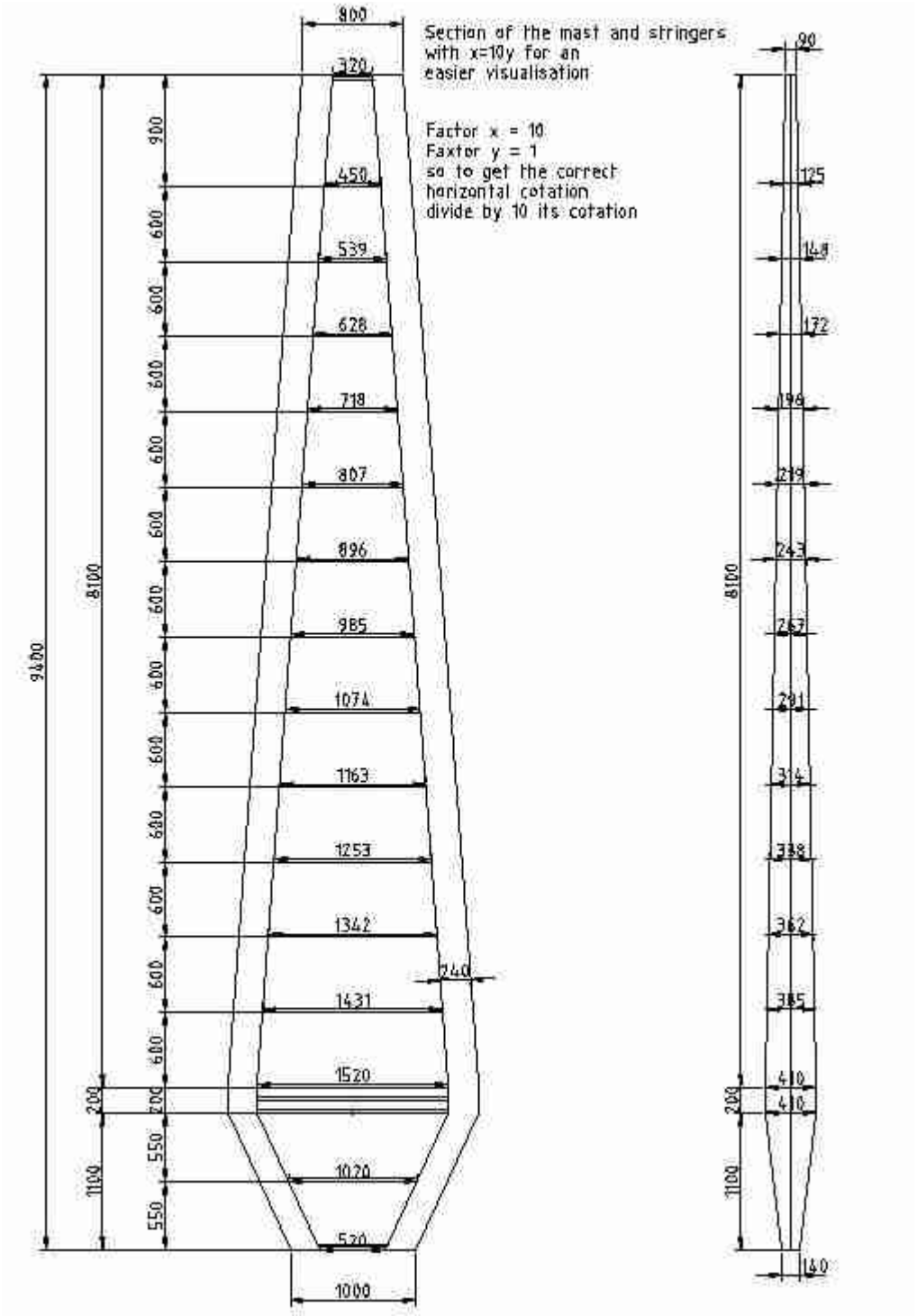
Building of two bi-conical wood free-masts made with 12 staves.

By Bertrand Fercot V0.1

Here is a method to build a wood free mast with no hurry to glue all the 12 stringers together. I used this method to build the free masts for my Tiki30 rigged with a Swing Wing rig on each hull.

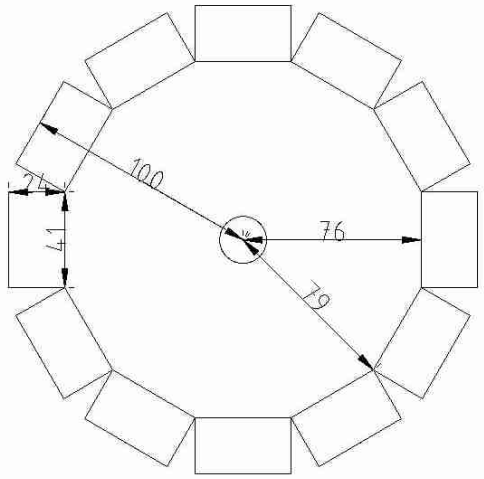
Below on the left is the vertical section of the mast and on the right are the sizes of one stave.
To be readen easily, the horizontal sizes are 10 times greater than the vertical sizes. So divide the horizontal quotations by 10.



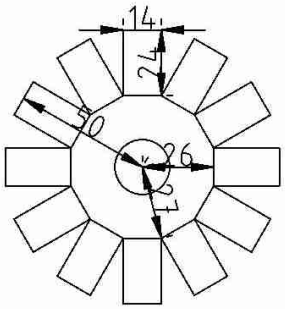
The first job is to cut the 12 staves in timbers of 24mm thickness and 10.50m minimum length. Why 10.50m? It's because with longer timbers than the total mast length it's possible to cut alternatively a stave from top and the next one from foot to avoid to waste wood.

Here are the section at foot, deck and top :

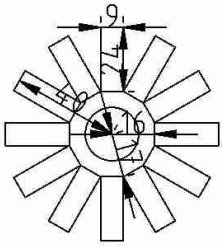
Section at deck



Section at foot

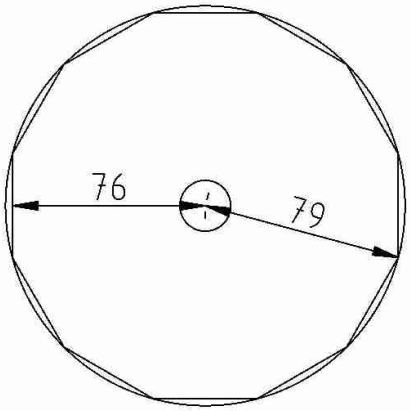


Section at top



This mast is build as a bamboo with bulkheads of 12 faces all 0.6m to get a light and strong mast. For that I cut according my plan 18 discs with 12 faces in the same timber of 24mm thick.

Drawing the size of a bulkhead at deck level



The mast shape is generated by the bulkheads which are fixed on a thick timber each 60cm . They are well aligned wit a thin line strongly tensioned between the foot and top of the mast :

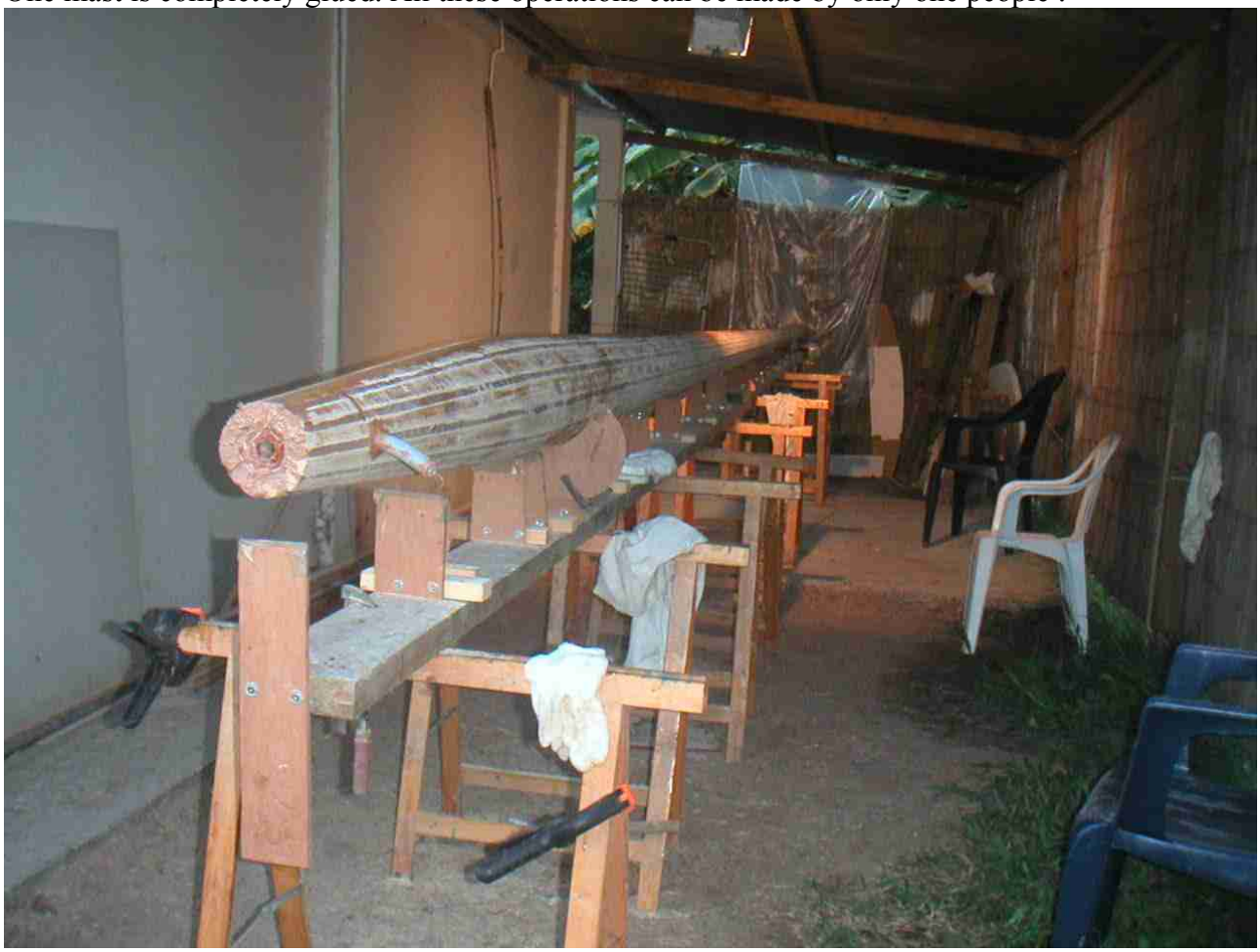
The first stave is glued on the bulkheads with the help of temporary screws :

And the next ones are glued so until to get an half mast :

Now the “V” spaces between the staves are filled with a thick epoxy glue with no hurry :

After to have glued so all the staves together, the half mast is disconnected from its support, turned and is well hold to keep it straight. Before to complete the mast a plastic tube is put through the center of each bulkhead :

One mast is completely glued. All these operations can be made by only one people :



With its 12 faces, this mast is easy to round and after to have glassed the masts, unidirectional carbon cloth is added only on the bottom part above and below the deck level :

The keel has been reinforced :

and a thick laminated plywood collar has been made moulded on the deck to follow exactly the shape of the deck. A thick rubber collar is put under the plywood collar in order to get a good sealing :

In order to adjust exactly the mast to the deck collar and keel, the mast is placed in the hull to be glued to the collar :

At the top, stainless eyes are bolted with epoxy to hold the blocks :

Final result after painting :

I don’t use this method for the 16m of my Tiki46 masts because, due to the thick staves it will request too much glue epoxy (increasing the weigth and price). But for a moderate length mast it is a very easy method in progressing step by step with no hurry with simple tools (I saw the 25mm starves only with a jig-saw).
The datas are :
- total length : 9.40m, height over the deck : 8.30m
- Diameter at foot : 100mm, at deck : 200mm, at top 80mm
- Weight of each finished mast : 60kg
- Sail area : 20m² on each mast

It could be an interesting method to build an hybrid mast with the core made with this method (with thin staves) and to cover it with heavy fiberglass or carbon cloth and epoxy.....