

Rudders

(Ed: There is always considerable debate about the wisdom of leaving the rudder mounted when the boat is on a mooring that dries. If the rudder is dismounted, there is no risk of it bouncing off the pintles and floating away as the boat takes the ground, but there is then an even probability of the boat sitting down on her transom as the tide leaves her. If the rudder is secured to the boat - and there is a variety of methods, some described below - it won't get lost and the boat will dry out more or less level. But, as Roy Sallabank strongly argues, the original pintles were never intended to take this sort of strain. In his view, the original 'hingeing' of the rudder is a design weakness, which all owners should rectify. He describes, below, one method of doing this.)

1. Is Your Rudder Safe?

Alan Cock's rudder failure during the Bembridge rally this year took me back 16 years to 1981. Whilst on a cross channel passage and 30 miles from Guernsey, the bush on the lower rudder pintle broke away from the rudder due to metal fatigue. The upper bracket was badly twisted as the rudder slewed. I had to take the rudder off, and it was an epic struggle to sail "Marnie" to Guernsey using the outboard to steer.

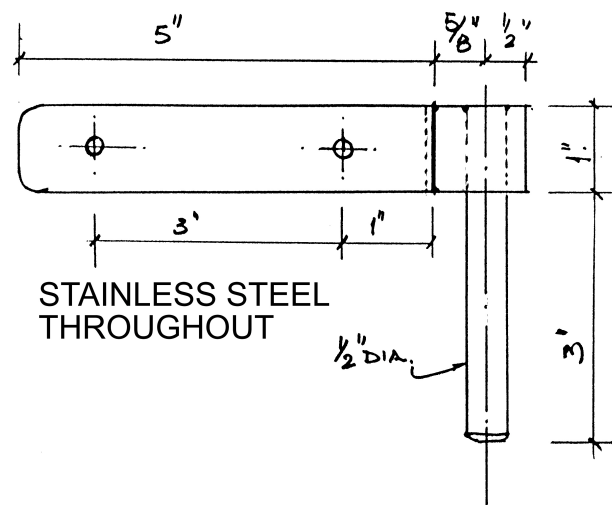
Alan Cooks, who bought his Sea Wych some years before I bought mine, also suffered a failure to the lower rudder pintle bracket. The joint where he had added an extended leading edge to the blade had cracked open, and his lower pintle bracket pulled out from the rudder. It was badly bent, resulting in the upper bracket also being badly twisted. He could not use his rudder. He had several times extensively "temporarily" modified his rudder, to give it a 15% balanced rudder, but had never carried out any modifications to the pintle brackets. In several respects, his rudder failure was very similar to mine. In my case, it could have been disastrous; luckily for Alan, he was not far from Bembridge.

The screws securing the tangs of the lower pintle bracket had rotted inside the rudder allowing the bracket to pull out. The way the original rudders were made means this cannot be detected unless you notice the brackets are working loose. Bearing in mind how long the rudders have been made, it is quite likely yours could similarly be at risk. Before it happens to you, let's look at some urgent preventive repairs to carry out on your Sea Wych rudder in the near future.

1. If the lower or upper pintle brackets are loose or show any signs of movement, get a local workshop to drill holes straight through the rudderstock and tangs. (If possible drilling out the old screws) Fit marine grade stainless steel bolts through the rudderstock to re-secure the brackets. You can tell where the old fasteners are by the wood plugs. I recommend that all Sea Wych owners do this (unless your rudder fittings are already modified as in 2 below).

2. Check both rudder pintle brackets carefully. If possible use a crack detector spray. If cracked, it would be advisable to have new brackets made and bolted on the outside like those illustrated below, leaving the old bracket tangs inside the rudder.

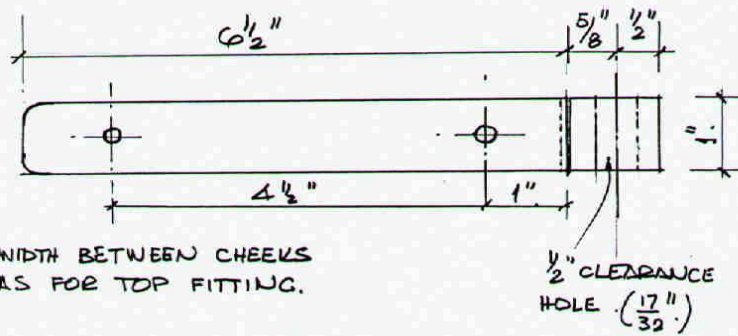
3. New rudders are expensive! Make sure your rudder can't be "bounced off". Get a 6mm hole drilled through the upper pintle pin and fit a large diameter split pin and washer. It is easy to remove the pin when you need to take the rudder off (NB. Tie a lanyard to the pin).



2mm MINIMUM THICKNESS



TOP FITTING FOR RUDDER STOCK



BOTTOM FITTING FOR RUDDER STOCK

4. If you intend to re-profile your rudder by adding an extended leading edge to reduce tiller load and/or weather helm, ensure that you use dowelled and waterproof-glued joints. Most local engineering machine shops can drill dowel holes precisely at right angles to exactly match each part using a pillar drill. Water forces on the rudder are considerable, and strong joints are essential.

(Ed: there is a photo of a similar arrangement at p 92)

Roy Sallabank (1997)

2. Semi balanced Rudder

During the early part of the year, having screwed up my courage, I took a saw to that lovely mahogany of my rudder blade, determined to reduce tiller effort by changing the rudder blade profile to achieve a 10 to 15% hydrodynamic balance. The trailing edge was cut back to bring that edge vertical, and a new leading edge section grafted on by means of 5 x 1/2" dia hardwood dowels and "West System" epoxy resin glue.

The new reshaped blade was carved to provide a streamlined aerofoil section to reduce turbulence losses across the blade, then coated with a double skin of fibre glass cladding to reinforce the blade even further. After smoothing, filling and final sanding to a fine finish, the blade was coated with 4 coats of International epoxy resin paint.

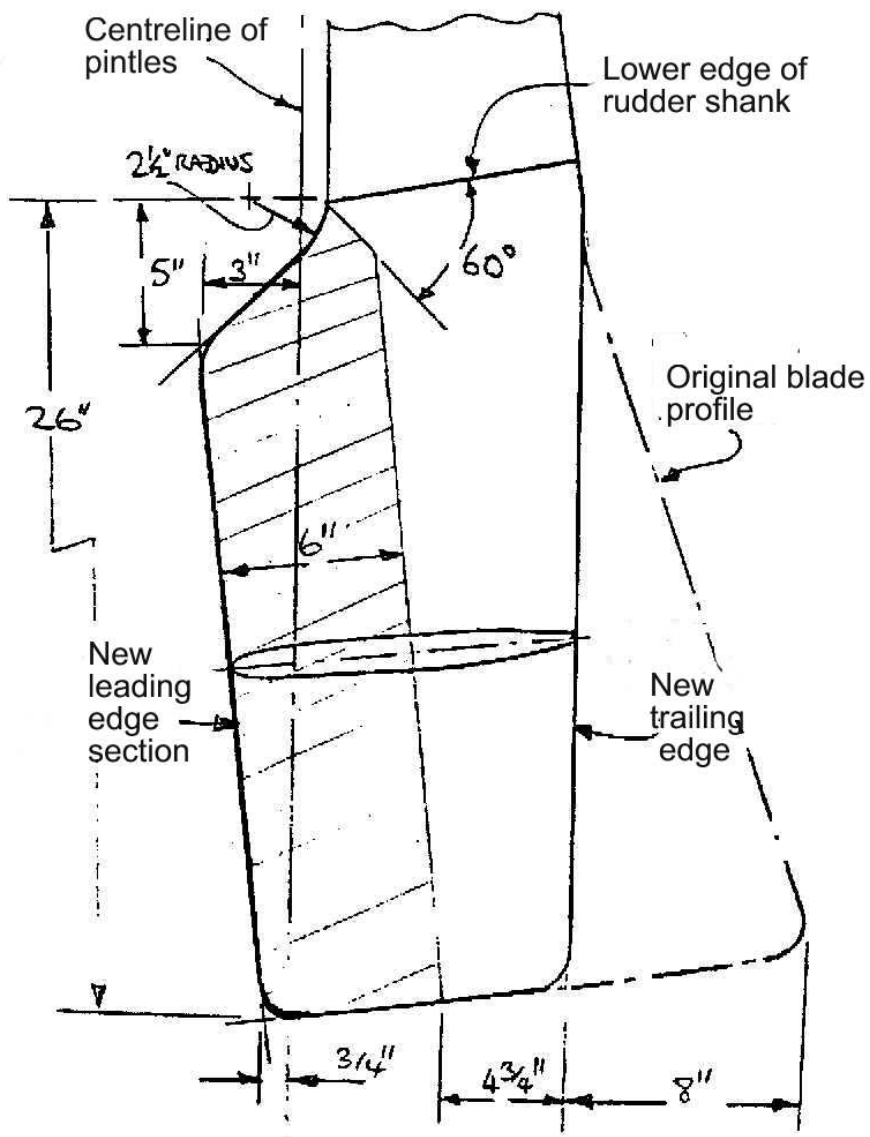
The intention was to leave the rudder mounted all the time on the transom, to steady 'Marnie' at her mooring in the Tamar, to try and stop her "sailing" around and even over her swinging mooring. To retain the rudder, I drilled a 1/4" hole in the upper pintle, and fitted a stainless steel 6 mm dia bolt with a self-locking nut. Finally the blade was given 2 coats of copolymer antifouling to prevent weed and other growths.

Changing the rudder profile to give a balanced rudder does not eliminate weather helm. It does, however, seem to reduce that effect slightly, at least, that's my subjective feeling. The tiller effort is now delightfully light at all times, and steering is precise and sensitive. There has been one unexpected bonus in almost eliminating rudder vibration when motoring, due to the trailing edge now being forward of the side vortex thrust impulses of the outboard motor propeller.

The scale drawing shows the new shape. So far I've proved the new rudder by sailing 'Marnie' over 170 miles single handed from Saltash (near Plymouth) to Bembridge and back again. The Autohelm did 80% of the helming each way, the manual helming bit being far less tiring than it would have been with the "traditional" Seawych rudder shape.

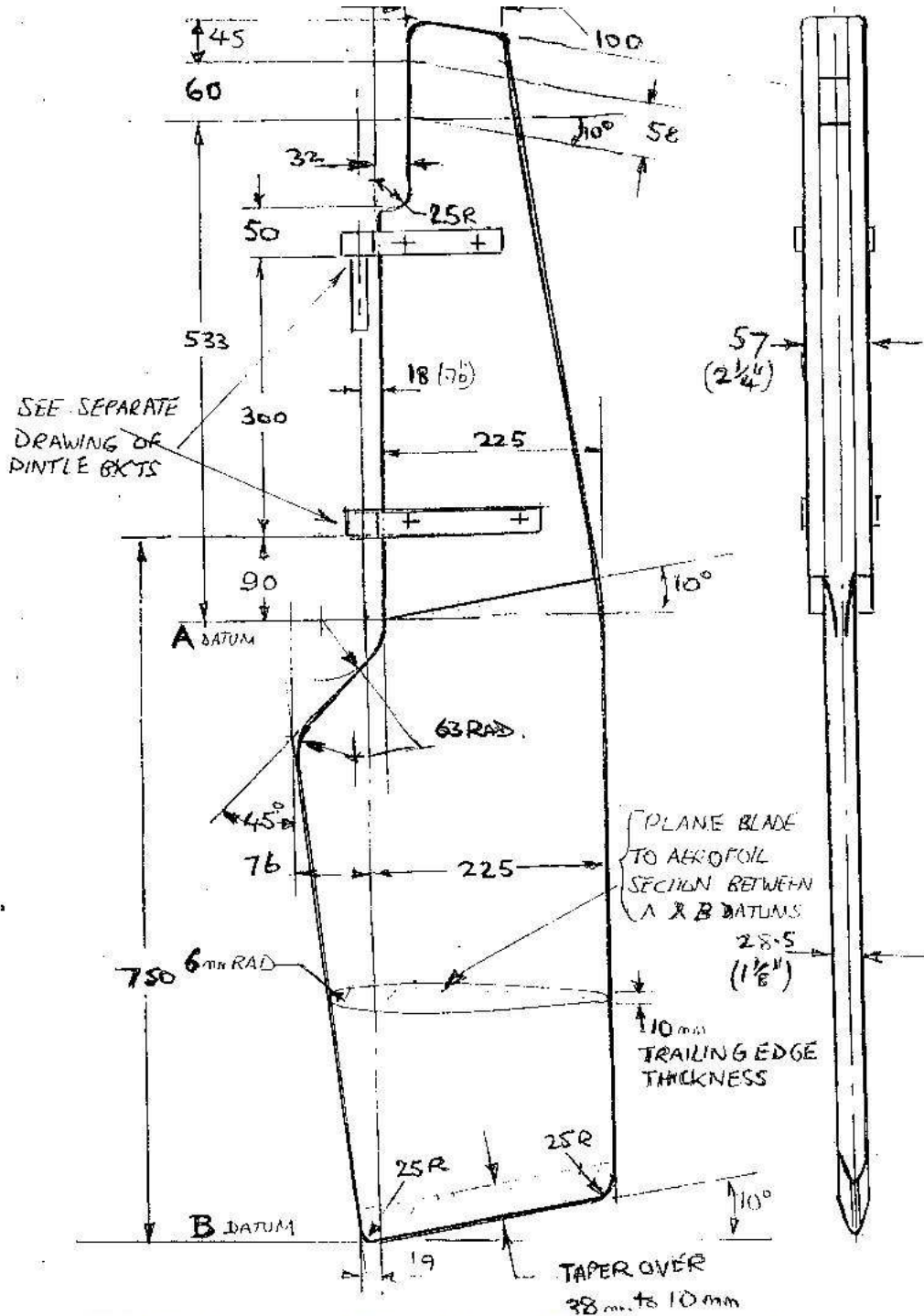
By the way, leaving the rudder on certainly seems to have markedly reduced 'Marnie's' antics at her Tamar mooring.

Roy Sallabank (200?)



(Ed: Some owners consider this amount of 'adjustment' to be too much, resulting in too light a feel to the helm. Bob Sarah, for example, reports this below. It does, however, considerably lessen both the work that any autopilot has to do, and hence the drain on the battery.)

3. Complete Rudder (semi-balanced) Design
 (Ed: The drawing below is Roy Sallabank's).



Balanced Rudder (Mahogany)

4. Rudders and Tillers

I broke my original rudder running over a submerged mooring during a gale some years ago. I carried out the Mods Manual suggestion for lightening the helm, during the repair. This has removed the strain of weather helm completely, and a new genoa with a shortened foot i.e. higher off the deck has produced better balance. Although, on my boat, the helm now feels a tad too light, using an old Autohelm 2000 from the Fal to the Helford this summer, seemed to take very little drain on the battery.

I also made a shorter tiller plus extension. My first attempt was too short, so I had to extend it - some crew do not like using an extension. Plus there are times when the extension gets in the way and needs folding back, for instance when using the o/b for steering out of a tight situation, or when using the Autohelm. There are two mods I would like to make to improve things, but can't figure how:

- Folding back means pushing the helm hard over momentarily, because the extension is too long to easily fold under the mainsheet horse - a reliable snap on/off coupling would be nice.
- A snap on/off handle to extend the tiller stock for those not wishing to use the extension.

When I get the boat home soon I hope I can give you the tiller dimensions.

More on tiller extension - brought the boat home today so here are the measurements -

Original tiller loa = 1090 mm (length to rudder) ltr = 945 mm

New tiller loa = 750mm ltr = 645mm

Tiller extension loa = 580mm made of wood 30 x 20 mm.

The Holt Allen coupling puts the extension back 40mm from the tiller end.

There is a small notch in the extension about 150mm back to clear the Autohelm arm when the extension is folded back and lying on top of the tiller. The extension could be shortened, so it does not foul the traveller horse, but I haven't measured for this.

On my first attempt, I made the new tiller 16 inches shorter than the original, and fitted a screw-in handle. This didn't work well, so I increased the length by 4 inches. As I said before, it would be handy if there was some way to make the extension easily detachable - but NOT inadvertently.

Bob Sarah (2000)

5. More on Rudders

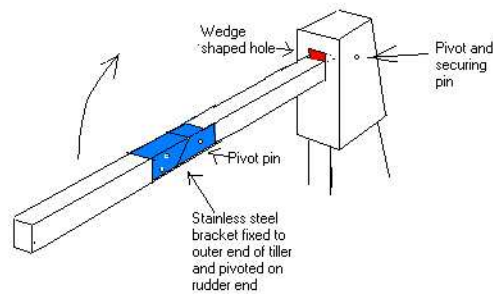
NEVER leave the rudder on if you are likely to go aground. The Sea Wych pintles and the welds on them are not designed to take the strains imposed, both vertically and horizontally during grounding, which are considerable, especially if the boat is swinging or the seabed is uneven. There have been instances of failure of the welds on Sea Wych rudders, and grounding with the rudder on could well have been a contributory factor. I wrote an article for PBO a few years back on just this point, with which they agreed. The split pin idea is OK when you are sailing, but not when you are likely to go aground.

As for using the rudder as part of a tripod, I feel you should have a better system for hanging it than the standard one, so that the load is properly taken. The original transom fitting is probably strong enough, but you would need to fit a bracket at the top of the rudder to go above and below the top gudgeon on the transom, and have a loose gudgeon pin to put through the bracket and gudgeon. There don't seem to

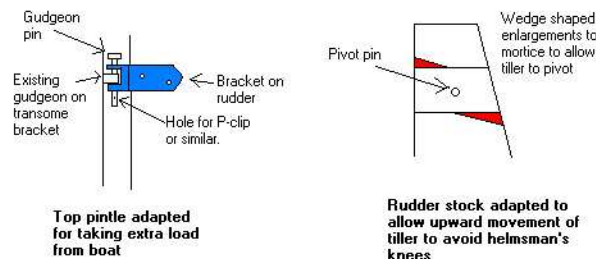
be many production boats with fixed transom-hung rudders that don't also have skegs, although a number of Hunter models do. Some allow some vertical movement of the rudder, but some don't. If you look around one or two boatyards, you'll probably see some. They also have what, I think, is called a high aspect rudder. Have a look at their system and you'll see what I mean about the brackets being designed to take the weight of the boat. They usually have a long pintle to go through both top and bottom gudgeons, which probably makes a stiffer arrangement, but would mean a new transom bracket on a Sea Wych, and wouldn't be worth the trouble.

The other thing you should think of doing if you make a new rudder, is to use gudgeons with fixings that go down each side of the rudder, so that the rudder is gripped between them, as it were; again, this would help to take the loads. If you were really clever, you could probably make the new top gudgeon a couple of inches or so further from the rudder blade (leaving the existing pintle in-situ) and ream the existing bottom one a bit, so that it gave a bit of a balanced rudder (although it might rattle a bit at night!). It's just a question of sketching out the geometry. Hope these ideas help. Tipping backwards has never seemed a big problem with me, but it's probably because the keels sink into Poole mud better than they do into Borth sand!

Whilst on the subject, a couple of other things I did to make life a bit easier. One was to cut about half an inch off the top pintle so that the bottom one engaged before the top one. That made it easier to ship the rudder rather than try to fit top and bottom together, as seemed to be the arrangement as originally made. The other was to cut a wedge out of the front top of the tiller mortice in the rudder, and a similar wedge out of the rear bottom. I then put a pivot pin to hold the tiller into the rudder. This arrangement allows the tiller to pivot upwards about six inches, so that it passes over my knees more easily.



One possible arrangement for a hinged tiller



(Perhaps I've just got fat knees). The amount of vertical movement is, of course, governed by the height of the mainsheet horse.

Tony Bromley (2004)