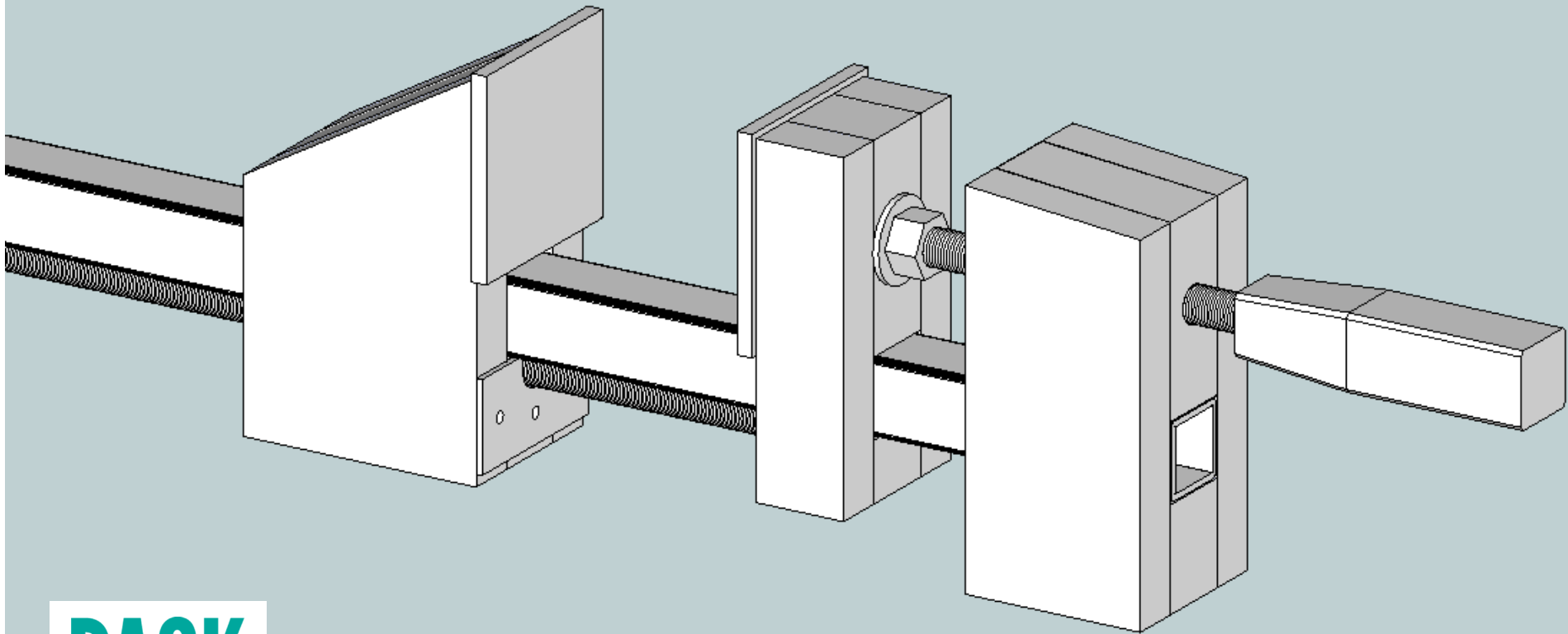


# HOMEMADE BAR CLAMPS



These clamps are an easier to make version of steel clamps I made a while ago - unfortunately I didn't make plans for those clamps but these plans could be of help if you wanted to make the steel ones. These clamps, while not being quite as heavy duty as the steel clamps, still have plenty of clamping pressure for any glue up and they should still last for years.

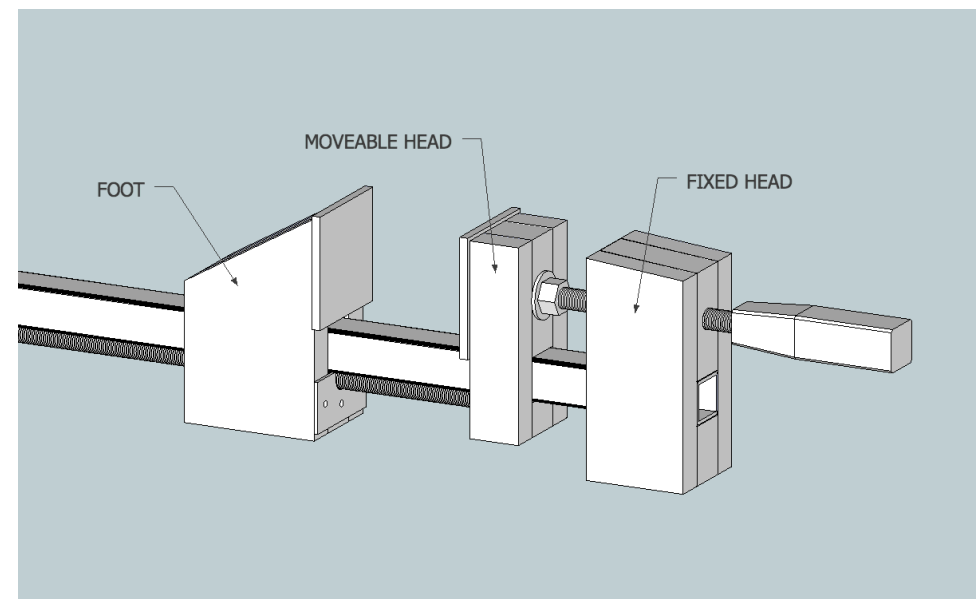
When I usually make something I make a rough sketch that wouldn't be intended for anyone else to work off but makes sense to me. So this is the first time I've made plans and also the first time I've used Sketchup so forgive me if I've missed something. Also please let me know if there are any mistakes so I can rectify them.

If you haven't already seen my Youtube video - it should also be of help - to find the video, my channel is PaskMakes. Also I have made an instructable at [www.instructable.com](http://www.instructable.com) where there maybe help from other instructable users in the comments.

I tried to do most of the work with basic tools, hacksaw, file etc rather than a grinder ( I enjoy this anyway - less noise). I did use my drillpress, tablesaw and bandsaw but those tasks could have been done with a hand drill and handsaw, jigsaw etc. I would think most people who need bar clamps would have at least some woodworking power tools though.

There are three main parts of the clamp (four if you count the bar), there's the 'Foot' which slides along the bar and houses the locking nut to grip the bar - the 'Fixed Head' and the 'Moveable Head'. That's what I will be naming these parts in these plans.

Please read the plans through before starting.



## MAKING THE BAR

The bar can be made to any length that you want.

The threaded rod under the bar needs to be 140mm shorter at the head end. The foot end can also be shorter too ( up to 60mm ) as the locking nut doesn't reach all the way to the end. This could help if you want to get the most out of a longer length of threaded rod to make several clamps.

After cutting the bar and threaded rod I used a good quality construction adhesive to glue them together. I eyeballed the and then got creative with weights, then left it overnight to dry.



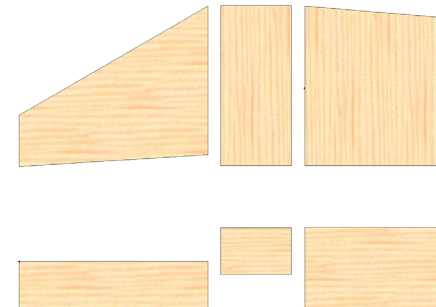
## CUTTING PARTS FOR THE HEAD AND FOOT

I made the sides out of plywood, this gives plenty of strength. I used 17mm thick ply but any size from 12mm upward would be fine. The center pieces that go above and below the bar need to be 26mm thick so I cut these out of construction pine on the tablesaw.

I cut the plywood and pine parts with the tablesaw and dropsaw, using the dimensions in these plans. I used the 1:1 template for the upper center piece of the foot and glued it to the pine, then cut it out on the bandsaw staying a little away from the lines and sanded up to the line. This was safer than cutting on the dropsaw and also more accurate. This one part needs to be correct for the clamp to work.

I have included 1:1 templates of all parts if cutting out with a bandsaw or jigsaw and sanding up to the line is an easier option.

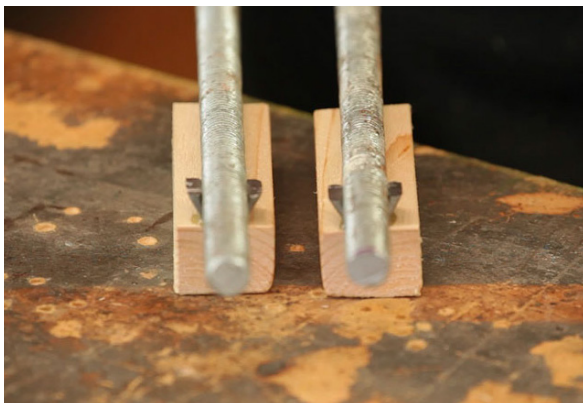
The grain direction needs to be observed with the center pine pieces.



## THE LOCKING NUT

The locking nut is what locks the foot onto the bar when the clamp is under pressure.

There was no need for power tools to cut the M12 nut in half, a hacksaw made fast work of it. I then used a small amount of 5 min epoxy to secure it to the lower center piece of the foot. I used a couple of pieces of threaded rod to weigh down the nut while drying. Also the rod helped to line up and center the nut, which I did by eye - amazing how accurate this is. The rod I used was the pieces we need later on for the clamp screw (200mm length).



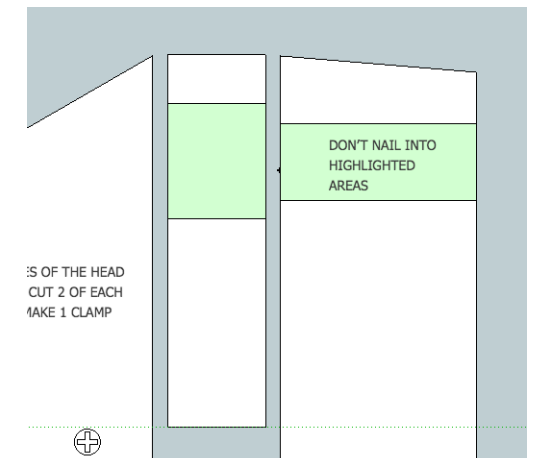
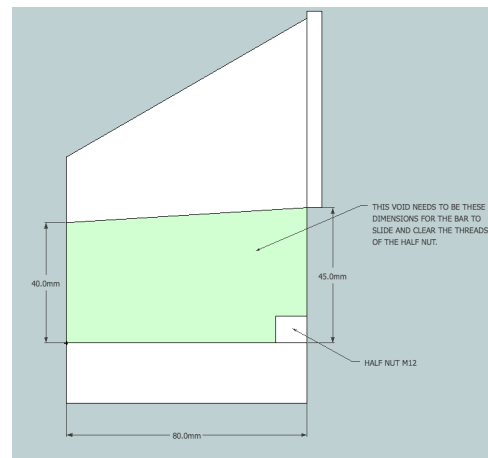
## HEAD AND FOOT ASSEMBLY

The foot needs to be fairly accurately put together. The measurements of the foot should be checked to make sure it is leaving the correct sized void where the foot slides along the bar while still clearing the locking nut.

The foot gets put together with woodglue and nails - also I put two woodscrews each side of the foot for more strength. The base of the foot is where most of the clamping pressure is directed. I used 40mm woodscrews, as they go over halfway into the foot they had to be slightly offset from one side to the other.

The fixed head and moveable head were assembled around a piece of bar with wood glue and nails. As well as nailing I also clamped the fixed head to close up the gap as much as possible - the void left for the bar is 26mm, the bar 25mm. Later this gets glued in place with epoxy - the clamps close the gap a little more than just nailing alone.

Don't make the same mistake I did - pay attention to where I've highlighted not to put any nails. As they will interfere with drilling into the head later on.

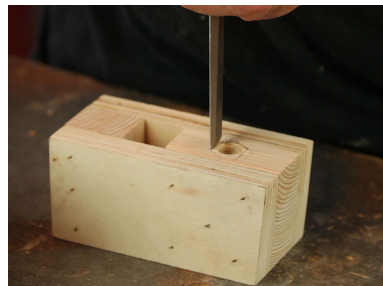


## DRILLING FOR THE CLAMP SCREW

A recess was drilled in the moveable head for a nut on the end of the clamp screw to turn in. The recess needs to be wide enough to fit an M12 washer and deep enough for the washer and a nut to turn freely. The washer I used was 35mm so I drilled a 38mm hole with a forstner bit and 15mm was the depth I went to.

After drilling the recess, I drilled a through hole for the clamp screw - I used a 12.5mm bit. I then clamped the moveable head to the fixed head and drilled through the moveable head a short way into the fixed head to mark where the hole needed to be. Then removed the clamp and drilled the rest of the way through.

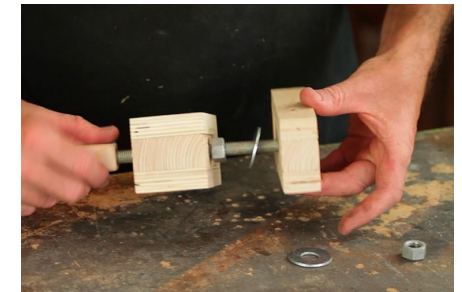
Next I put a M12 nut on a piece of threaded rod and put it through the fixed head and marked around the nut with a pencil. Then I chiseled out the marked area for the nut to live.



## HANDLE AND CLAMP SCREW

After cutting a length of 25mm square stock I cut 100mm off for each handle. Then I marked the center and drilled down around 60mm with a 10.5mm drill bit. The hole was then tapped with a M12 tap. Alternatively the hole could be drilled wide enough to accept the threaded rod and then epoxied in but I've found in the past that it can still slip. A bit of shaping and sanding to make the handle more comfortable to use. I then used epoxy to glue the handle to the clamp screw (M12 threaded rod 200mm long).

A M12 nut needs to be glued with epoxy into the recess that we chiseled out. For the assembly the clamp screw needs screwing through the fixed head, then a nut and washer needs putting on the rod before pushing through the moveable head. A washer then needs to be added to sit in the recess of the moveable head. Epoxy is then added to the end of the rod, being careful to get just enough on, to glue the nut in place without getting it all over the rest of the threads. The nut between the two head pieces then gets glued in place tightening the nut up to the moveable head, just enough that the clamp screw can turn without being too sloppy.



## HEAD ASSEMBLY

This is an easy task of gluing the bar onto the fixed head. I used a decent amount of epoxy - I originally planned on putting a bolt through the head and bar but I realised this wasn't necessary.

If you wanted the head to be removable, to use on longer bars, you could skip the epoxy and just bolt the head in place.



## REINFORCING THE LOCKING NUT

I used masking tape to build a barrier around the half locking nut, so I could build up epoxy around it to add some strength.



## FILLING AND SANDING

Not necessary but if we're spending the time to make the clamps, we may as well put some effort in and prepare them for a coat of finish.



## CLAMP PADS

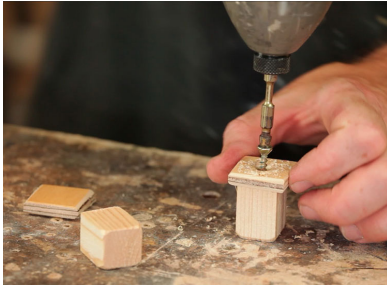
I cut the clamp pads out of 7mm ply but you could use almost anything. The pad on the head is 65mm wide by 70mm high, the foot needs to be 5mm shorter in height, 65mm x 65mm. The pad on the foot needs gluing in place so the bottom of the pad leaves a 5mm gap above the main bar. The pad on the moveable head can sit on the bar.

Use the clamp to clamp the pads in place.



## END CAPS

The end caps are to stop the head from sliding off the bar. They were made by cutting a piece of pine slightly larger than the internal measurement of the main bar, a cap screwing on and then hammered in place.



## AN EXTRA STEP

At this point I finished the wood with Linseed Oil and thought I was finished.

Then, while giving them a work out the locking nut began to fail - it wasn't adhered to the base of the foot well enough.

I didn't have this problem on my steel clamps as the nut was welded in place and was going nowhere.

My theory here, is that most of the force on the nut is vertical pushing it into the bar - but I found that there is enough force sliding the main body of the foot slowly (very slowly) backwards off of the locking nut.

I thought the epoxy was going to be strong enough. I even used higher strength, not 5 minute epoxy, and left it overnight. Maybe I didn't leave it long enough but I still think it would have failed.

I made a prototype before I made my original bar clamps and I hot glued the half nut in place and that actually worked very well. I don't think that would be a good long term solution though.

So after a little thought I added a small plate to the foot, under the bar. This stops the nut from slipping out of place- it acts like a hook, catching on the nut. It's disappointing that this extra step is needed but it only took a few minutes to make the plate (a short piece of 30mm flat bar). Now it works as it should. There is only a small amount of horizontal force but the nut should still be reinforced with epoxy (as in earlier step) as well as the metal plate (which I glued on with epoxy and screwed to the foot). The plate should be fitted before hammering the end caps on - I managed with the foot fitted but it would have been easier to fit beforehand.

Also the metal plate could possibly work with a piece of plywood instead - I didn't try it but if that's an easier option I'm sure it would work fine.



## FINISHED CLAMP

The finished clamp turned out great. Much easier/quicker to build and cheaper than my original steel clamps.

The M12 clamp screw is where I saved most on cost - the steel clamps used M16 threaded rod which bumped the price up a little (M12 threaded rod is much cheaper than M16). These clamps could easily be adapted to use an M16 clamp screw though, which I believe would add to the life of the clamp with its coarser thread. But the M12 clamp screw will still last well as long as its not abused by putting more pressure on than needed - the threads could eventually strip out with careless operation. A glue up shouldn't need a crazy amount of pressure.

The steel clamps are certainly a little more heavy duty but these clamps use the same bar and are still a very strong and capable clamp with the same ease of use. They will last many years.

A rough price guide (Australian prices), I'm sure in many parts of the world these prices would be a fair amount cheaper - everything here is expensive.

The steel price is from a steel merchants rather than a hardware store. I buy steel fairly often so I always buy it this way - much cheaper.

25mm SHS (Main Bar) \$20 for 6.5m

M12 Threaded Rod \$9 for 3.6m

Plywood and pine (scraps or a small amount of each) \$not much

Nuts & Washers \$2 per clamp

Epoxy \$5

Construction Adhesive \$5

The cost depends on how many clamps you make.

From the above prices you could make six 80cm capacity clamps with the following :-

1 x 25mm SHS (Main Bar) \$20 for 6.5m

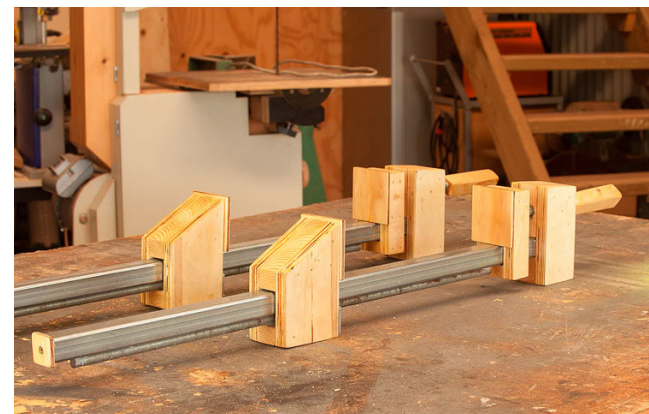
2 x M12 3.6m Threaded Rod \$18 for 7.2m

Nuts & Washers \$10

Epoxy \$5

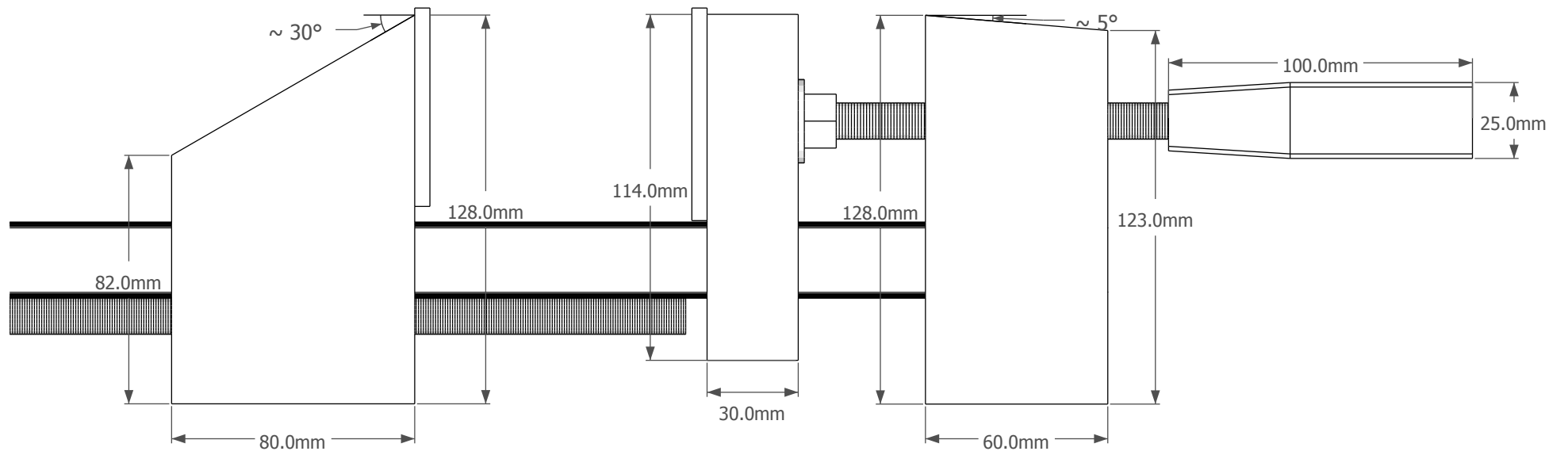
Construction Adhesive \$5

Total \$58 - < \$10 each





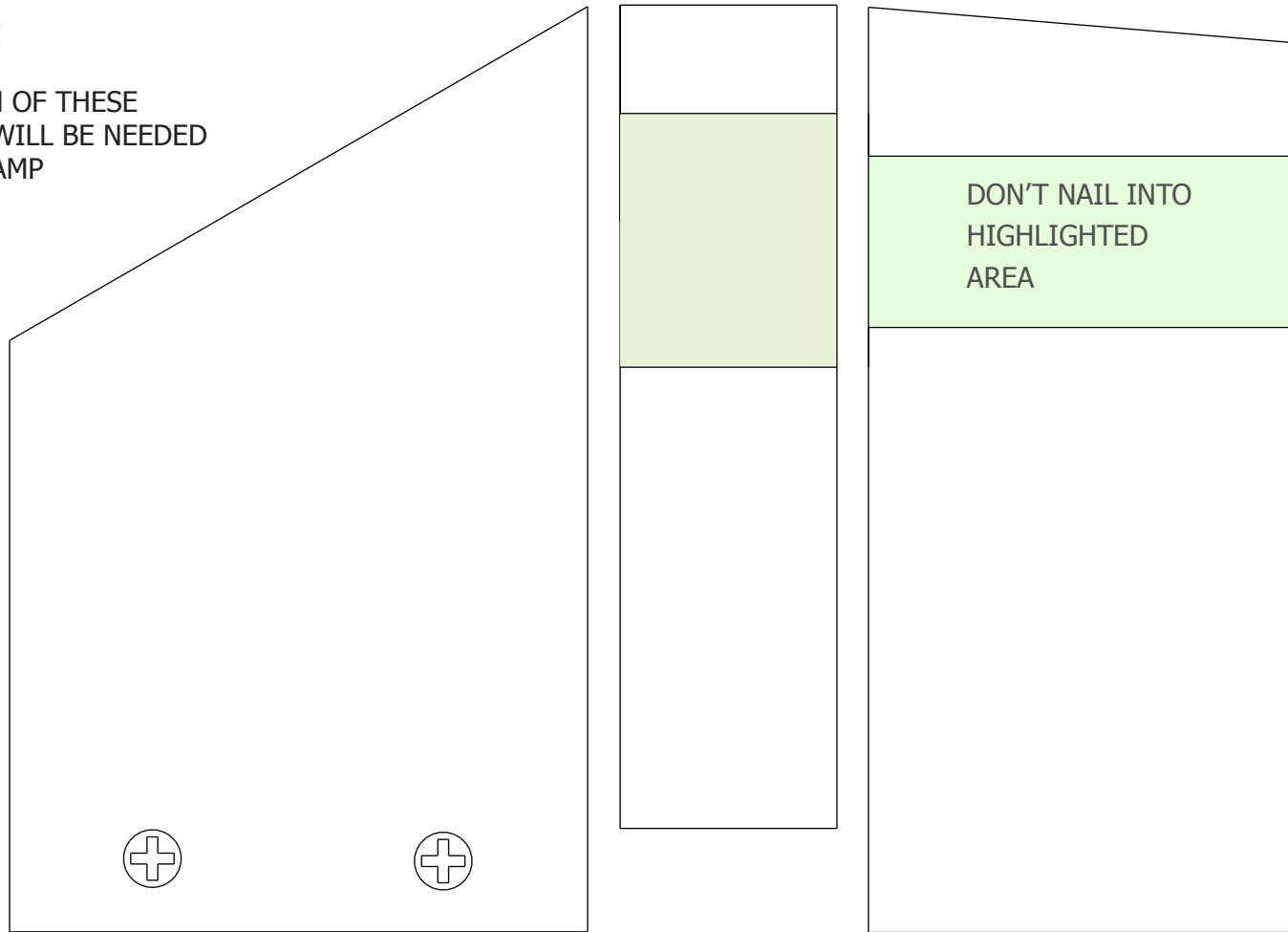
NOT TO SCALE



# PLYWOOD SIDES

1:1 TEMPLATE

TWO OF EACH OF THESE  
SIDE PIECES WILL BE NEEDED  
FOR EACH CLAMP

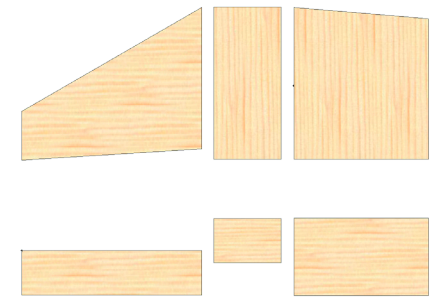
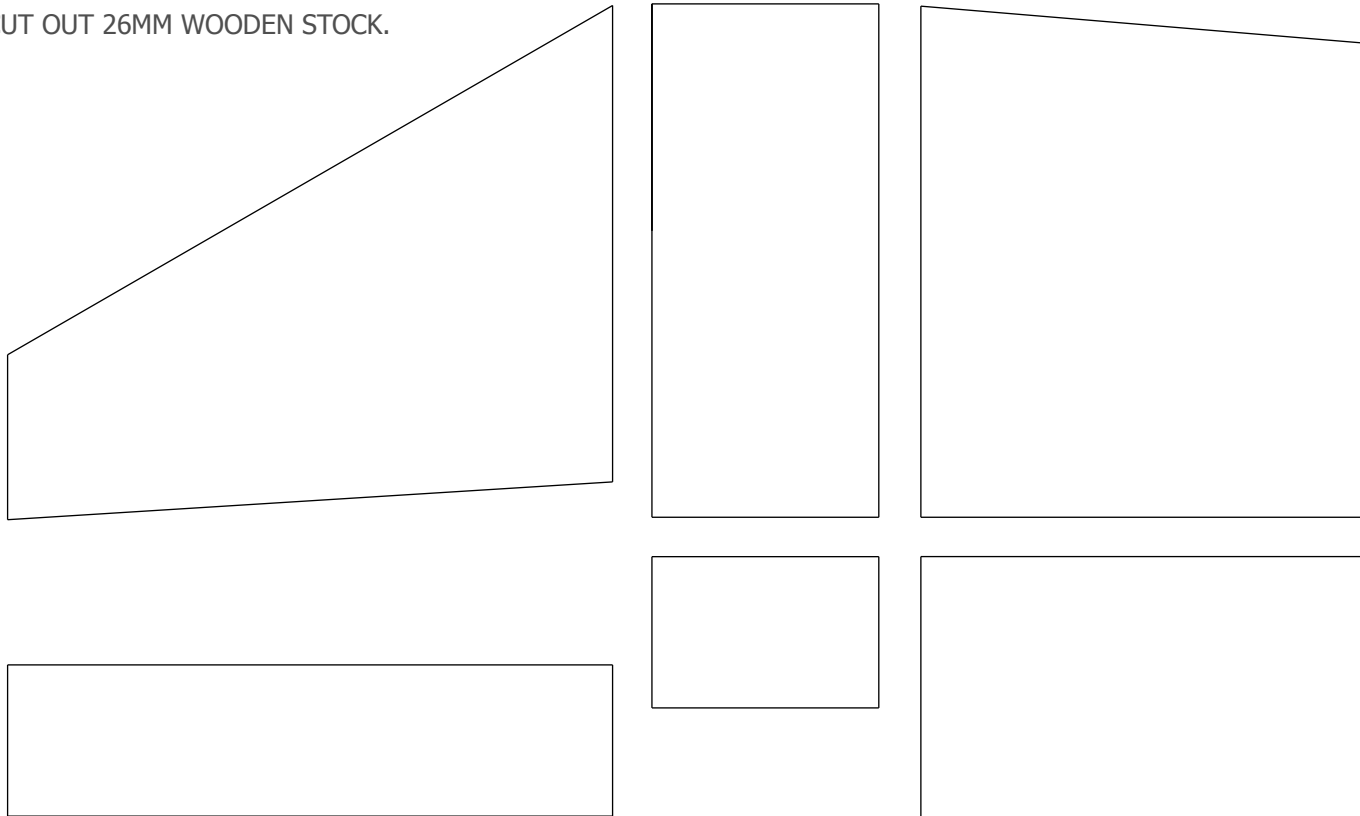


MAKE SURE 'PRINT TO FIT' IS TURNED OFF IN PRINTER SETTINGS.  
CHECK THIS SCALE AFTER PRINTING TO MAKE SURE YOUR PRINT IS 1:1



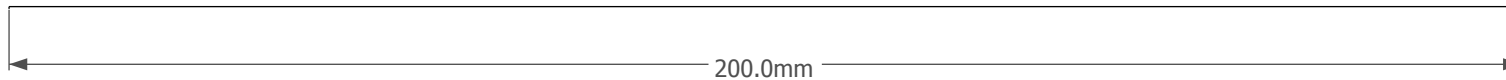
# CENTRE PIECES

THESE 1:1 TEMPLATES CAN BE GLUED TO AND CUT OUT 26MM WOODEN STOCK.



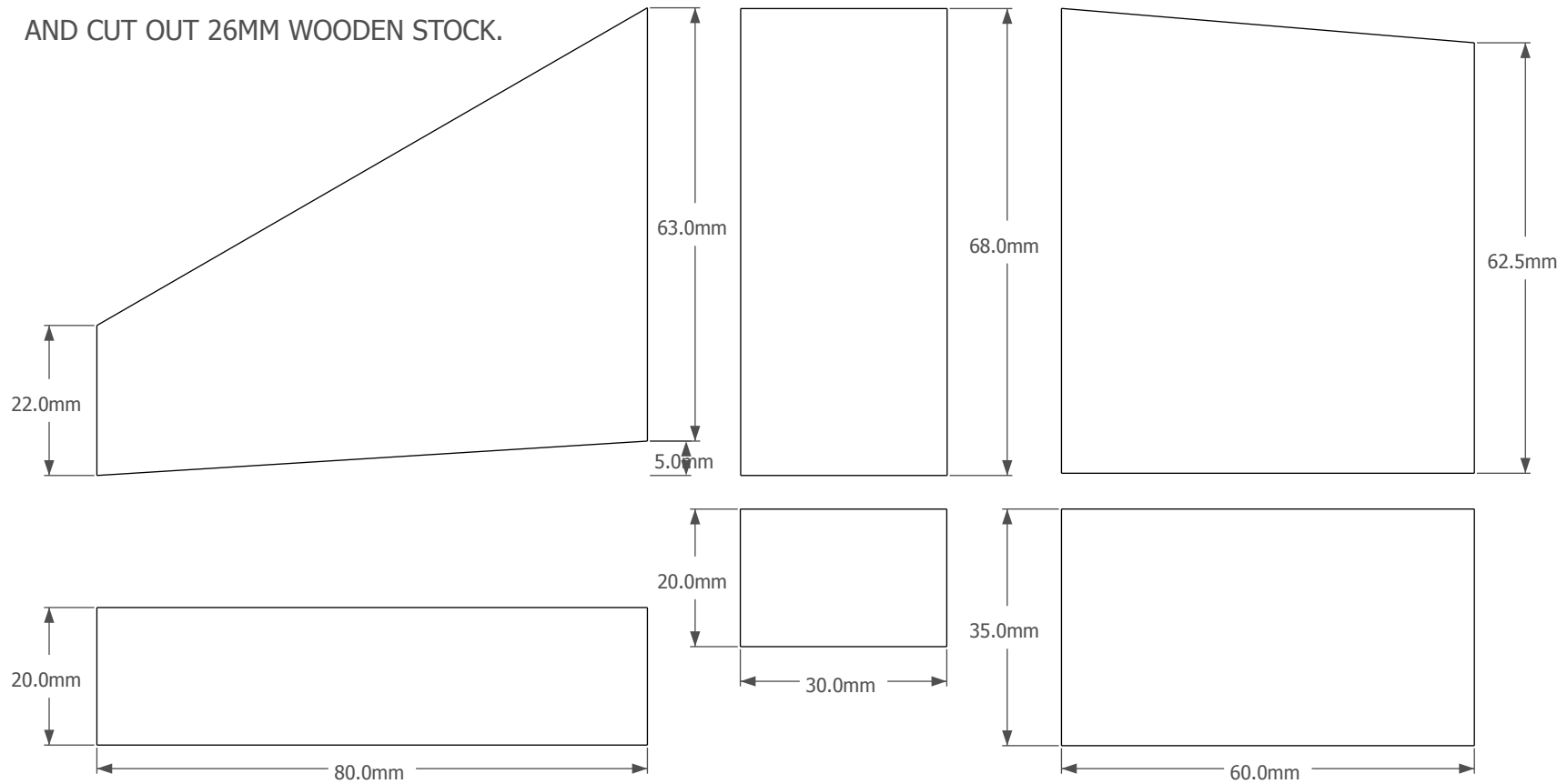
MAKE SURE TO OBSERVE GRAIN DIRECTION WHEN LAYING OUT

MAKE SURE 'PRINT TO FIT' IS TURNED OFF IN PRINTER SETTINGS.  
CHECK THIS SCALE AFTER PRINTING TO MAKE SURE YOUR PRINT IS 1:1

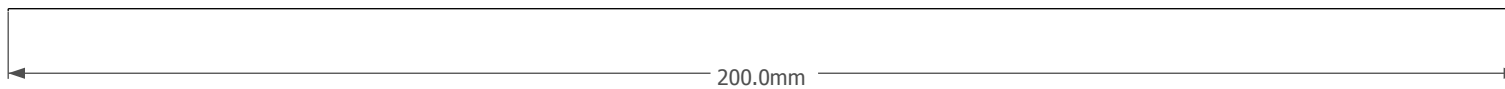


# CENTRE PIECES WITH DIMENSIONS

THESE 1:1 TEMPLATES CAN BE GLUED TO  
AND CUT OUT 26MM WOODEN STOCK.

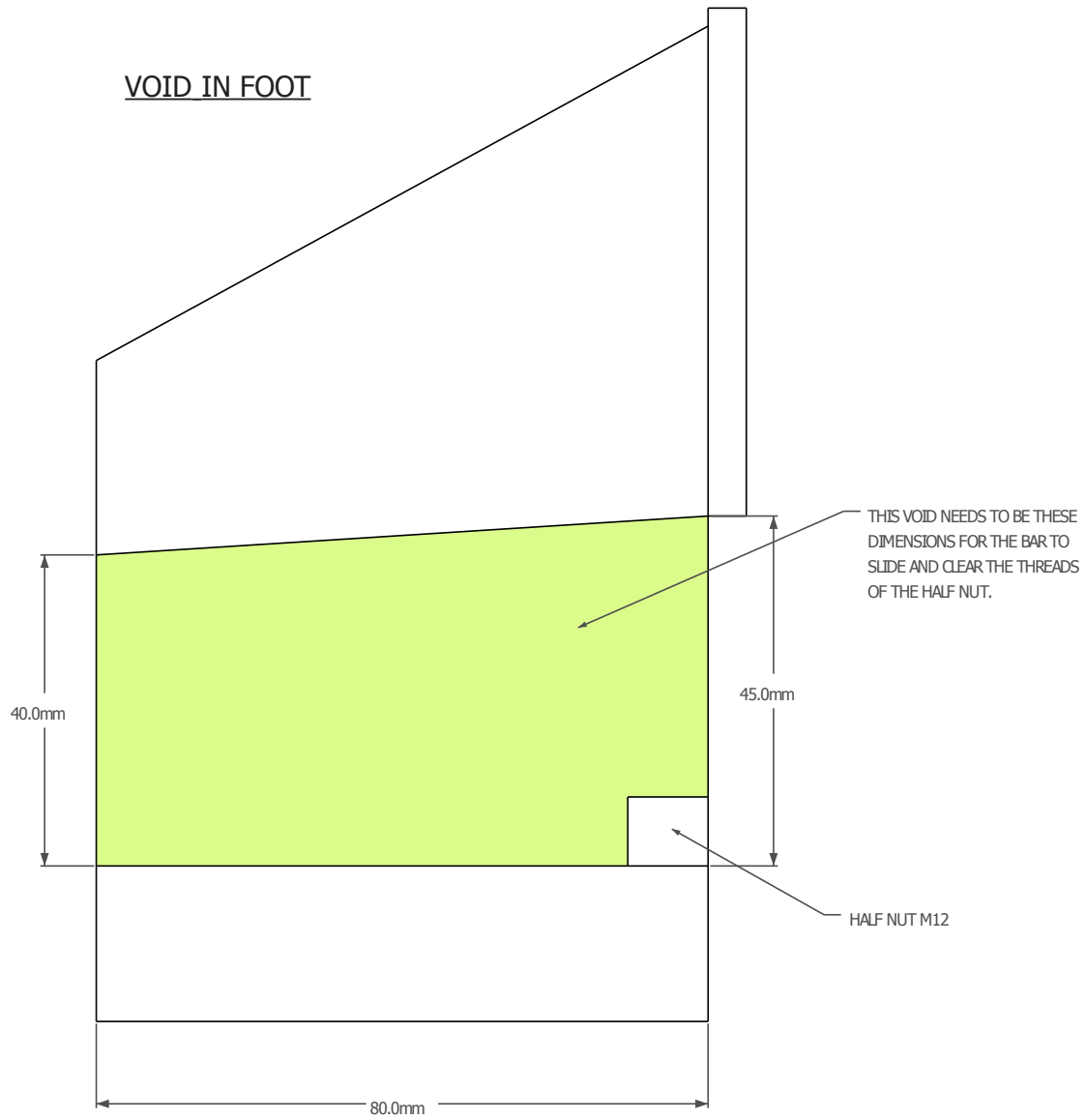


MAKE SURE 'PRINT TO FIT' IS TURNED OFF IN PRINTER SETTINGS.  
CHECK THIS SCALE AFTER PRINTING TO MAKE SURE YOUR PRINT IS 1:1



NOT TO SCALE

VOID IN FOOT



LOCKING NUT SUPPORT PLATE

