

Making Wooden Cleats

Method "A"

Planning and Design

1 Make a sketch of the size and shape of your cleats, then draw a pattern on stiff paper. The length of the horns should be six times the circumference of the line. The mouth of the cleat must be slightly larger than the diameter of the line so the line will pass through freely and not pinch. Plan the size and measurement of the bolt holes and mark them on the pattern.

2 Select the wood blocks for your cleats, choosing tight-grained hardwood such as locust, maple, ash or teak. Buy blocks that are slightly thicker than the width of your finished cleat.

3 Cut out the shape from the pattern, fold it in half to confirm that the two horns are symmetric. Draw a pencil line around the pattern to transfer the shape to the block.

Shaping and Finishing

1 Cut out the rough shape on a band saw or jigsaw. Take care that the blade is exactly vertical to the plane of the block so that both sides are identical.

2 Mark the location of the mounting holes making sure they are centered. Drill and countersink the bolt holes. A drill press will help you drill straight and vertical holes, but if you take your time, you can drill proper holes using a hand drill.

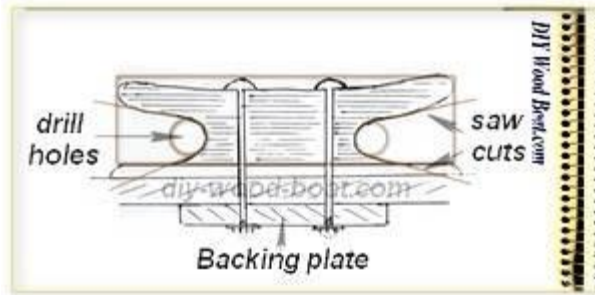
3 Shape with files or a rotary shaper such as a Dremel tool, then sand the piece carefully. Since lines will be running through your cleat, be certain the surfaces are fair and smooth.

4 Apply a first coat of diluted varnish to soak deep into the wood grain. You may choose to finish your cleats using wood oil instead of a paint or varnish.

5 After mounting, plug and finish the bolt holes. Bed the plugs in varnish leaving them a bit proud. Sand them smooth and apply several more coats of varnish, paint or oil.

Method “B”

How to make your own Mooring Cleats



The first cleat is made from a solid block of suitably sized wood.

The main criteria are that the grain should run along the horns and the space under the horns should allow enough room, so that even the largest rope you are likely to use won't jam.

When marking out the shape on your block use a half pattern which, can be flipped over to provide a symmetrical outline.

For mooring, drill holes for the base using a drill bit larger than the diameter of the thickest rope likely to be used on it.

Then cut out the waste wood with a saw to give the basic rough shape.

The next stage is to round off all the corners and give it a bit more shape. I have found a Japanese Saw Rasp a quick easy way to rough shape convex surfaces.

You'll need a round rasp for the concave edges.

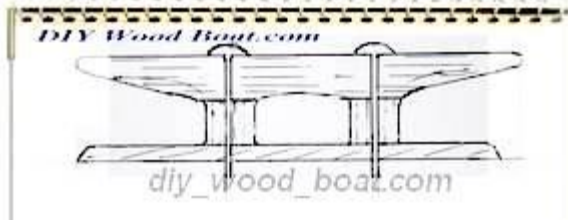
As the base is where greatest friction occurs, this will need to be well rounded at both ends.

Finally, a really good sanding to make it as smooth as possible.

I mount mine on a hardwood base in order to keep the rope clear of the nonslip deck surface.

You can if you wish drill a hole or slot through the base.

This needs to be between the two through bolts and below the level of the horns.



There is also a second method.

Use 1inch/25mm square lumber.

It is simply a cross bar resting on two short pillars of the same stock and resting on a hardwood base.

The wood is cut to length, holes drilled for the through bolts then glued and bolted together.

To finish all the corners are well rounded and sanded smooth.

Sizes and Materials.

There is a formula which states that the length of the horns should be 6 x the circumference of the mooring line.

However, for any boat over 20 foot I wood suggest that they should be at least 9 to 10 inch, 230 to 260mm.

For any boat less than 20 foot, the horns want to be at least 6 inch across.

It is possible to make your cleats from almost any wood even fir, though a hardwood is best.

The best choice is probable well seasoned locust, or white oak.

Mounting.

Mooring cleats normally will mainly be subjected to loading from the side.

However, in some situations, such as tied to a fixed dock with a falling tide, they may have to bear considerable upward pressure.

They will also be subject to twisting as the pressure is exerted on the line leading from one side.

So, those for mooring must have strong horns with the wood grain running along the length.

They also need a minimum of two through bolts from the top of the horns to a backing plate below the deck or through a deck-beam.

If you use carriage bolts as the fastenings there is no need to countersink as the domed heads won't interfere with the cleat-hitch.

Backing plates need to be much larger than the base area of the cleat.

If using either plywood or solid wood the through bolts must be fitted with large diameter washers under the nuts or a metal plate.

Cleats, apart from those used for mooring, should be installed at an angle of about 10 degrees to the lead of the line belayed to it.

This will help prevent the standing part of the line becoming jammed between and the horn and the figure of eight and help reduce chafe.

Mooring lines should be lead through a metal fairlead before cleating off.

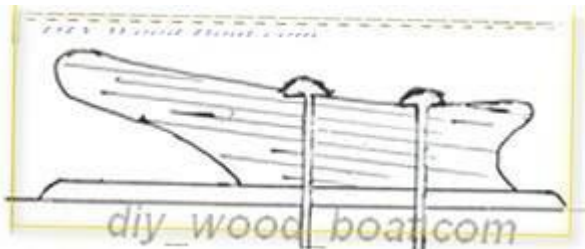
Finish.

There is very little point either varnishing or painting a mooring cleat as the rope friction will soon wear through even the toughest finish.

A good soaking hot linseed oil or any other wood oil (I prefer Tung oil) will help to prevent any checking.

Once the oiled wood is dry it can be buffed up to give a very pleasant sheen.

Other Belaying points.

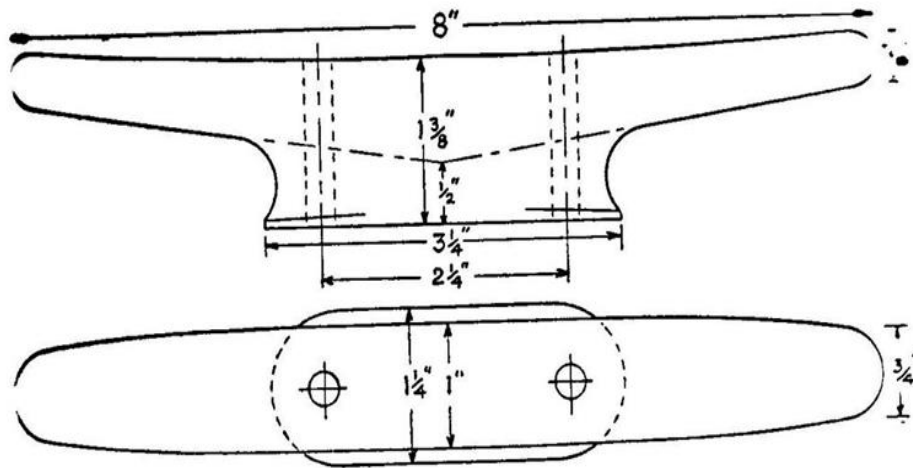


Wooden jammers are equally easy to make.

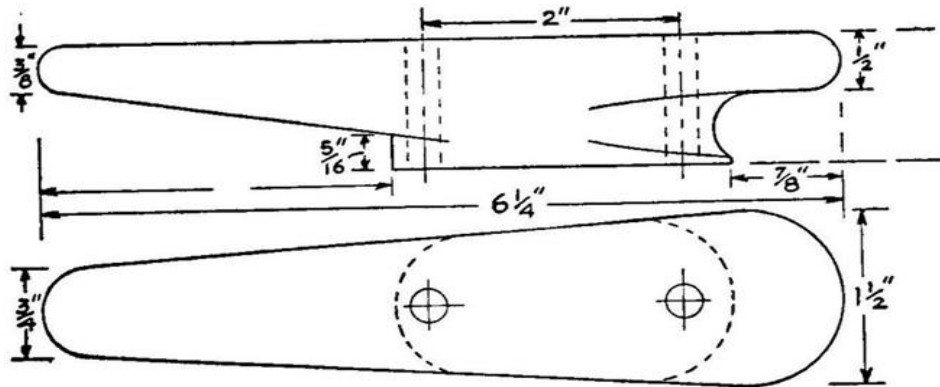
As the line only needs to go around once there only need for a long horn at the front.

With this cleat, we do want the line to jam so the horn slopes down to the base plate at an acute angle without any clearance.

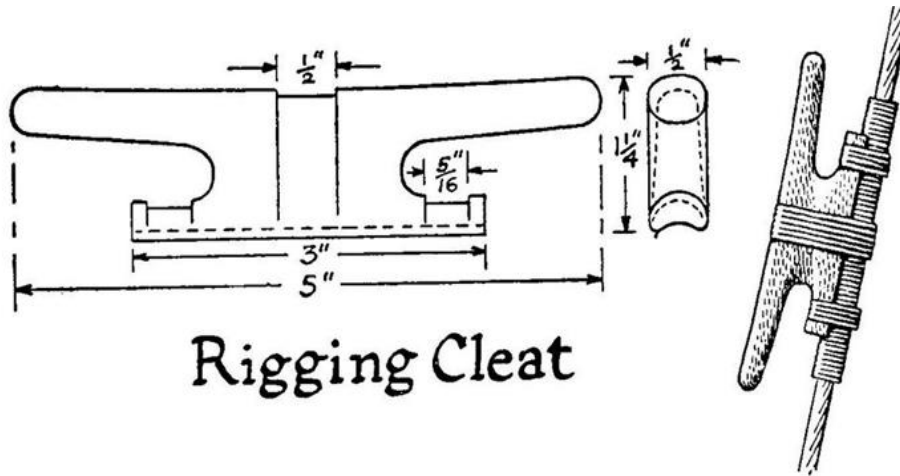
Other belaying options include using the king post or bollards.



Typical Wood Cleat



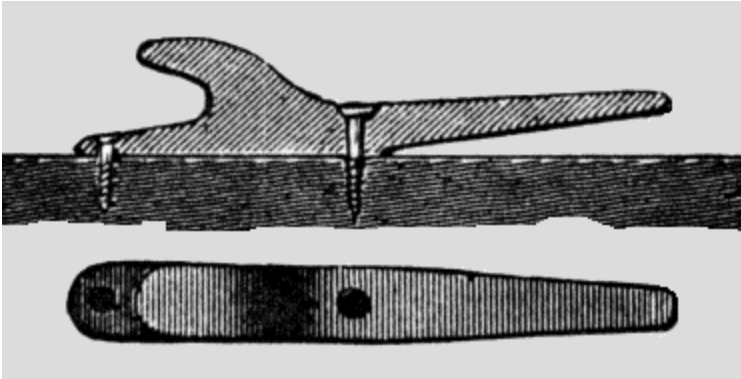
Toe Jam Cleat



Rigging Cleat

Above 3 drawings from The Arts of the Sailor by Harvey Garrett Smith (Dover Publications)

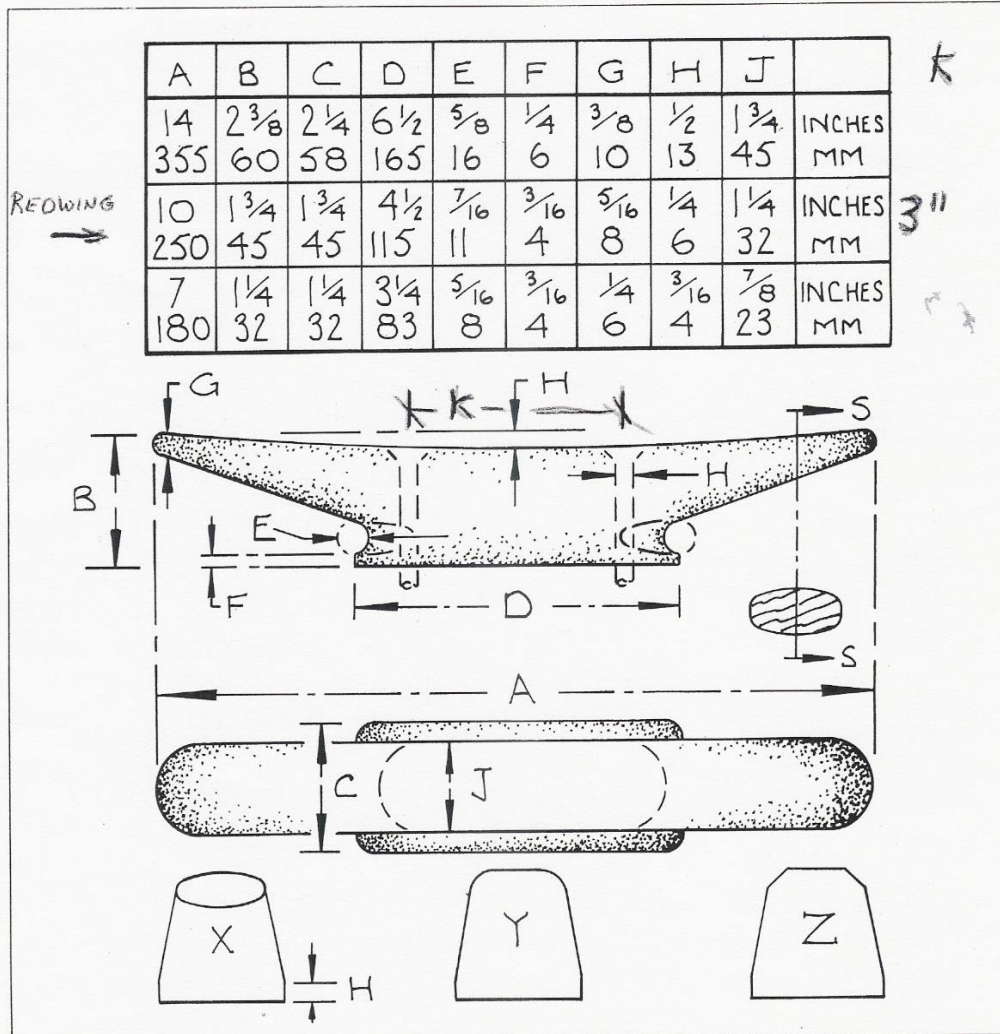




Method "C" – Use the dimensions provided in table on p. 7

Rugged cleats A cleat should be almost unbreakable and at least 40 per cent bigger than those fitted on most standard boats, and for every two cleats there should be a spare. The proportions shown, for three different sizes of cleats, have been worked out from experience to give strength, simple fabrication, easy use, and good appearance. Hollowing the ridge (dimension H) is important for good looks, and even more important is the sloping in of the sides. The best section is shown bottom left (X); a simpler version has a flat top (Y), and an even simpler one has bevelled edges at the top (Z). On no account should the sides be left parallel: this results in a shape which looks primitive and is less convenient to use. All edges should be rounded; in particular the throat where ropes lodge should be extremely well faired with a round rasp or Surform. In the plan view the broken line shows how the throat should be rounded.

Teak is the best wood for cleats, but failing this many of the reliable hardwoods are a reasonable substitute. The harder the wood the better, since there is inevitably a lot of chafe. Bolts rather than screws should be used, and in the largest size a good case can be made for using three of them. When making a cleat the outline should first be marked out on the side of the piece of wood and then the two holes drilled (of diameter E). Saw cuts are made to meet these holes, starting up from the base and then slanting down from the ends of the horns. Tapering the sides should be left as late as possible because once this is done the cleat is more difficult to hold in a vice. The taper should not be carried right down to the base; a small flat is left all round, shown as dimension H on section X.



Steps

1. Layout in pencil on wood blank using chart above
2. Drill holes "E"; use drill press if possible
3. Cut along top of cleat dimension "B"; for better look, cut contour as shown "H" deep
4. Cut from tip of horns to hole "E" (both sides)
5. Determine angle of cut to get sloping sides using angle gage; see X, Y, or Z sections.

6. Set table saw to angle and cut. Probably need to run cleat through upside down (horns on table). **Use pusher stick.**
7. Drill hole in top (diameter = H) but first drill recess for plug if not using carriage bolt to mount
8. Round and taper to taste
9. Sand
10. Oil (several coats)