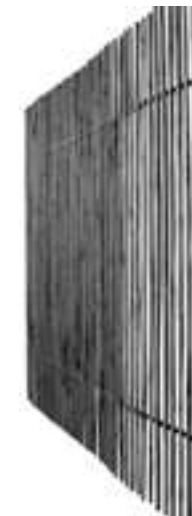
Step 20: Keep adding the bamboo poles to the rod.



Step 21: Align it properly.



Step 22: Lock with a nut on the other end.



**Bamboo Partition**

# Stool

A stool is one of the simple furniture that is used at various places from home to public space to restaurants etc. This can be made well using solid bamboo and simple working techniques. The same method and skills can be used for making other furniture too.



Step 1: Bend the solid bamboo for stool set frame



Step 2: Bend two pieces identically



Step 3: Scrape out the skin after bending.



Step 4: Mark points on bamboo for drilling.



Step 5: Use fastener bit for drilling.



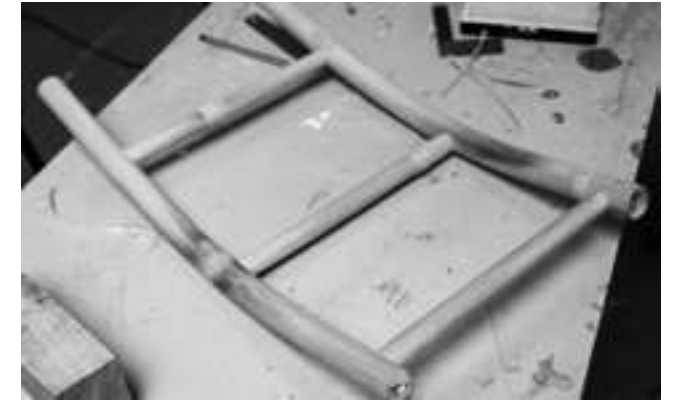
Step 5: Make three cross members for the seat assembly.



Step 6: Reduce the diameter at the end.



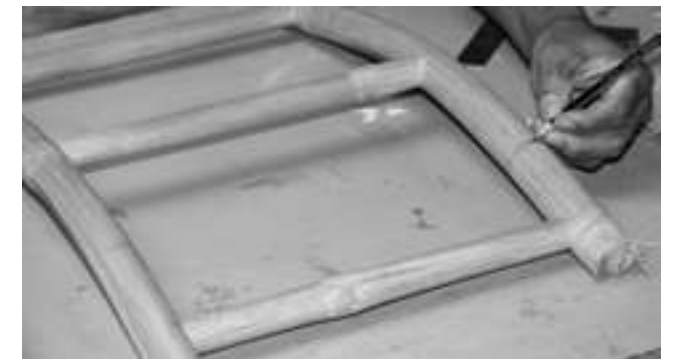
Step 7: It should fit tightly into the drilled hole.



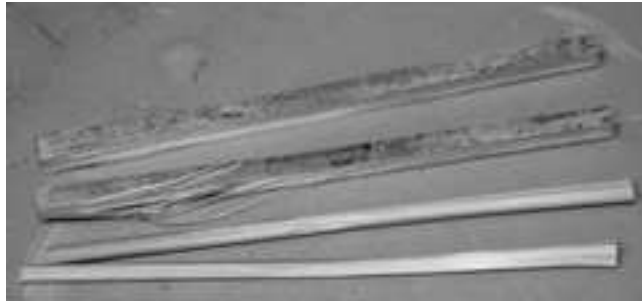
Step 8: Assemble the seat frame.



Step 9: Cut the excess length of the seat member.



Step 10: Mark the drill for fixing the leg unit.



Step 11: Make the sliver for stool seat making.



Step 12: Bend the sliver using hot air gun



Step 13: Match the curve with frame.



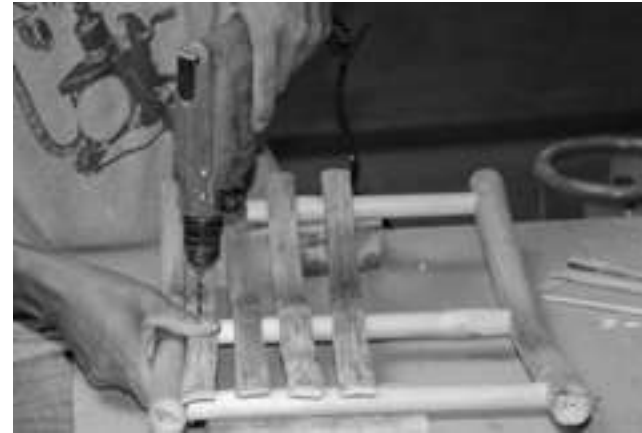
Step 14: Sand it and clean the surface.



Step 15: Place slivers on the seat frame.



Step 16: Hold tightly with 'C' clamp.



Step 17: Drill a hole through sliver onto the frame.



Step 18: Fix it with bamboo nail and an adhesive.



Step 19: After fixing it use sand paper to finish the surface



Step 20: Make a leg member and mark it for drilling a hole through it



Step 21: On the leg unit, drill the hole for fixing the tie member.



Step 22: Fix the leg member.

# SofaMaking



Step 23: Fix the tie member between the legs.



Step 24: Fix it with an adhesive and bamboo nail.



**Bamboo Stool**

Sofa is one of the most widely used furnitures, and it is available in various materials and designs. The process of making a bamboo sofa has been explained in this section. A single seater, a double seater and a centre table can be made using the same skills. The colour and upholstery can be explored further by individual artisans



Step 1: Prepare the frame of the sofa



Step 2: The back rest unit and front leg unit.



Step 3: Seat unit of a 2 seater sofa.





Step 4: Back rest unit of a single seater.



Step 5: Front leg unit of a single seater.



Step 6: Seat unit of a single seater.



Step 7: Assemble the structure of a sofa.



Step 8: Finish the structure by using mellamine.



Step 9: Assembly stage one.



Step 10: Assembly stage two.



Step 10: Fixing the upholstery to the sofa frame.

# Other Furniture Products



Final Single seater



Final two seater



Assembly of two seater



Centre table



Babywalker



Multi utility chair



Rocking horse

## 4. Workshop Safety

Workshop is the place where various kinds of machineries are being used and it carries the risk of potential safety hazards. The purpose of safety measure is to prevent fatal accidents and provide emergency help. Therefore, it is very important that the rules and guidelines are followed.

It is not possible for this section to cover every conceivable situation and therefore staff who have management or supervisory responsibilities must also establish and enforce safety rules to cover specific hazards in their workshops. The laws that govern occupational health and safety in a bamboo processing workplace is very important to each and every learner. The learner should be able to identify typical workplace hazards and follow procedures that will control the risks associated with those hazards to prevent injury, illness and death. The knowledge of workshop safety measures will enable the learners to respond and act appropriately in an emergency situation that may arise in a bamboo processing workplace.

The trainer should explain the warning or reporting procedures of unsafe situations in the workplace. In case of an emergency situation, the trainer or the trainee should inform the nearest hospital for treatment.

There are various safety measures followed in bamboo processing working environment. The following are some of the important safety clothing and equipment one should strictly wear while working with bamboo in the workshop. They are a) safety glass, b) mask, c) apron, d) hand gloves. and e) first aid kit.

**a) Safety glass**

Safety glass is glass which has safety features to protect eyes while working in the workshop. There are many types of glass available in the market like toughened glass, laminated glass and wire mesh glass for workshop safety.

**b) Mask**

When working in the bamboo workshop, you can breathe in a lot of dust that can cause

serious respiratory diseases. In such condition, it is advised to use dust mask to protect oneself. A dust mask is a pad held over the nose and mouth by elastic or rubber straps to protect against dusts encountered during workshop activities.

### c) Apron

An apron is an outer protective garment that covers primarily the front of the body. It is worn for various safety reasons in the workshop to protect oneself from many hazards. Aprons are available in a variety of materials and the learner should wear a thick cloth apron for bamboo activities in the workshop.

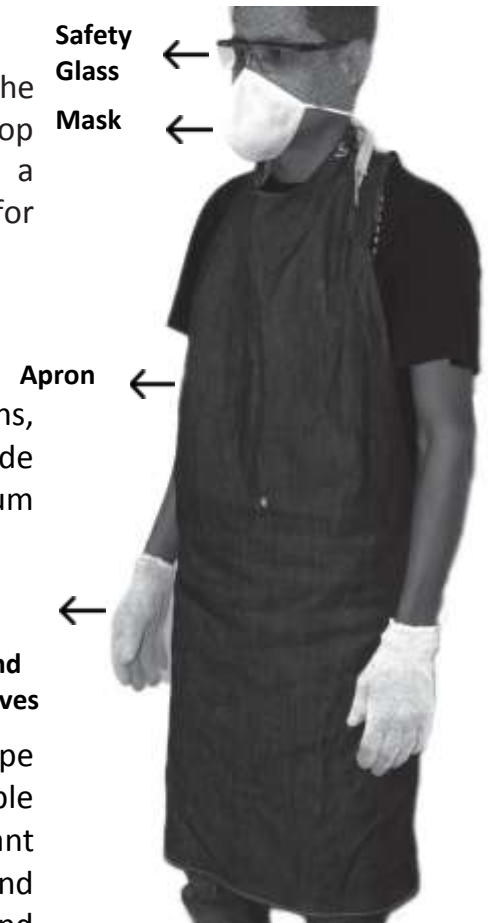
### d) Hand gloves

Hand gloves are worn to protect hands from cuts and abrasions, chemicals, heat and most work environments. Hand gloves are made from leather, cotton, synthetics, nitrile, latex etc. to offer maximum protection and comfort.

### e) First aid kit

A first aid kit consists of equipment for treating minor injuries: individual. Typical contents include adhesive bandages, crepe bandage, finger bandage, scissors, hypoallergic tape, disposable gloves, regular pain medication, gauze and disinfectant. It is important to keep all kits in a clean water proof container to keep them safe and hygienic. The contents of the kit should be checked regularly and replaced if any items are damaged or expired. Other than the above mentioned safety measure one should keep in mind the following strictly.

- No causal attitude in the workshop premise.
- Wear suitable personal clothing to the workshop conditions.
- Appropriate footwear should be worn.

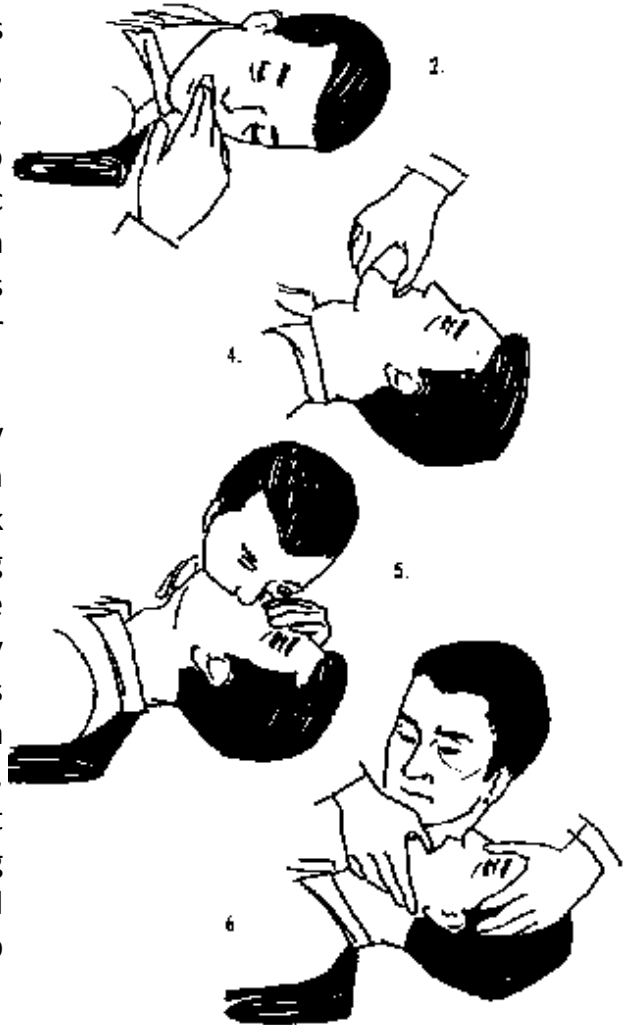


- Never run in the workshop.
- Label safety equipment and maintain good condition.
- Keep all fire escape routes completely clear at all times.
- Ensure that all safety equipment remains accessible to the workshop personnel at all times.

## Artificial Respiration

Artificial respiration is a procedure used to restore or maintain respiration in a person who has stopped breathing due to drowning, electric shock, choking, gas or smoke inhalation, or poisoning. This method uses mechanical or manual means to force air into and out of the lungs in a rhythmic fashion. In emergency situations, however when no professional help is available rescuers undertake the natural method mouth-to-mouth or nose-to-nose for artificial respiration.

In the first place to perform this method, any foreign material is swept out of the mouth with the hand. The patient is placed on his/her back with the head tilted backward and chin pointing upward just to avoid the tongue blocking the throat. The rescuer's mouth is then placed tightly over the victim's mouth or nose with the victim's mouth or nostrils shut. The rescuer then takes a deep breath and blows into the victim's mouth, nose or both. The breathing should be vigorous at the rate of 12 breaths per minute. Breathing exercise should be continued until natural breathing resumes or until professional help arrives.



## **Foundation for MSME Cluster**

FMC is a non-government, not-for-profit Public Charitable Trust, registered under India Trust Act set up in the year 2005. It was conceived in the year 2004 at the suggestion of the then Ministry of Small Scale Industries (SSI) and now renamed as Ministry of MSME, Govt. of India. United Nations Industrial Development Organization (UNIDO) helped to draw up its business plan and Entrepreneurship Development Institute of India (EDII) gave legal birth to FMC. The Foundation is an apex national body known worldwide as a pioneer organization for the development of MSMEs through cluster development approach. FMC has rich experience of working with MSMEs and has provided services in the areas of advocacy, implementation and coordination, training and research to more than 150 clusters nationally and globally across 10 countries. It has its head office located in New Delhi and regional/project offices in Hyderabad, Phagwara, Ludhiana, Jaipur and Kolkata.

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