



Part 19: High Heels

Moray MacPhail comes down from the masthead to consider the fitting at the foot of the mast.

There's not very much I can say about mast steps, those fittings which securely anchor the heels of keel-stepped masts. They should, of course, be constructed to suit the structure of the craft, spreading fore-and-aft the design load of at least 1.5 times the weight of the boat.

Ideally, they will also allow some fore and aft adjustment at the heel. A difference of 6"-8" (150-200mm) at the masthead can transform the balance of a boat and while you might induce that by cranking away at the stays – so bending the mast – it is better to keep the stick straight on a traditional rig if you can. By doing so you maximise the strength of the mast – see all that stuff in W142 *et seq* for the arguments about buckling

and so on. Plus make sure that neither bilge water or rainwater can linger at the bottom of the mast.

The deck collar should act as not much more than an attachment for the lower edge of the mast boot and a lip around the fitting helps here.

Above: A neat metal tabernacle with gooseneck attachment on the 20' (6m) Norfolk Gypsy built by Neil Thompson Boats who kindly supplied the picture.

What is essential is that the mast is firmly wedged at deck level; as we saw in W149, the buckling load a mast can withstand which is 'pinned' at the hounds and the keel is about 6 times less than one which is 'pinned' at the hounds and 'fixed' at the deck.

Tabernacles

Tabernacles can be grouped into two types. There are those which enable the mast to be raised and lowered as an everyday event. These tend to be large and extend down through the deck to the keel, with the mast often counter-balanced or used with a heel tackle. In such cases the load from the mast is permanently on the very substantial pivot.

Workboats like the Norfolk Wherry which needed to 'shoot' frequent bridges are typical examples and some Dutch boats adopt a similar approach. This arrangement suits inland craft well, though the large hatch or slot in the foredeck does not suit offshore craft but then they don't often have to go under low bridges.



*Above: On the Yare & Bure One Design – or 'White Boat' – the tabernacle sides extend down to the keel and the pivot is set low enough to allow the foot of the mast to swing up under the foredeck. Photograph: Andrew Wolstenholme.
Below: The mast lowered on the Norfolk Gypsy. Courtesy: Neil Thompson Boats.*

The second, more common type today, enables self-contained mast lowering on an otherwise 'normal' rig. This has clear appeal not just to trailer-sailers but also offshore vessels which need to go inland. A frequent example is taking a yacht to the Mediterranean via the French canals. This type of tabernacle is almost always deck-stepped.

Here the pivot pin is a temporary arrangement used only during mast lowering and some form of heel wedges or a jack should be used to transmit the rigging loads into the hull via the deck when the mast is upright. You then need to take the load from

the tabernacle into the structure of the boat. The easiest way to do this is to fit a pillar under the tabernacle down to a step on the keel.

If this really fouls up the interior arrangement, it is possible to take the load on a bulkhead. The snag here is that generally one needs a doorway. If that can be made off-centre, then the bulkhead can be locally stiffened on the centreline to take the load. If the doorway must be on the centreline, then some thought needs to be given to transmitting the load. Unless there is a huge beam, then an arch-topped door opening is usually the best bet, even though you may have to duck low to get through it.

Above deck, a tabernacle can be used as the base for either a pinrail or for turning blocks so that halyards and reefing lines can be led aft. Either arrangement is fine, so long as the lines do not foul the mast hoops, the saddle or the jaws. Lacing the sail to the mast rather than using mast hoops helps here.

Sometimes the gooseneck is anchored to the aft face of the tabernacle, so that the mast can be lowered without detaching the sail. Derived from Broads practice, this has been used to good effect on the Norfolk Gypsy where once the sail is





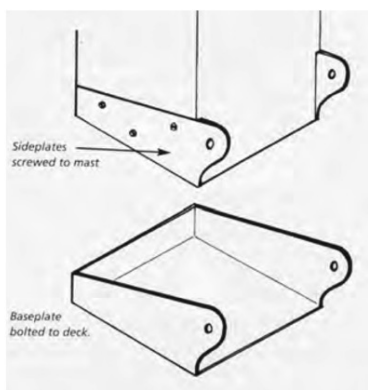
*Above left: A typical deck-stepped arrangement with cleats on the tabernacle.
Above right: Or leading the lines aft from the base of the tabernacle to the cockpit, this time on Andrew Wolstenholme's own boat, Kite.
Left: Or then again incorporate a pinrail instead of cleats.*

lowered, you simply have to unhitch the saddle and move it clear before lowering the mast. Though it makes for a taller tabernacle, this scheme has found its way into Cape Cutters and Cornish Crabbers. Do make sure to leave lots of vertical clearance between the pivot bolt and the gooseneck. It is surprising how much height a sea-stowed sail takes up.

You need to give thought to the arrangement for lowering the mast. A line to the stemhead is fine to start

with while the mast is nearly vertical but as it lowers the angles grow more acute and the forces greater – the same effect as narrowing shroud angles as described in W142.

I have seen occasions when the line has been released and the mast has either missed the poor sap waiting in the cockpit to catch it as it falls or crushed the scissors placed there to do that job. I have also seen a mast crash down ripping out the tabernacle and a chunk of deck as it went!



For smaller craft, you can use a mast hinge which works fine and is very neat as long as the lowered mast does not have to clear a cabin top or similar obstruction. I'll confess I thought hinges at the base of the mast were just for small craft until Andrew Wolstenholme – whose Norfolk Gypsy design graces the head of this article – pointed out that this method was used in 1845 on Brunel's *SS Great Britain*. It's the Shock of the Old – again. Next time: bowsprits.
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