Mast Maintenance & Repair

By Keith Thatcher, Shrimper *Winkle* (144), SOA Technical Web Sec (March 2011)

This winter the Poole fleet has seen a spate of mast problems, from rot to failure of the glue joints, so here are a few thoughts to help prevent any nasty surprises come fit-out time.

Faults are much easier to remedy if caught early, so regular mast inspection is essential. Owners who de-rig their boats the end of each season are well advised to include a quick condition check as part of their annual lay-up procedure, but even if you are one of those who leave your boat rigged, it pays to give the mast a once-over every two or three years so that problems do not have a chance to build up. The occasional knock or ding in the coating as part of normal sailing is quite common and these obviously need to be repaired, but there are a couple of areas that warrant particular attention if lasting damage is to be avoided. These are the structural glue joints and the area around the mast band.

For those unclear as to the method of construction, Shrimper masts are made from at least two lengths of timber joined together along the centreline. The timber is usually sawn from the same baulk with one side reversed to create an opposing grain pattern. This ensures the mast remains straight and allows the internal cable duct to be machined before assembly. I have also seen a few masts with extra timber added to make up the square at the heel.

All joints are glued using a high quality marine grade adhesive, commonly resorcinol (Phenol Formaldehyde resin), which moves and flexes with the wood and can be identified by a red joint line. Other adhesives are also used, so don't worry if the joints on your mast are not red. Used correctly, these glues have excellent durability, but can occasionally suffer bond failure in the surrounding timber if it is allowed to become wet over long periods. This is usually the result of hairline cracks in the coating along the glue line allowing water to penetrate the timber. It is therefore essential to check all glue joints for sign of weathering discolouration. Caught quickly, a quick clean back to bare wood and local recoating should be all that is necessary to prevent further problems, but the area should be allowed to dry out before recoating.

Re-gluing a severely delaminated join is not advisable and, in most cases, impossible without taking the whole assembly apart. Not only do you have the difficulty of getting a thixatropic liquid into a narrow crack, but the adhesive needs to penetrate the wood pores to bond effectively and any old hardened glue effectively seals the surface. It is therefore important to seek professional advice when determining the repair potential for any glue line fault, particularly one as bad as that shown in Figs. 1 & 2. However, small areas of joint separation, similar to that shown in Fig 3, can be repaired, if not too deep, by cleaning out the damaged area to sound wood using a router and gluing in new timber. A typical repair of this type is shown in Fig. 4.

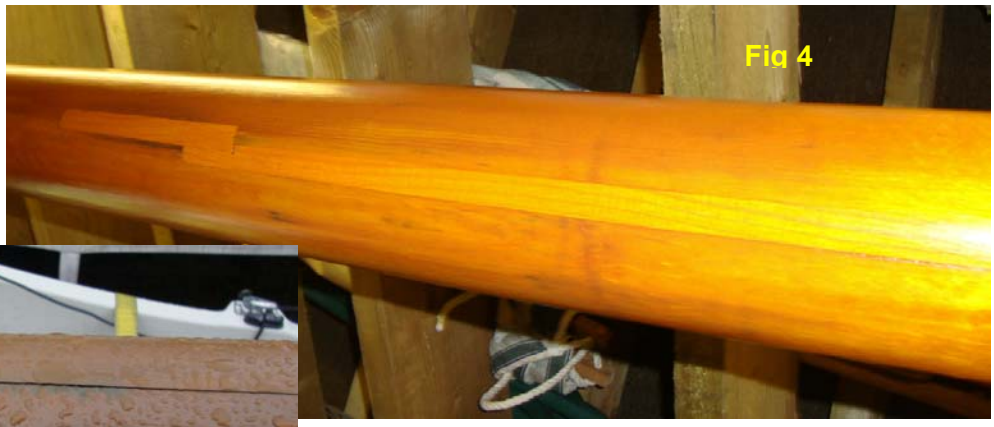
Fig 4


Fig 3

Although simple and effective, the Shrimper mast band has one design weakness, its securing bolt, which passes through the mast narrowly missing the cable duct. The collar is rarely a good fit, so water can run down inside the band and along the bolt where it soaks into untreated timber inside the mast. Over long periods this can lead to decay, particularly where the bolt first enters the mast. Unfortunately, any early signs will be concealed by the band itself, so it pays to remove the band regularly to check the mast condition underneath. Once decay becomes visible clear of the collar it has almost certainly gone too far for a simple repair.

With the band removed, look for peeling varnish, discolouration or softness of the wood around the hole using a small screwdriver or spike to determine the full extent of the damage. Remember that for an effective repair all the decayed timber needs to be removed or the problem will be back within a few years. The band transfers all the rigging loadings into the mast and the only things keeping it in place are the bolt and the shoulder machined into the mast below. Any sloppiness in the bolt hole could allow the band to slip or twist to one side, altering the effective length of shroud causing the mast to lean.

Digging out and patching small areas with a polyester resin filler can provide some respite, but rarely works for long as the timber and filler have different flexibilities. The best way to repair small areas of softened timber found in the outer surface of the mast or extending a short way into the bolt hole is to cut out the damage and glue in a suitably sized piece of new wood. If necessary, the band can be refitted and used as a template to re-drill the bolt hole. Anything more serious, as shown in Figs. 5 & 6, will require more drastic measures (in this case a whole new top section!). Notice how the enlarged bolt hole has allowed the band to move and distort the shoulder on the opposite side.


Fig 5

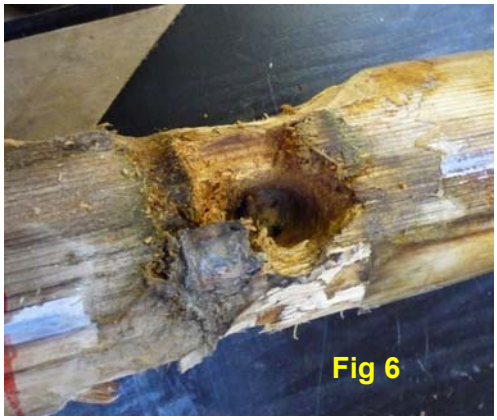
Fig 6

There are various thoughts on how to prevent rot under the band, but essentially the problem goes away if water is kept out of the timber. One solution is to do away with the bolt altogether and modify the band to bolt-on only, as described by Rod Young elsewhere in this section. I suspect that most owners will choose to stay with the standard fitting, but here again there are a variations in how to seal it. Some apply a marine sealant in the gap between the band collar and the mast. This does work, but most varnishes and paints are not truly water impermeable and, over time, moisture can seep through, so it pays to clean out and re-apply regularly, obviously checking the mast condition at the same time.

Keeping water out does not necessarily mean sealing the collar. One school of thought is that a loose collar allows water out as well as in. It is obviously still important to keep water from entering the mast via the bolt and one way is to seal the hole internal surface using epoxy resin or similar. Quite a messy procedure, but, done well, it does provide a long term solution. Slightly less messy is to apply a good coating of marine sealant to the bolt where it enters the mast. I favour the latter and use non-setting oil-based mastic squirted into the hole and smeared around before sliding the band into position. So far, this has worked, but time will prove whether I have it right.

Despite these horror stories, severe mast problems are thankfully relatively rare on Shrimpers and, with diligence and a little forethought we can keep it that way. Prevention is always better than cure, so give your stick a good looking at periodically and it will keep you sailing for many more years.