Stairs Manufacture

WMF PHASE 6

Stairs

- When making a stairs it is crucial that you have an accurate setting out as any slight error made will increase with each step, so the stairs becomes useless as it will not conform to building regulations.

Technical Guidance Documents: TGD

For this reason, it is recommended that some form of jig or template is used when setting out, and that measurements are checked and re-checked for accuracy.

Marking Out For Stairs

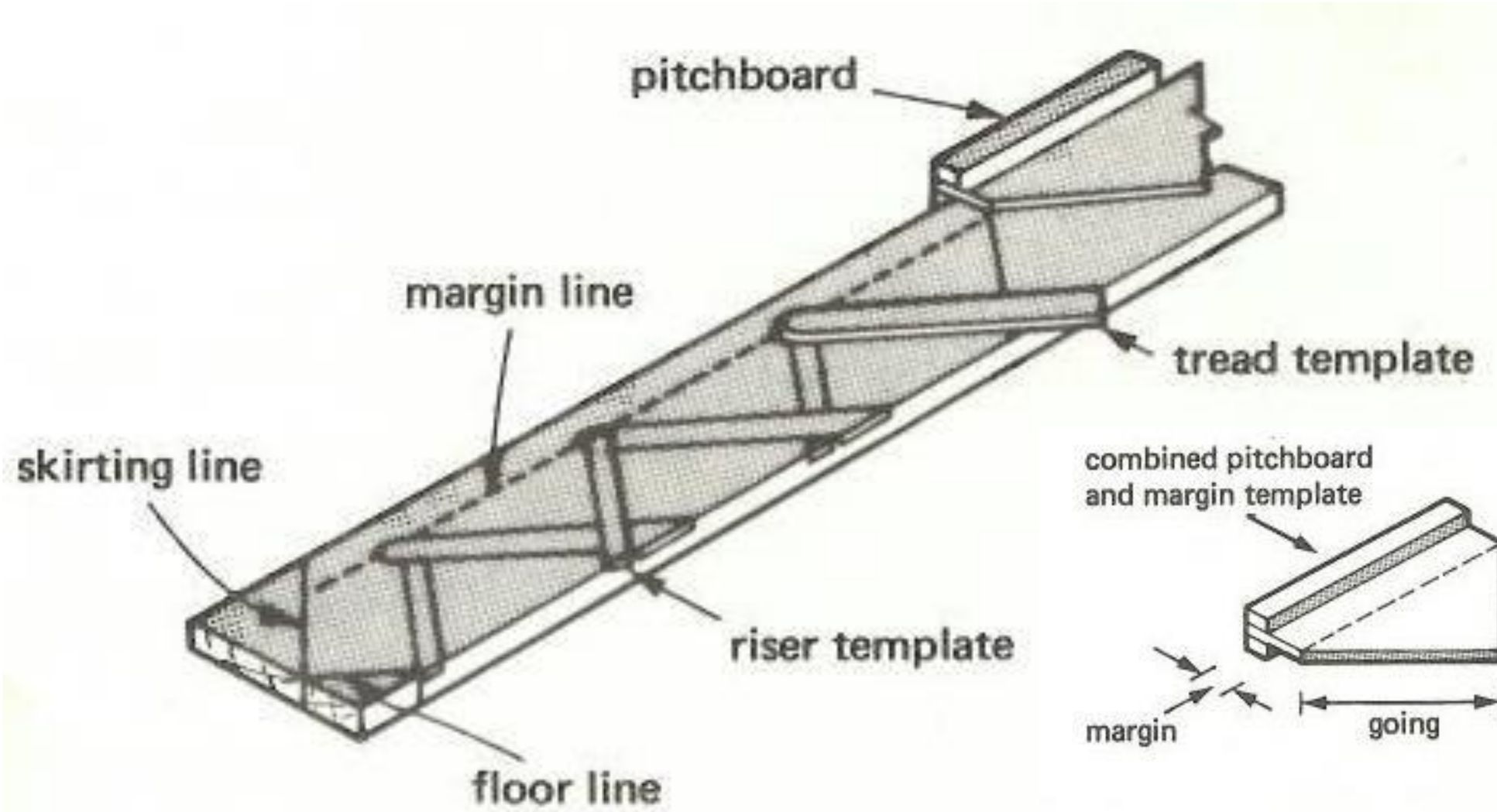


Figure 215 *Templates in use*

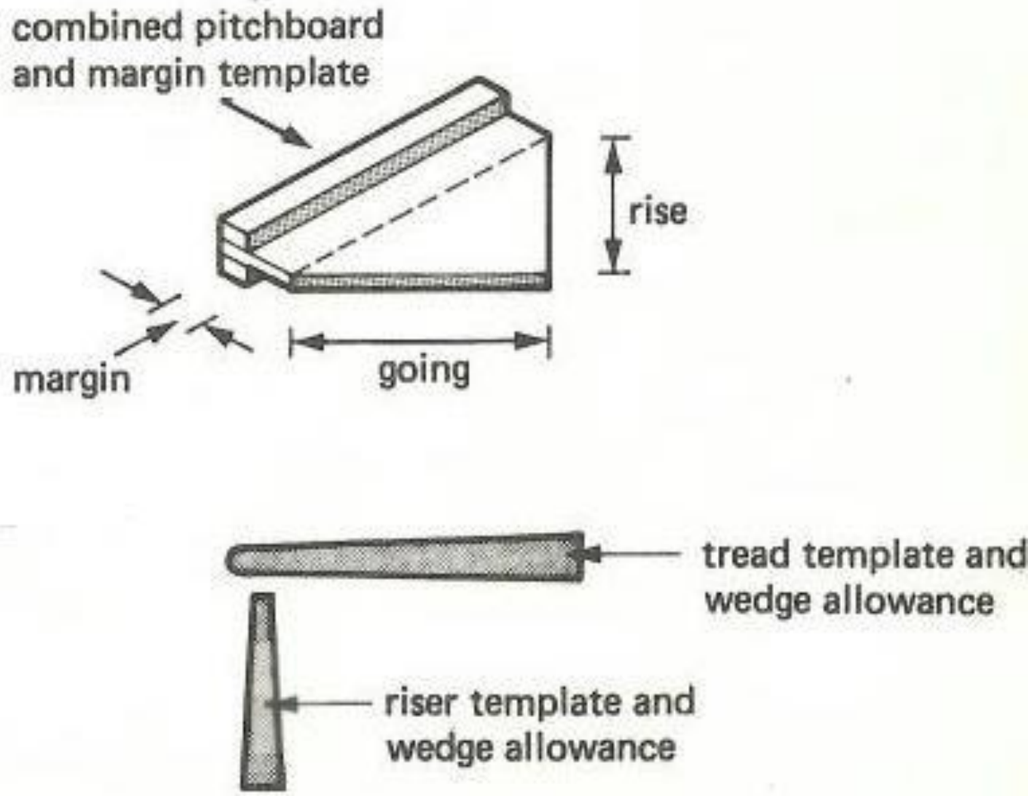


Figure 214 *Setting out templates*

Images taken from *Carpentry and Joinery for Building Craft Students 2* by Peter Brett

Manufacture of String Old Method

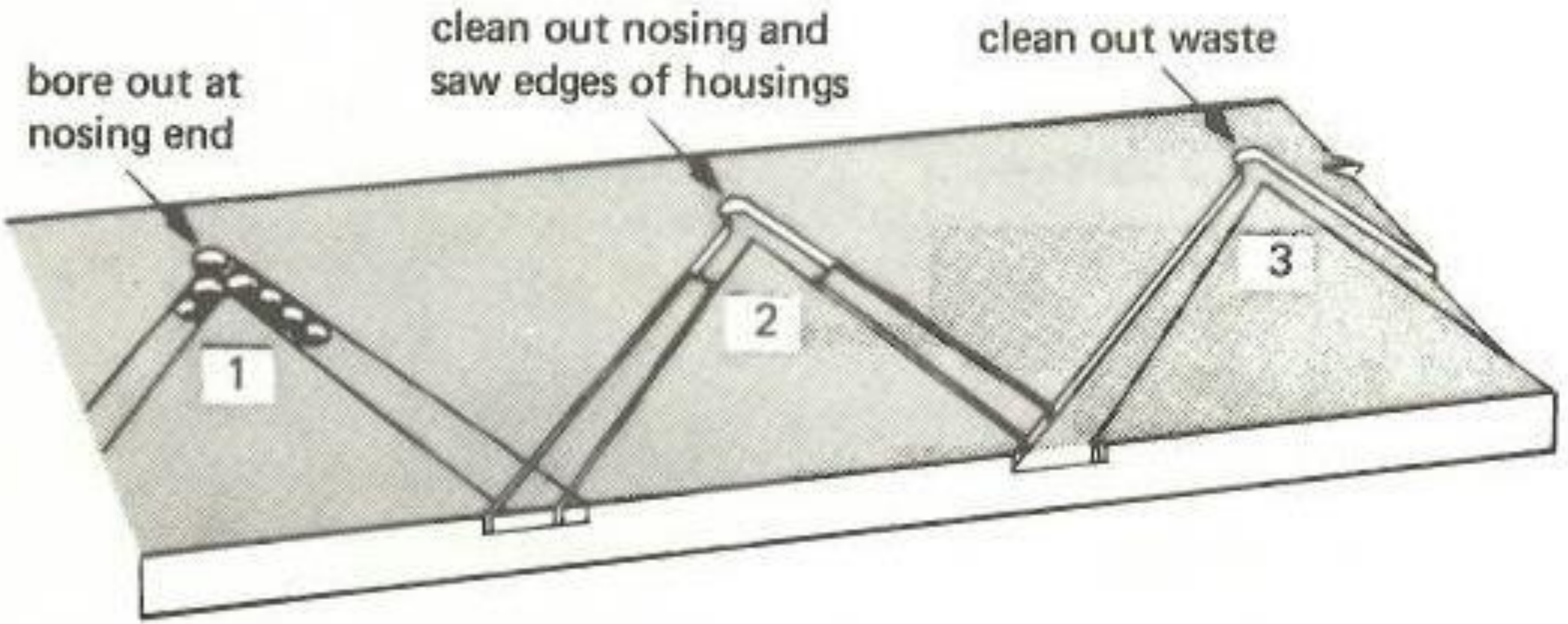
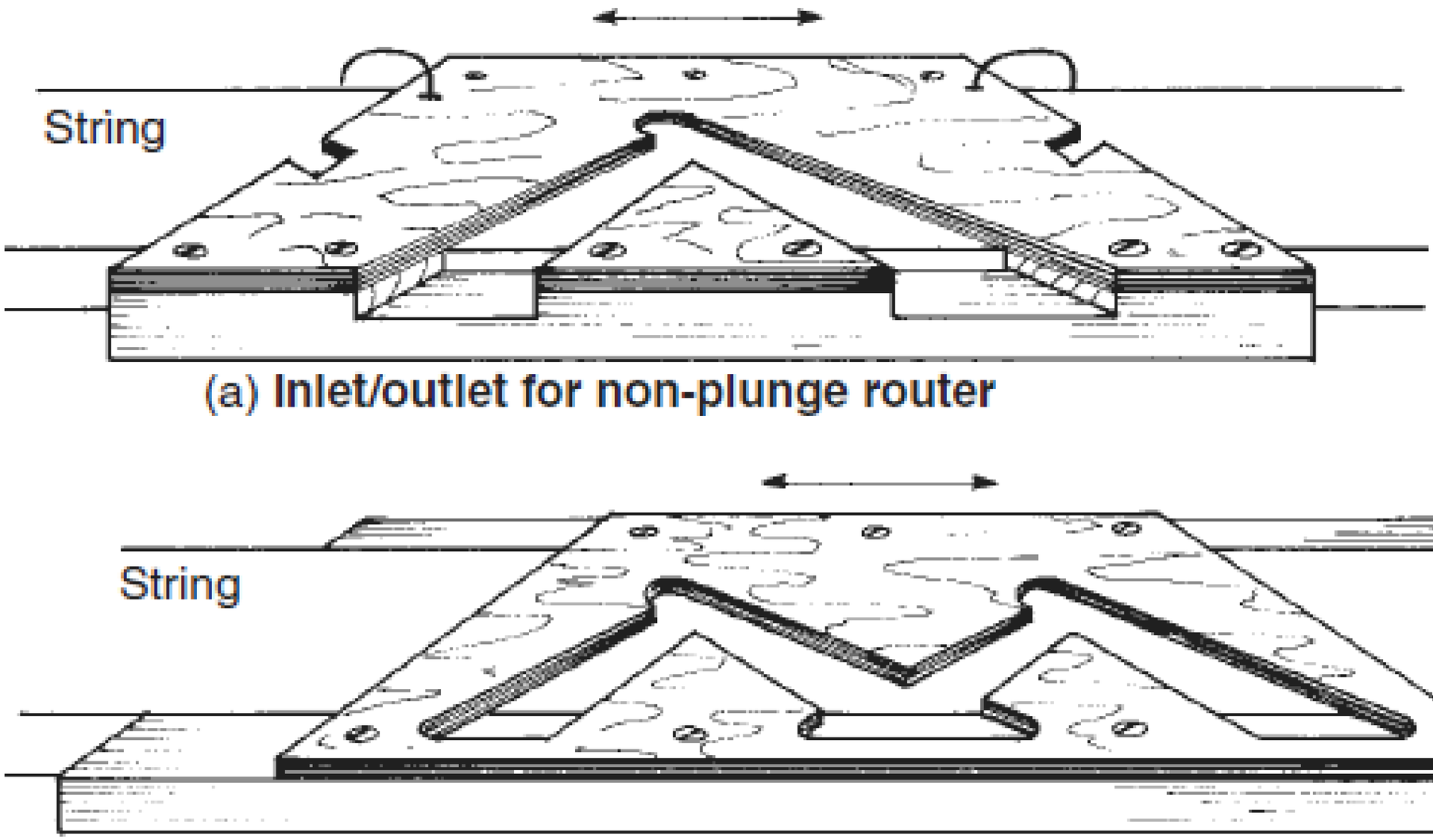


Figure 216 *Sequence of operations*

Image taken from *Carpentry and Joinery for Building Craft Students 2* by Peter Brett

Manufacture of String Using Jig Template



(a) Inlet/outlet for non-plunge router

(b) Inlet/outlet not necessary with plunge routers

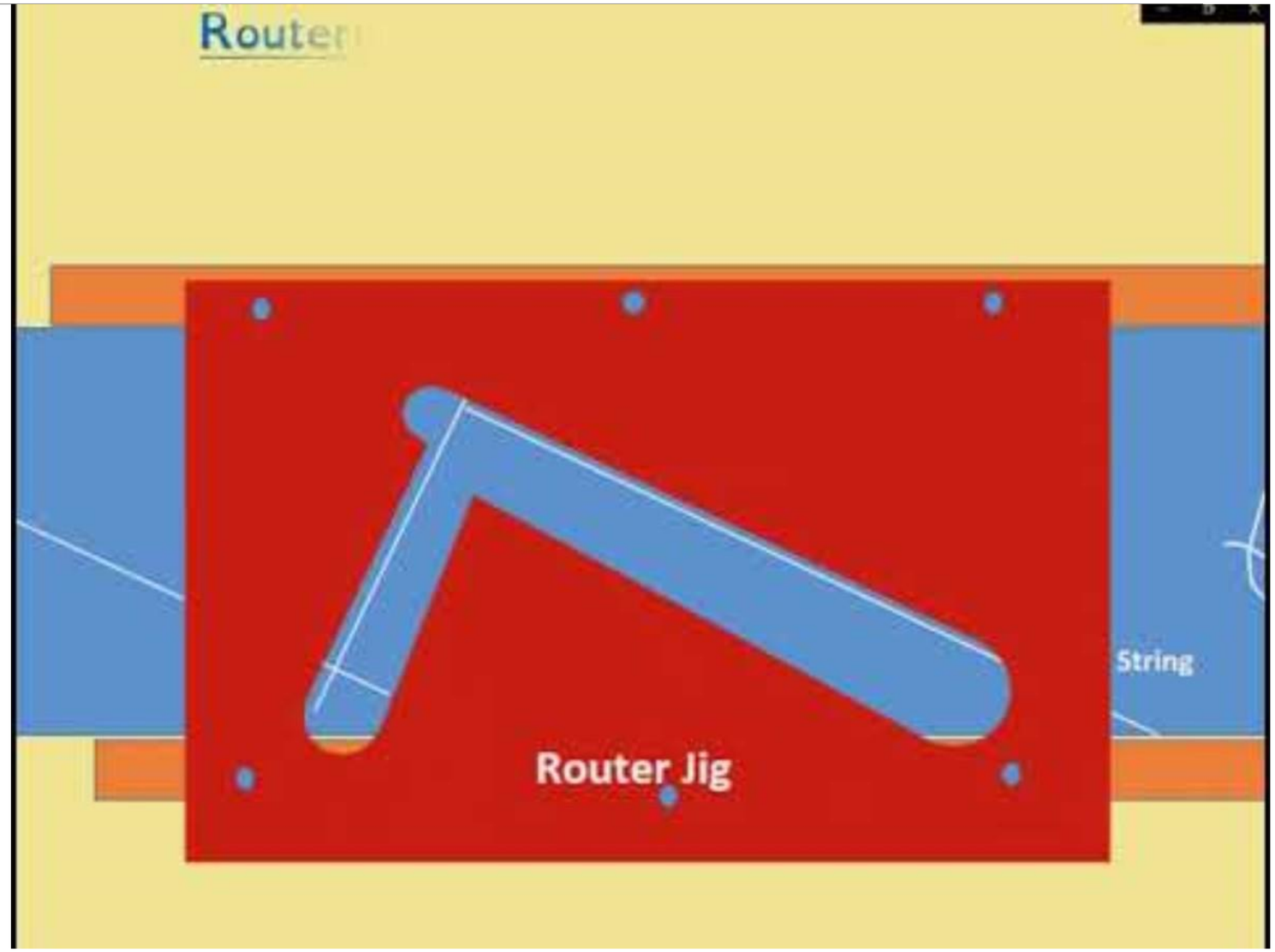
Manufacture of Stairs using Jig Template and Router

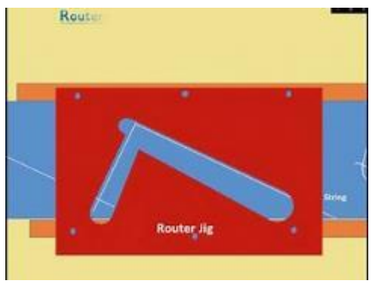
- It is crucial to maintain accuracy when using jigs, particularly to top of tread and face of riser. Clamps and screws can be used to assist with this.

- Image taken from Wonkee Donkee

Marking out Pitch Board and Template

- Watch this step-by-step animation on how to make a template for a string.

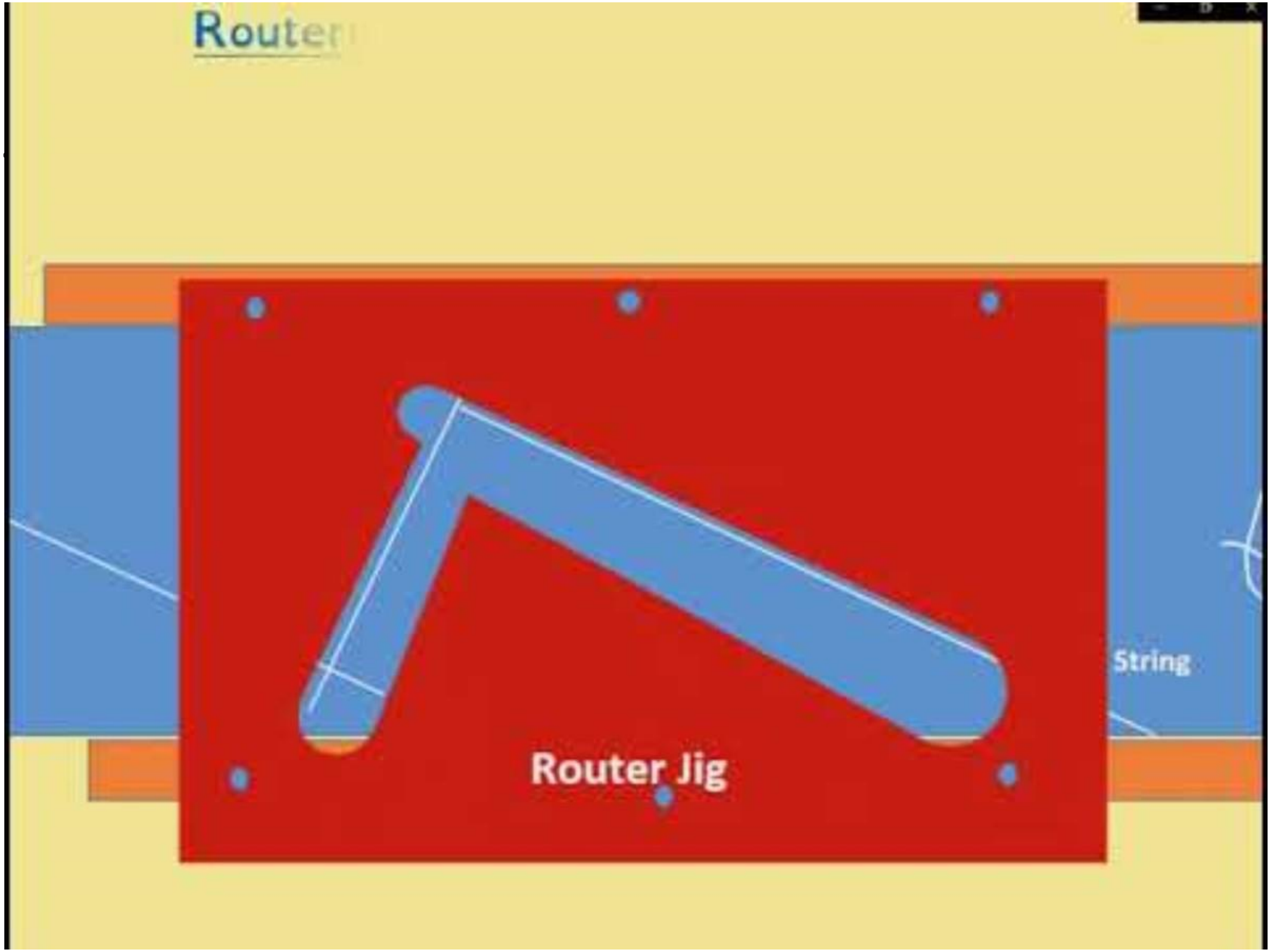




HOW TO SET UP AND USE A STAIR JIG ROUTER TEMPLATE

This is an animated lesson on the process involved in positioning and determining the step (shift) distance when using a Stair Router Jig.

www.youtube.com


Router
String
Router Jig

Stair manufacturing using router jig

- Watch this step-by-step video on setting out and using a stair jig and router.

- Carpentry & Joinery Wigan & Leigh College (14.36 mins)

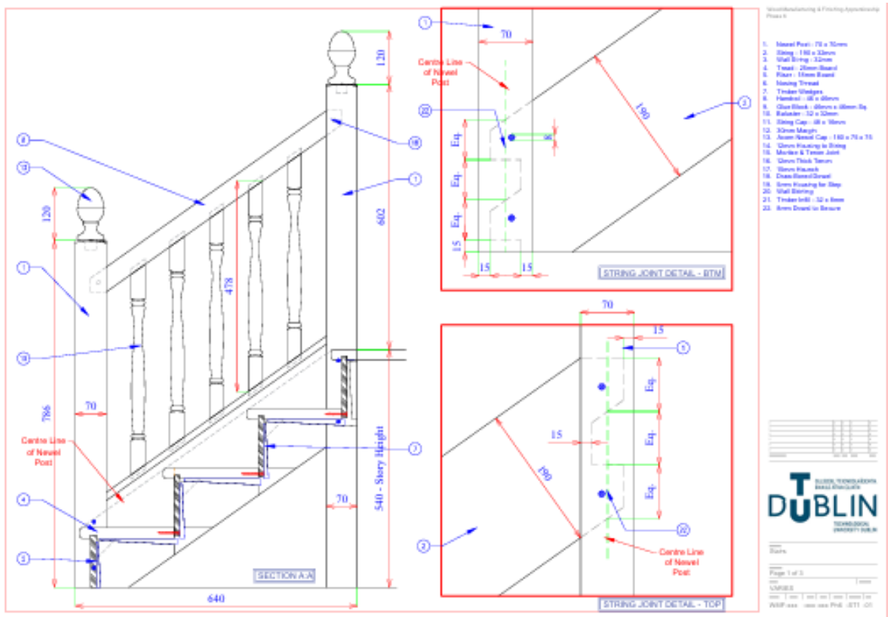
- https://youtu.be/BW29YddwogA?si=hry6cpk-ADLcuJVJ

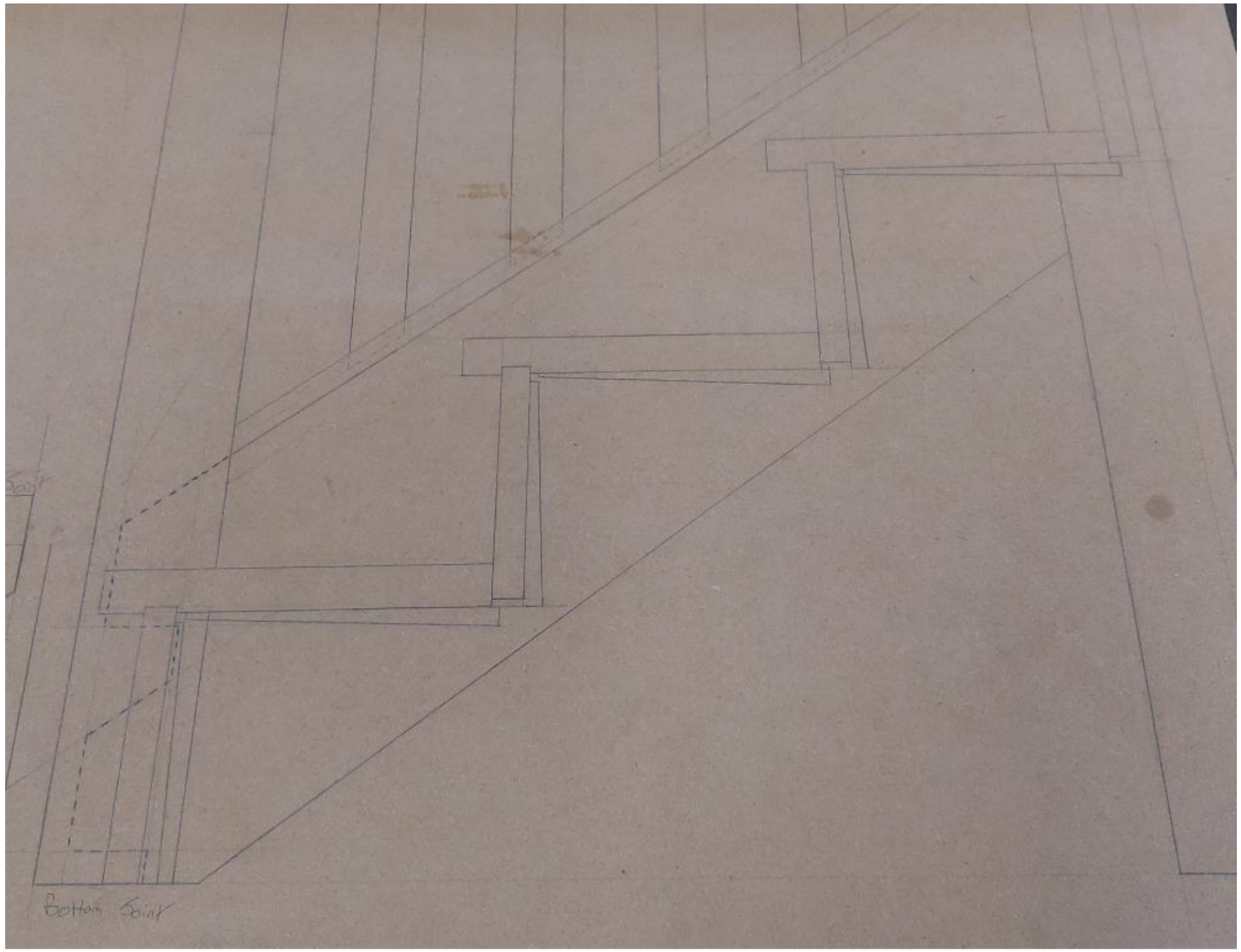

HODDER
EDUCATION

Setting out

- From drawings produce a full size setting out board.

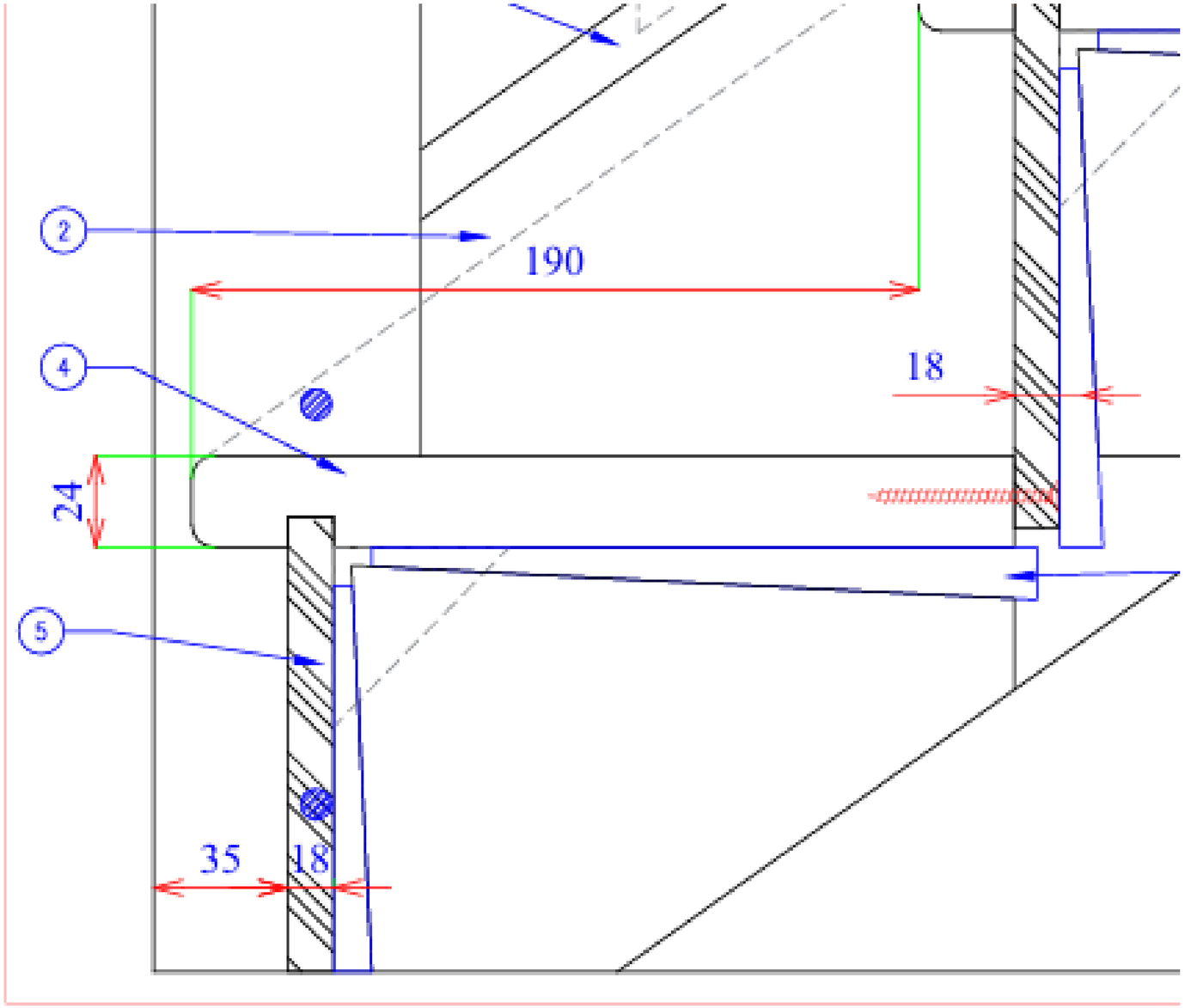
- You will be referring back to this board to check sizes.





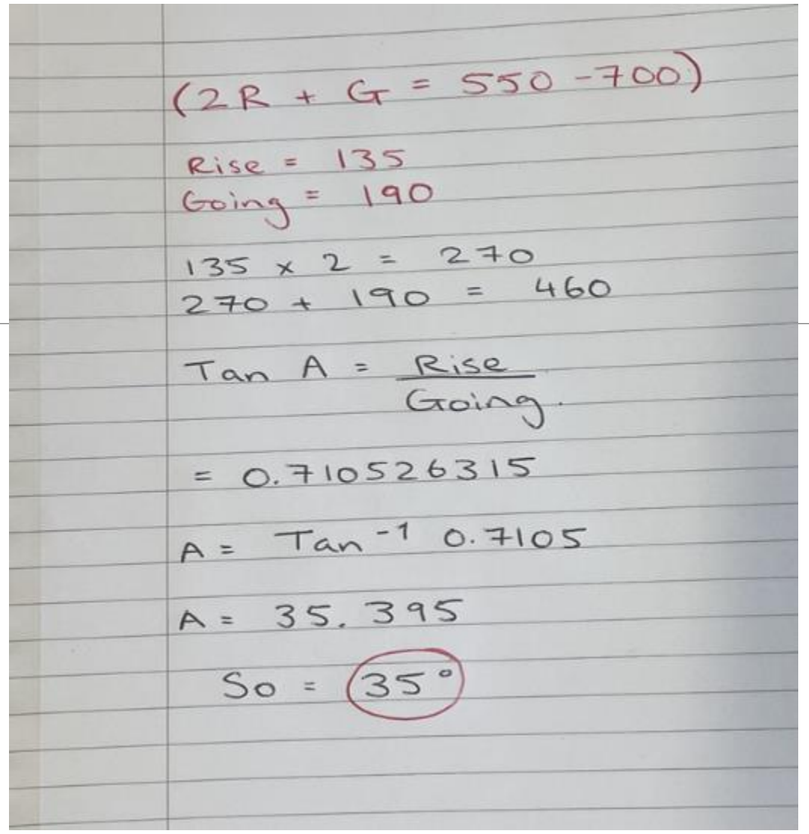
Setting out

- From drawings where is our starting point?
- What do we know?
- Check available material to determine sizes of tread and riser.

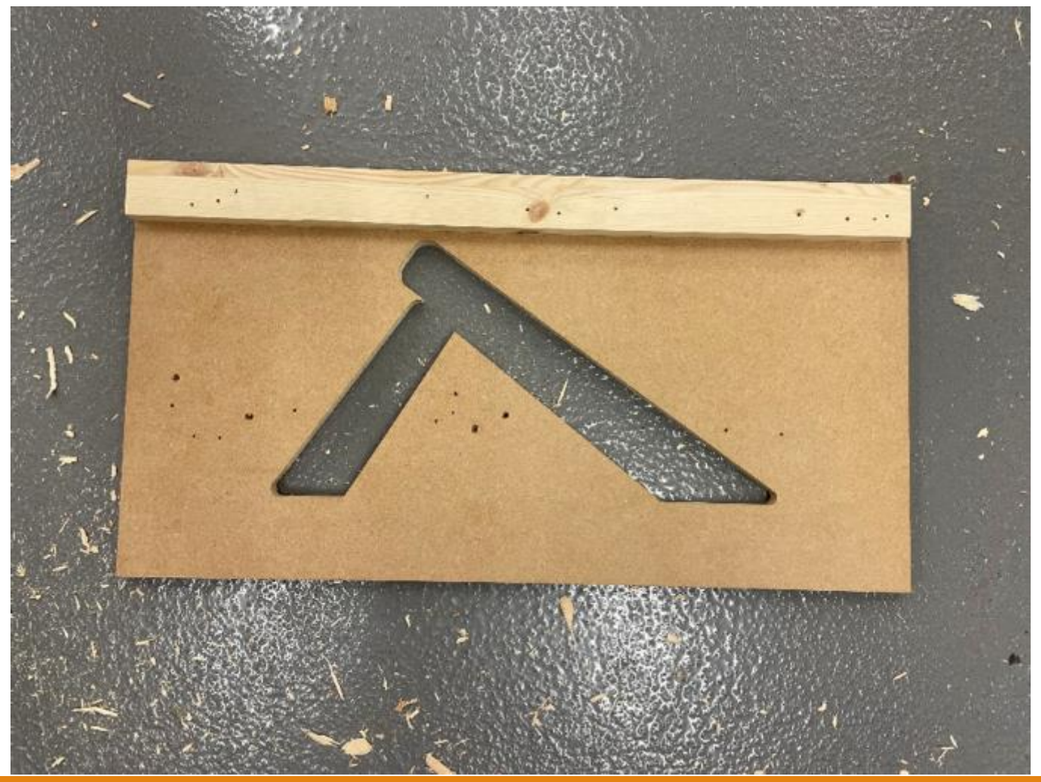


Jig Template

- Calculate the Pitch using maths.



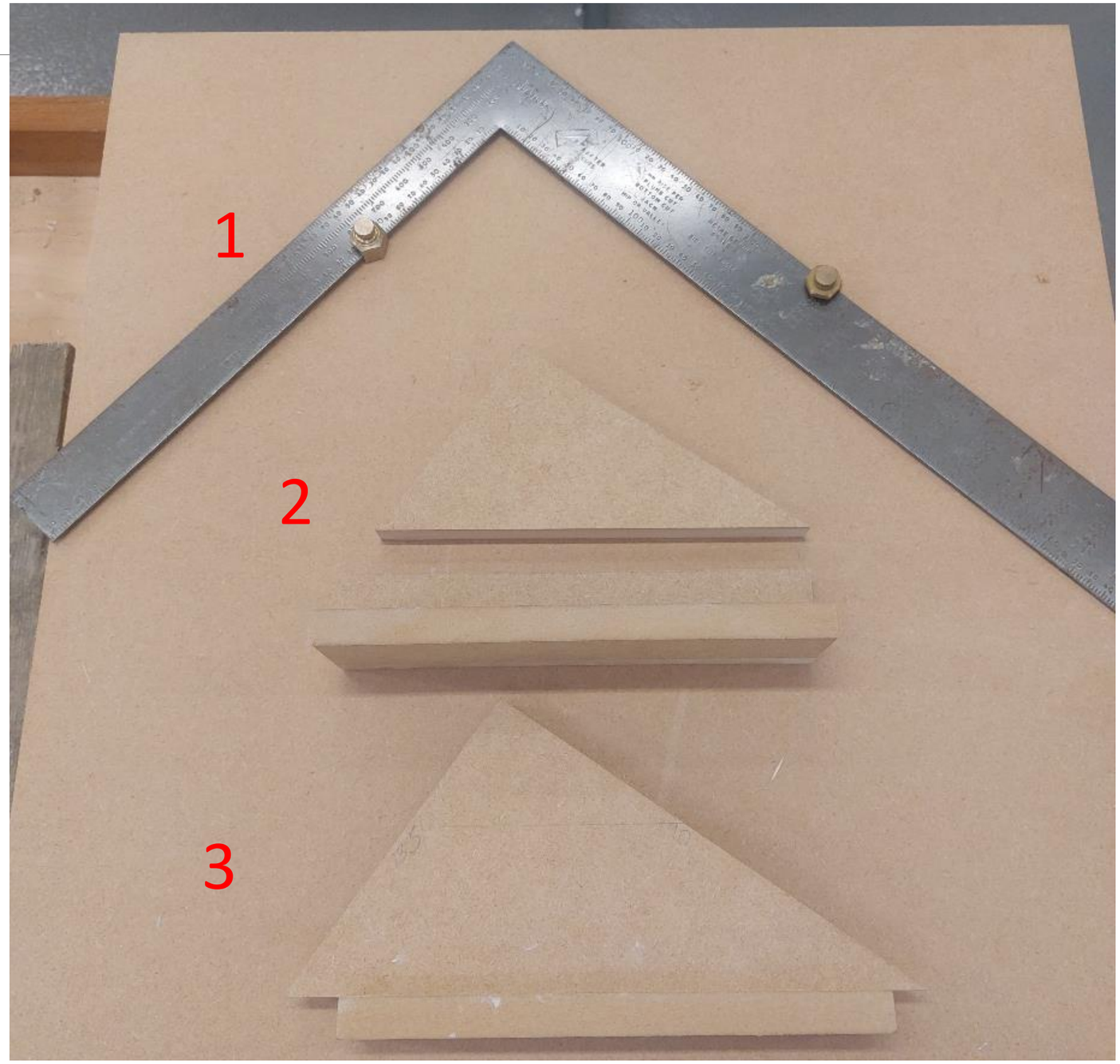
- Draw the template on Alpha Cam and machine out on CNC.



- Images by Jack lang

Pitch Boards

- 1: A roofing Square with stops.
- 2: A detachable pitch board.
- 3: Fixed pitch board
- In all methods you must allow for margin.
- What size is the margin?

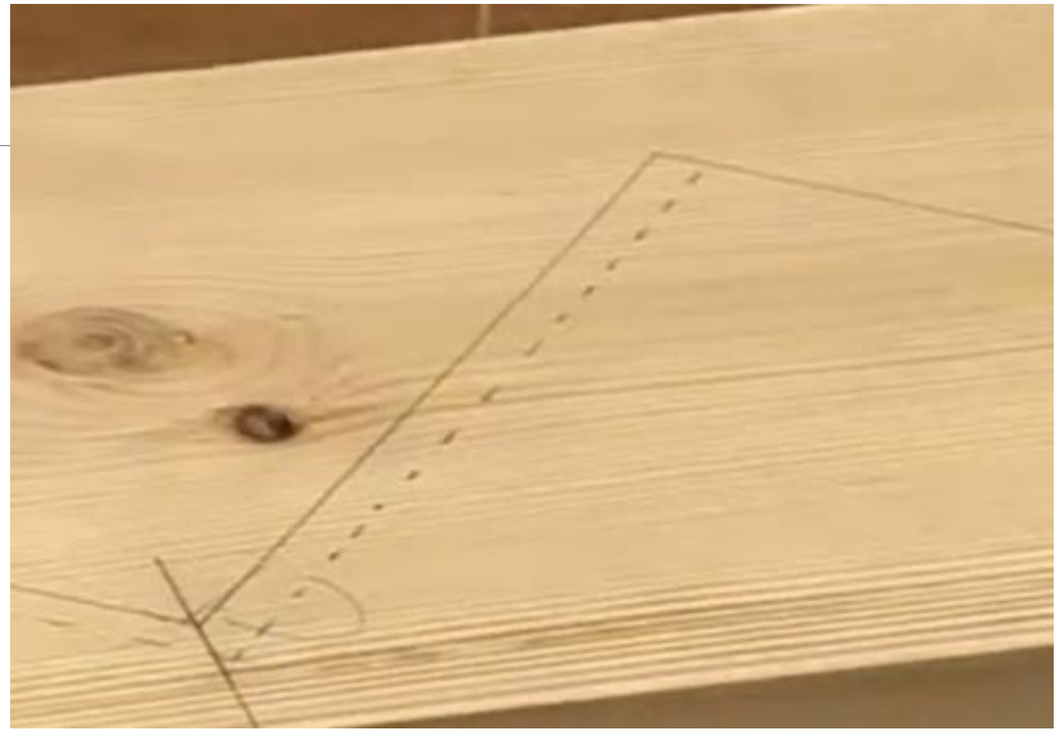


Marking out Strings

- 1: Start by drawing a face side and face edge on the strings.
- 2: Using the pitch board carefully mark out the steps.
- 3: Check that the distance between each point is equal.
- Transfer the points over to the other string and carefully mark the steps on the second string.
- Template below was produced on the CNC by Chris.

Router Strings

- Measure the distance from the cutter edge to the outside of the guide. This is the distance that you need to step off the tread & riser.
- Set up the template to align with these guidelines.
- Set cutter to 12mm below the jig (allow for thickness of jig)
- Images from Hodder Video



Router Strings

- 1: Repeat the process for the second string.
- Remember to create mirror image, not two the same!

1

- 2: One string will be housed between the newel posts.

- Check the shoulder lengths etc. on the setting out board.

2

Tenons

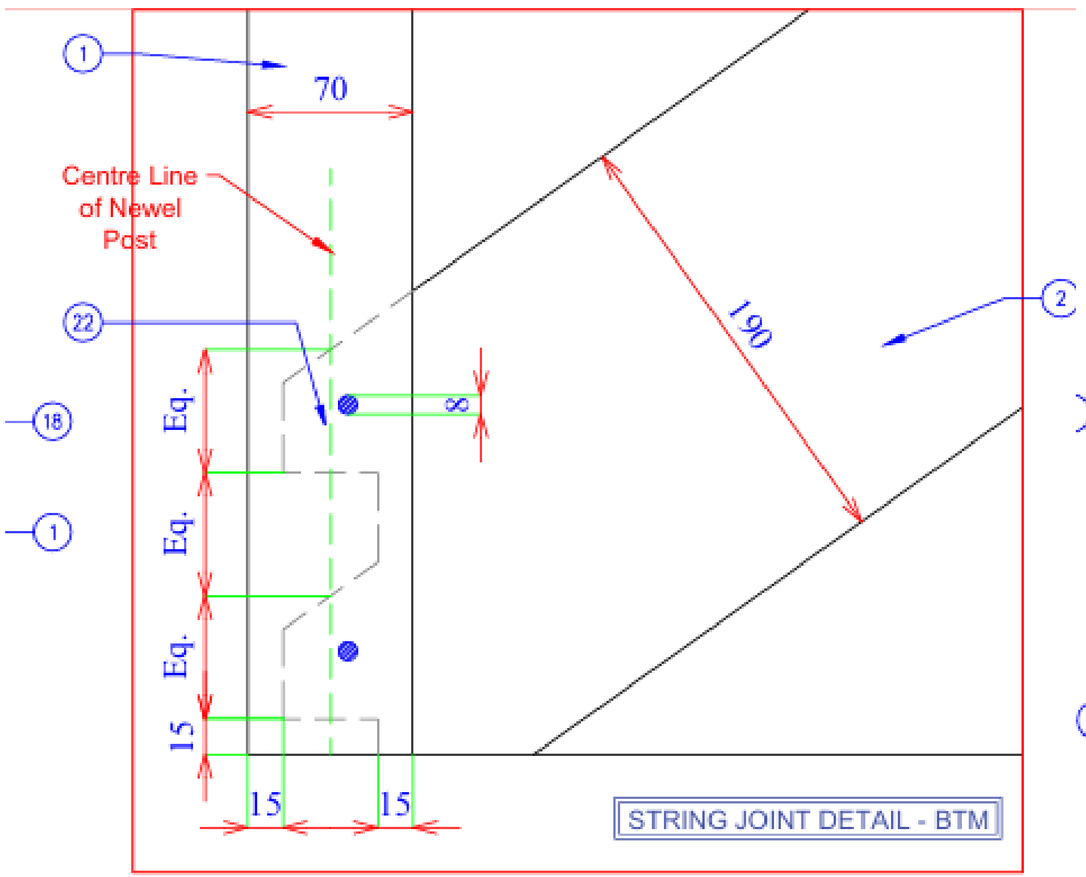
- Where should the front of the riser be on the newel post?
- 1: Mark the shoulder for the top tenon by stepping off half the width of the newel post ? from the front of the riser.
- 2: Mark the shoulder for the bottom tenon by stepping off half the width of the newel post ? from the front of the riser.
- Set the tenoner to what angle?
- Cut both tenons on the tenoner.

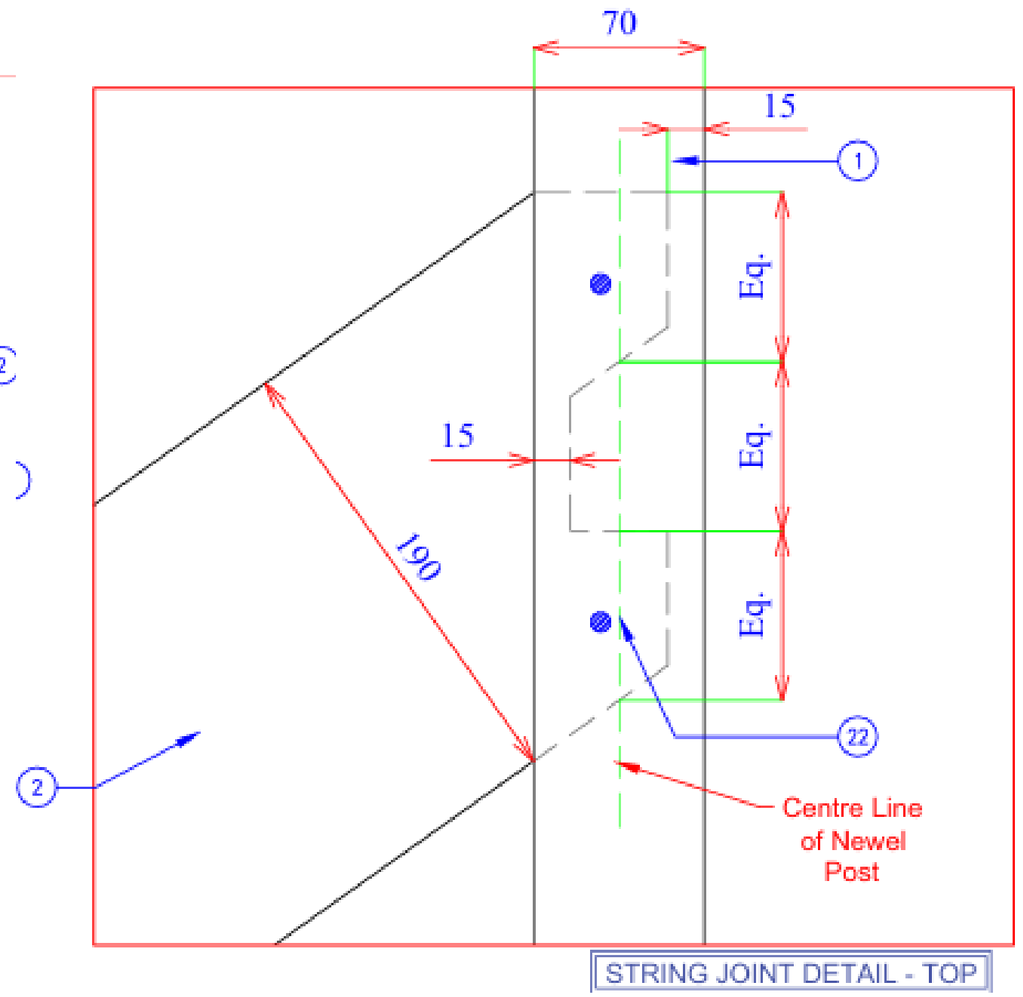
1

2

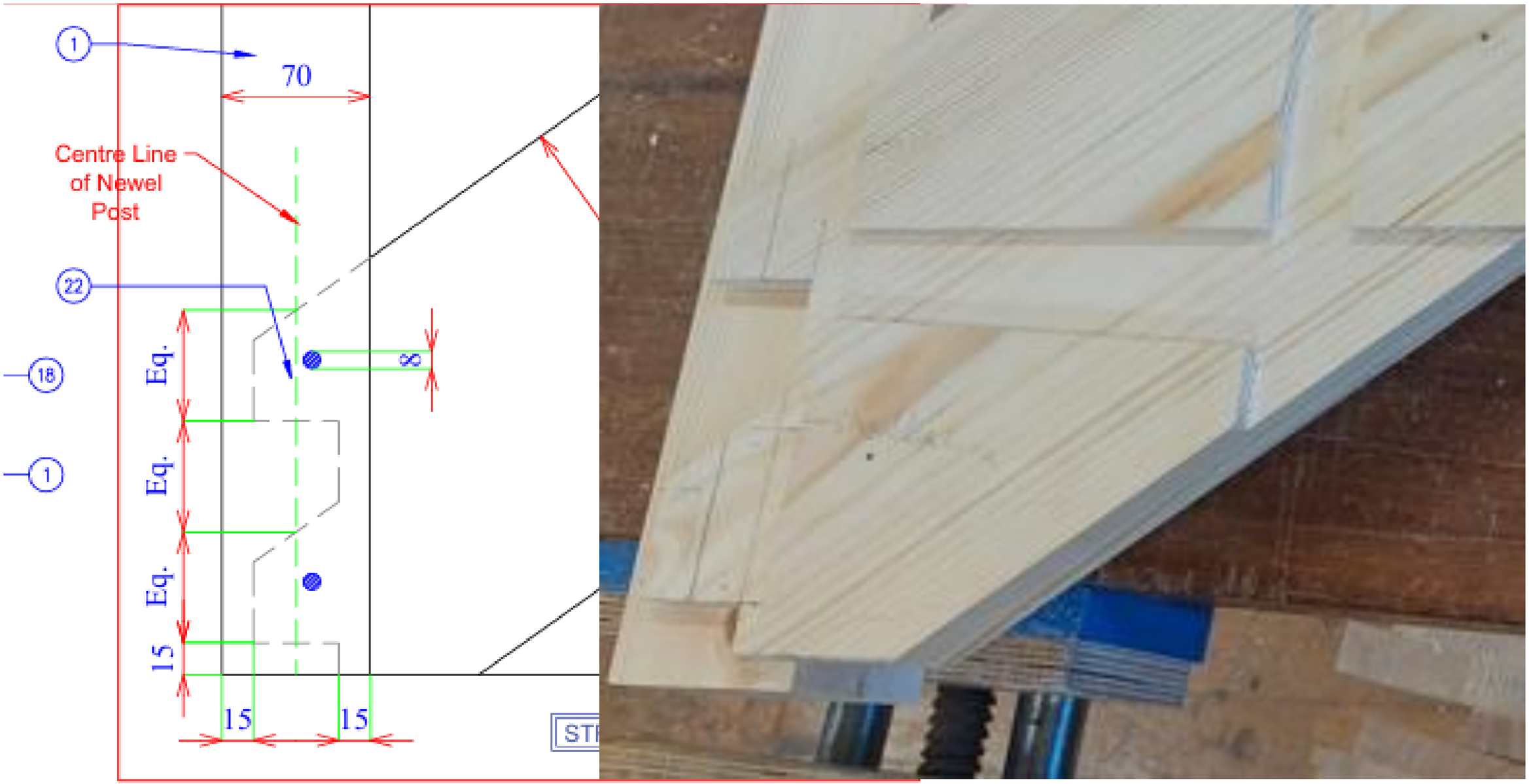
Mark Tenons

- Mark the size and shape of the tenons on the top and bottom of the string. Look at the drawings and setting out board.

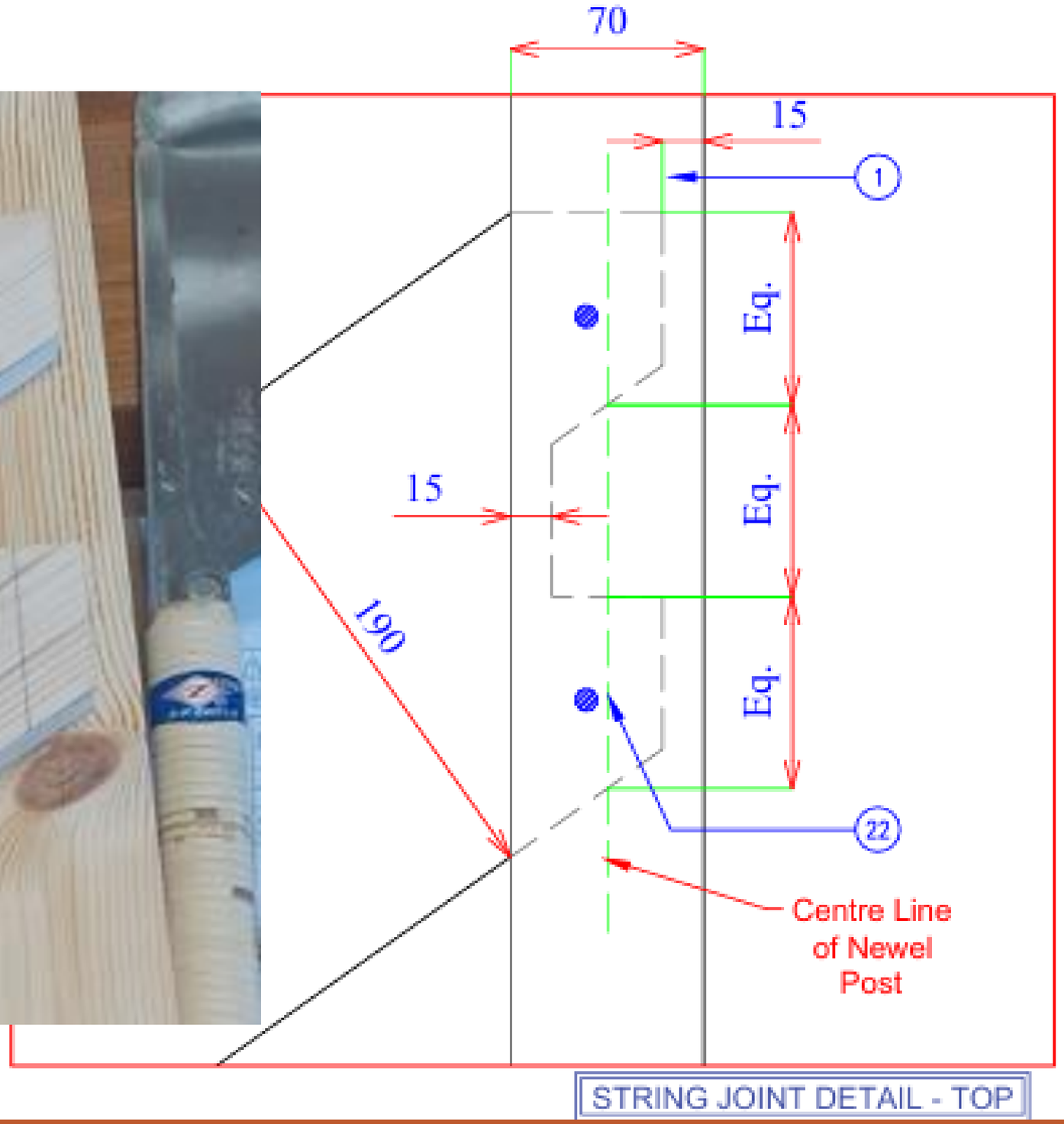




Mark Bottom Tenon



Mark Top Tenon



Mortice Joint at Newel Posts

- 1: Mark mortices on top and bottom newel posts.
- 2: Mortice the haunch and straight mortices then tilt the newel to mortice at an angle.
- Use pitch board for support.

1

- Mark position of dowel holes drill newel posts.

2

Draw Bore Joint

- 1:Fit the strings back into the newel posts and using the drill bit point, mark the tenon.

- 2:Offset the point on the tenon by 3mm and bore the holes for the dowels.
- Repeat for the handrail joints.

- Sand all components and glue joints, fit together and hammer in the dowels to draw the shoulders to the newels.

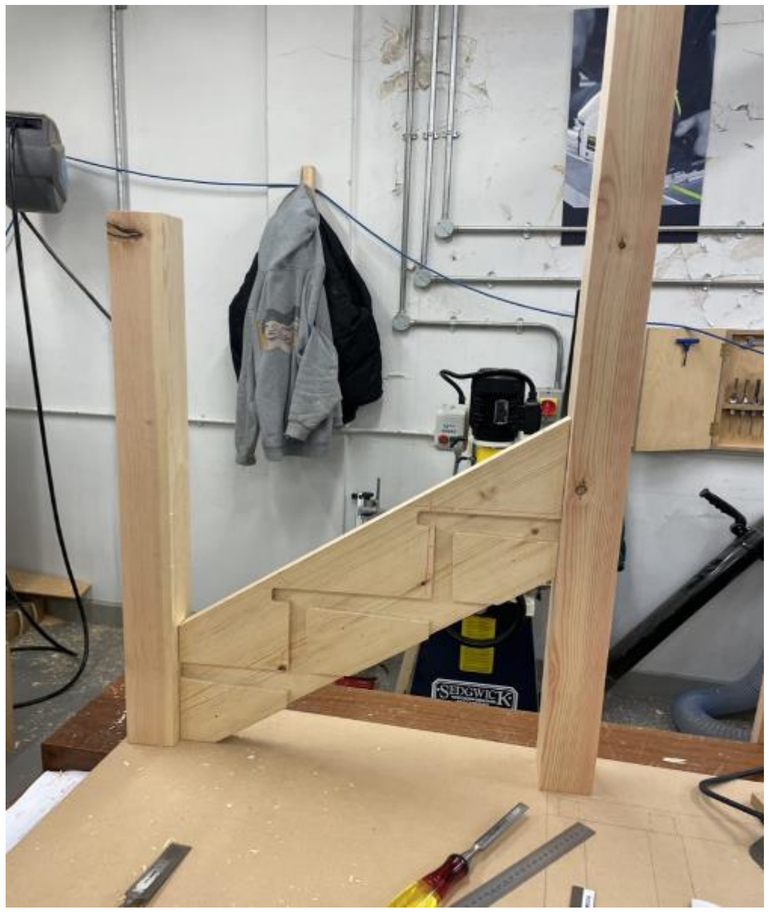
1

2

3

Stair Construction.

Mortising newel posts

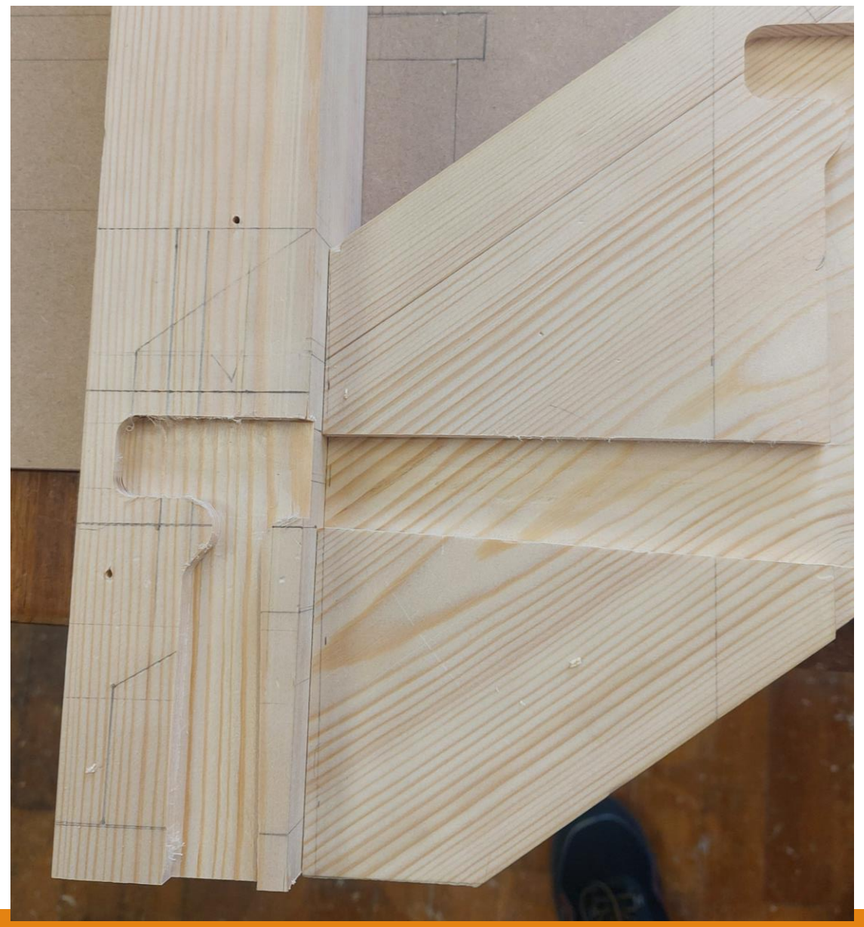


String in newel posts

- Images from Jack Lang

Routering Newel Posts

- 1: Carefully mark the position of the top step on the newel post. Mark the off set for the jig and position jig onto newel post.
- Secure jig and router out for tread and riser.
- Repeat for bottom step.



2

1

Stair Construction.

String and handrail glued into newel posts

Balusters glued and pinned in with spacers

- Images from Jack Lang

Manufacture

- The use of a step assembly jig will guarantee that the riser and tread are at a right angle to each other

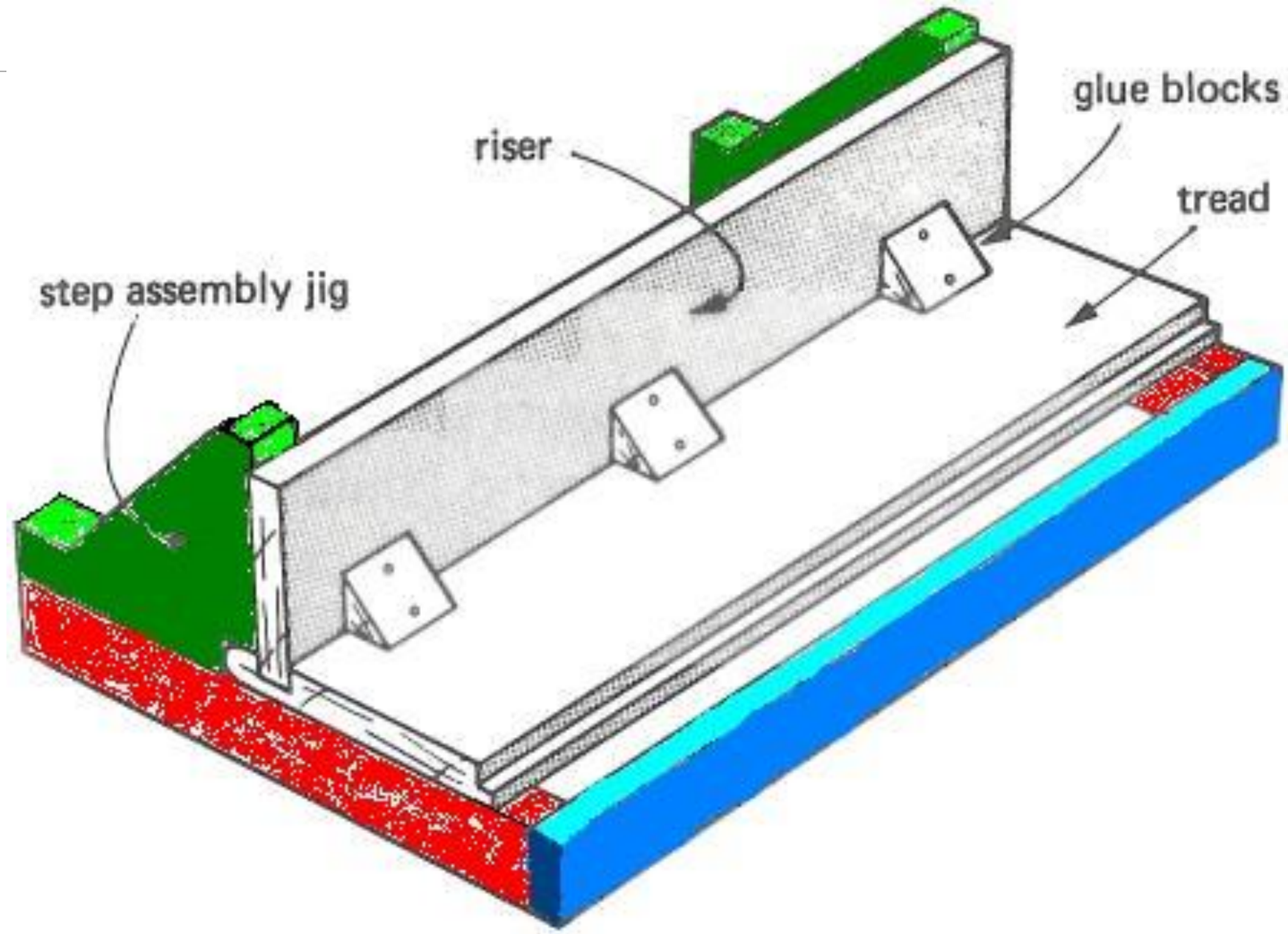
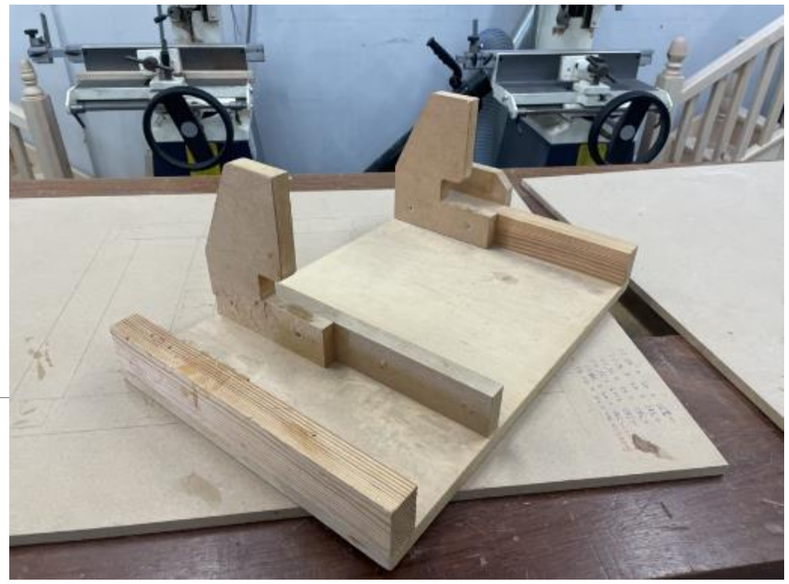


Figure 220 *Step assembly jig*

- Image taken from *Carpentry and Joinery for Building Craft Students 2* by Peter Brett

Router Strings

- Using a jig for step assembly will ensure that the riser and step are at 90° to each other. They are reinforced with pinned angle blocks.



Jig for step photo by Jack lang

Thread with groove sitting in jig

Note that ends are kept flush with MDF guide

Assembled stairs photo by Jack lang

Stairs

The method chosen for joining step to step will dictate whether the stairs gets assembled from the top down or the bottom up

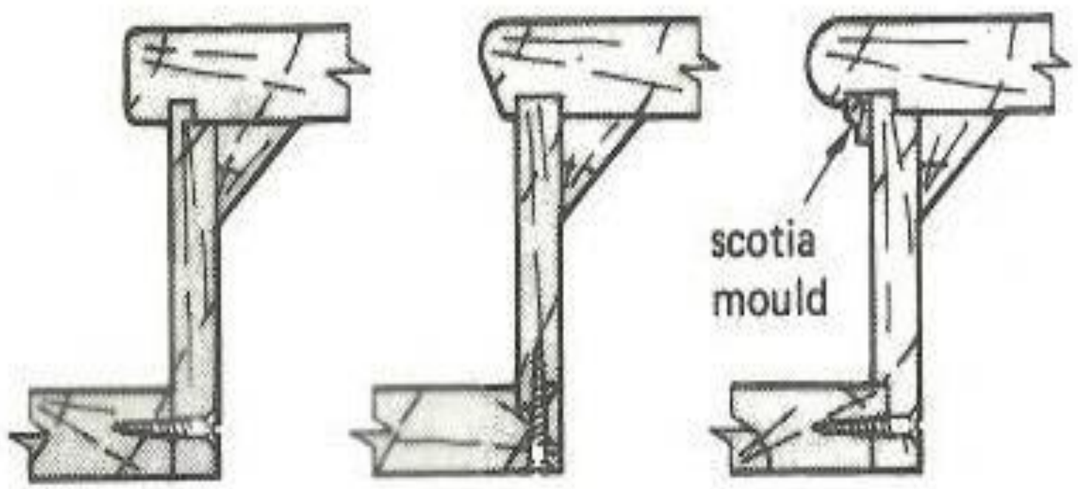


Figure 219 *Tread and riser details*

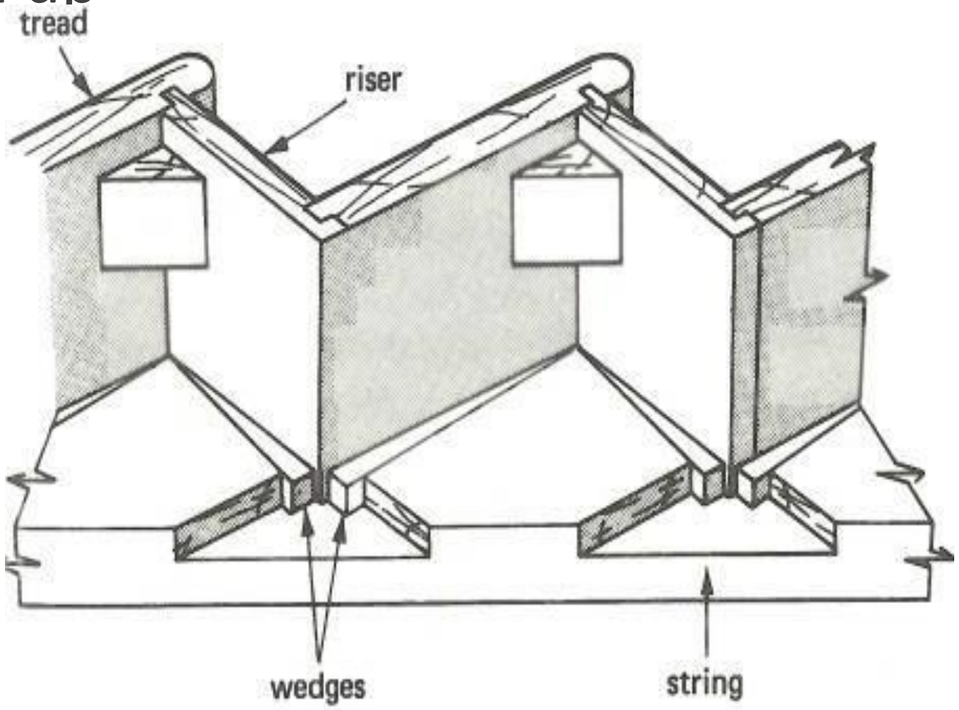
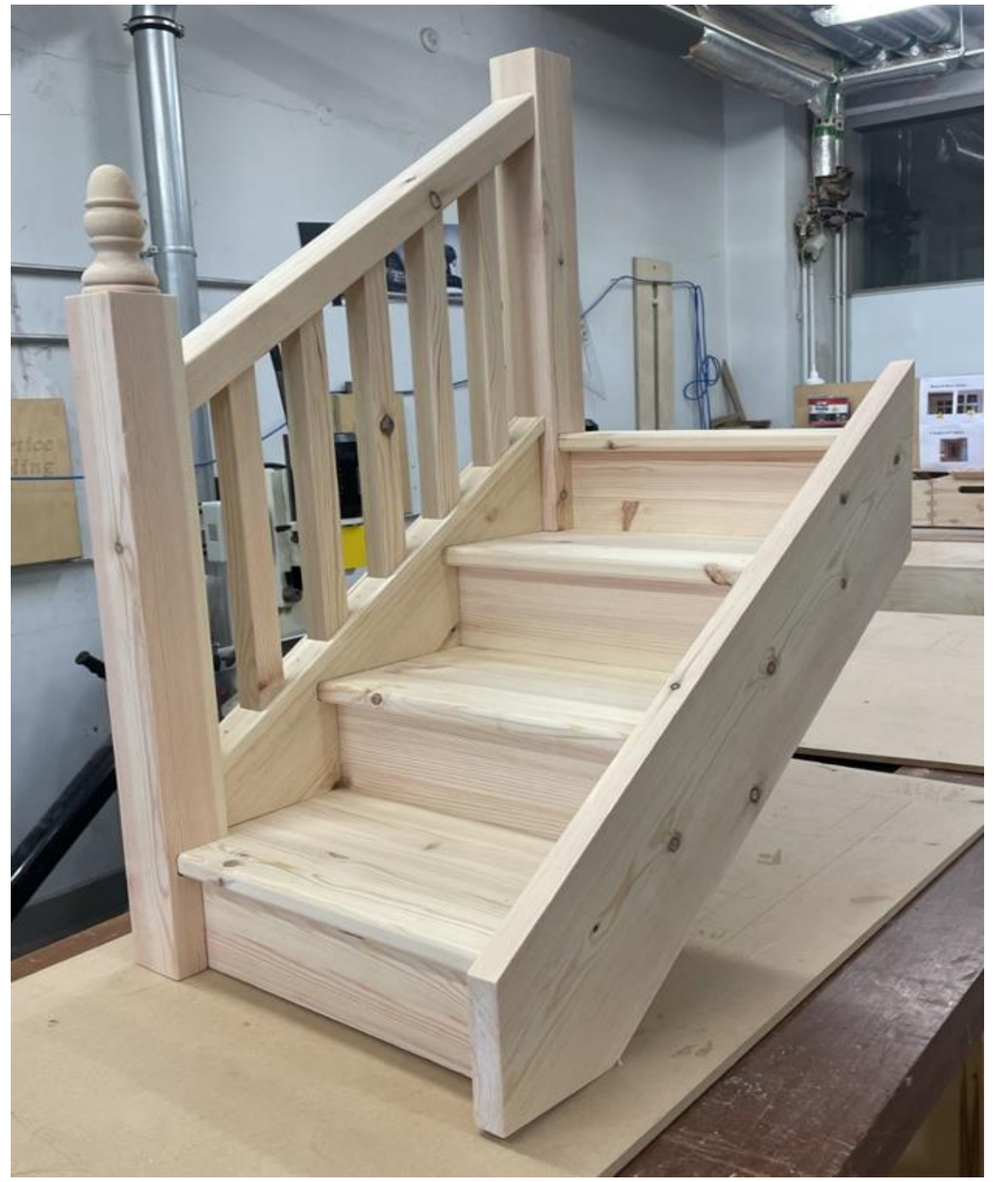


Figure 221 *Fixing of steps into string*

Images taken from *Carpentry and Joinery for Building Craft Students 2* by Peter Brett

Stair Construction.

When wedging it is important that the wedges fit in snugly to both the riser and the tread and do not protrude past either one.



Finished stairs by Jack Lang