



## **BENDYWOOD® SQUARE & RECTANGULAR HANDRAILS** **1<sup>st</sup> TIME USER GUIDE**

Please read these guidelines **BEFORE** working with Bendywood® Handrails.

The manufacturers web-site is regularly updated with technical information: [www.bendywood.com](http://www.bendywood.com)

### **GENERAL RULES:**

1) **DO NOT USE BENDYWOOD® OUTDOORS!**

2) Bendywood® **MUST NOT BE IMMERSSED IN WATER OR BE IN DIRECT CONTACT WITH SOMETHING WET**

### **WORKING / MACHINING PROCEDURE**

If you intend to work / machine the square / rectangular profiles this can be done **before** bending, however you should check the moisture content of the Bendywood.

When you receive the rectangular Bendywood® handrails, check that they are in their raw condition and dry with a moisture content of 8-10% (ready to be worked / machined). If the moisture content is higher then leave them in a dry area for a few days then check again the moisture content.

They can be machined using the same tools and machine processes as normal wood. However since Bendywood® has been compressed, it can have an increased tendency to tear. Therefore the following guidelines should be observed

1. Saw and sand as with normal wood.

2. When using rotary cutters on machines or hand planes, **pay particular attention to grain direction** as planing or cutting against the grain can cause severe tear-out.

3. When spindle shaping, routing or planing to thickness, increase cutter speeds by 20% and hold tightly against the fence to avoid any chatter. It is best to make a series of small cuts to remove material prior to a final finishing cut. Sharp cutters should always be used. Power sanding works particularly well. It is best to use a slower feed rate than normal.

Always test your cut on a spare piece of Bendywood® prior to machining the work in progress.  
**HSS tooling is the best.**

## **BENDING-RATIO:**

Bendywood® Rectangular Handrails can be bent up to 20 times their thickness. Different sections bend in different ways. It is always easier to bend in the thin (easy) direction. As with any material, any given section has a natural direction in which it tends to bend. A rectangular section will try to buckle if bent in the thick (hard) direction.

However it should be noted that Bendywood® is natural wood and therefore each piece is different in nature. Some pieces show some fracturing and could break before this 1:20 ratio, and some will be able to be bent further.

## **STORAGE:**

Bendywood® handrails can be stored indefinitely in dry conditions (e.g. in a workshop) without losing their properties, but should not be stored in damp conditions (outdoors).

## **BENDING**

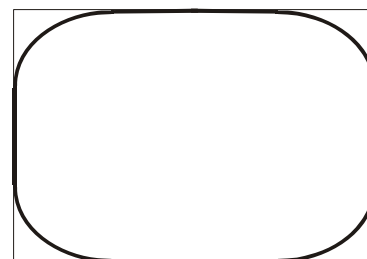
**BEFORE** bending you **MUST** check the moisture content.

The ideal moisture content for bending should be 14-16%. If it is lower please see below.

**Bendywood® Square and Rectangular handrails** need force to bend them, and therefore they are stiffer once bent. There are a number of ways of applying force. These include using pulleys, clamps or weights or for tighter or more complex bending a mechanical rolling machine can be used. **Always work slowly.** A difficult bend should be worked very gradually so that the wood can adjust to the new shape without breaking

The Angle Ring Co Ltd has purpose designed and built facilities for such bending – contact details below.

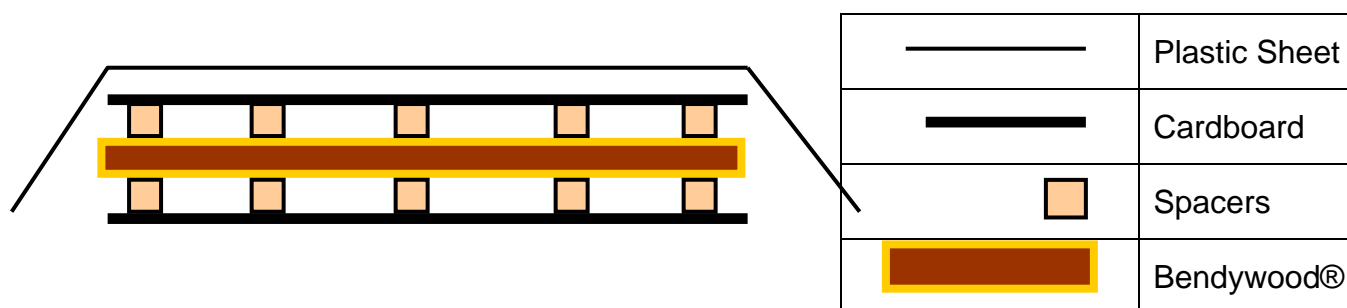
Make sure you slightly round the corners of the rectangular / square handrails before bending. If you do not, the Bendywood® may fracture and break.



## RAISING MOISTURE CONTENT

It is important that the moisture is 14-16% prior to bending. If necessary, to **raise the moisture content** this can be achieved by putting the Bendywood® handrails between two layers of moist cardboard for a day or two & wrapping in a plastic sheet to keep the moisture in. Spacers should be positioned between the bendywood® and the wet cardboard to avoid actual contact with the cardboard.

### SANDWICH METHOD



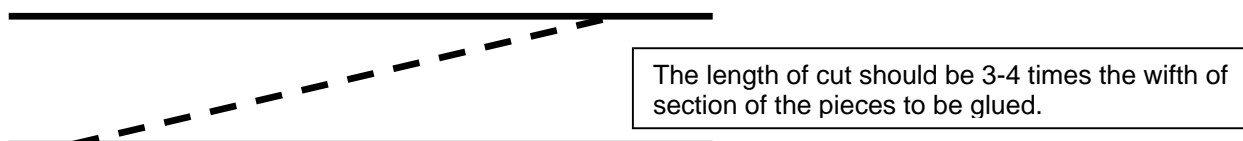
This technique (“Sandwich method”) allows the Bendywood® to absorb moisture from the air without getting wet. Bendywood® **MUST NOT BE IMMERSSED IN WATER OR BE IN DIRECT CONTACT WITH THE WET CARDBOARD**. Direct contact will not increase the moisture content uniformly. Also if the pieces are jointed this could cause the joints to weaken or come apart rendering the piece useless.

- **After bending**, Bendywood® handrails should be **temporarily (3-4 days) held to a shape** while they shrink along their length (about 1%). For example after about 3-4 days a 6 metre long handrail temporarily held to the banister should have shrunk & stiffened to the point it is ready for final fixing. Please note that if you permanently fix the handrail to the banister before it is sufficiently dry, it may break while shrinking.
- Pay attention that during the final assembly, Bendywood® shrinks along its length as the moisture content reduces. For this reason it is better to start fixing the components in the middle, working toward the ends using **slotted** fixings / **oval** holes that can compensate for any further shrinkage.

## **GLUING & STAINING**

1. Bendywood® can be finished like normal wood, except that **water based stains and glues should be avoided** if the subsequent expansion caused by wetting will cause a problem.
2. Check that the Bendywood® handrail is **completely dry** (8-10%) before gluing or staining.
3. If 2 pieces of Bendywood® need to be joined (glued) in the length, it is better to **join them on a sawn, angled cut**.

The length of the cut should be 3-4 times the section width of the pieces to be glued.



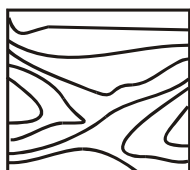
Finally, we can not cover all applications & situations in this brief introduction. If you have questions about a particular custom project or application, please contact us with your specific project details.

## **CONCLUSION:**

### **Bendywood® Rectangular Handrails**

1. Work / Machine them (first check moisture is 8 – 10%)
2. Raise the moisture content to 14-16%.
3. Bend them with application of sufficient force.
4. Hold them temporarily to shape on the balustrade, jig, or steps for 3-4 days until they are set and dry (moisture content 8-10%).
5. Work them again (screw holes, grooves, etc) if you need to.
6. Stain them.
7. Only fix them permanently when the moisture content is between 8% – 10%.

**Always use oval holes** when fixing as this allows for movement and shrinkage in Bendywood (shrinkage is in the region of 1% e.g. a 6000mm length will shrink 60mm = 5940mm)

**SQUARE HANDRAILS**

Species	Thickness	Width	Length	# of joints	Order Ref
Beech	45mm	45mm	4500mm	3	REC-45x45/450
Beech	45mm	45mm	5200mm	3	REC-45x45/520
Beech	45mm	45mm	6000mm	3	REC-45x45/600

Species	Thickness	Width	Length	# of joints	Order Ref
Beech	50mm	50mm	4500mm	3	REC-50x50/450
Beech	50mm	50mm	5200mm	3	REC-50x50/520
Beech	50mm	50mm	6000mm	3	REC-50x50/600

**RECTANGULAR HANDRAILS**

Species	Thickness	Width	Length	# of joints	Order Ref
Beech	50mm	80mm	4500mm	3	REC-80x50/450
Beech	50mm	80mm	5200mm	3	REC-80x50/520
Beech	50mm	80mm	6000mm	3	REC-80x50/600



THE  
**ANGLE RING**  
 COMPANY LIMITED