

**Assessment of a Prototype Laser >> Mast  
Datchet Water, 19 November 2011**

**1. Background**

The licensed builder and distributor of the Laser >>, 'Sailboats', have produced a one-piece mast with swept back spreaders as an alternative to the two-piece mast with diamond spreaders that has been used since circa 1982. Their motivation for doing this is to provide those needing new masts (due to breakage, no new boats are likely to be built) with a cost effective replacement, as summed up by:

*“We looked at producing the ‘Two piece’ mast but we had to order in massive quantities as to make this cost effective and the European dealers were not prepared to support us by ordering any, so we couldn’t pursue that avenue. (We looked at several manufactures).”*

and:

*“As it stands we will only be looking at making the one piece mast for now. We have not taken this decision without researching the options. We have many club sailors and ‘non racing’ sailors who are desperate for masts and have very little funds so this is their solution to keep sailing.”*

**2. Assessment**

A prototype mast provided by Sailboats was assessed at Datchet Water using a boat belonging to Andy Whapshott (#9212) with a good condition mainsail (6 yr old but lightly used) and fair condition jib and spinnaker.

**3. Dimensions**

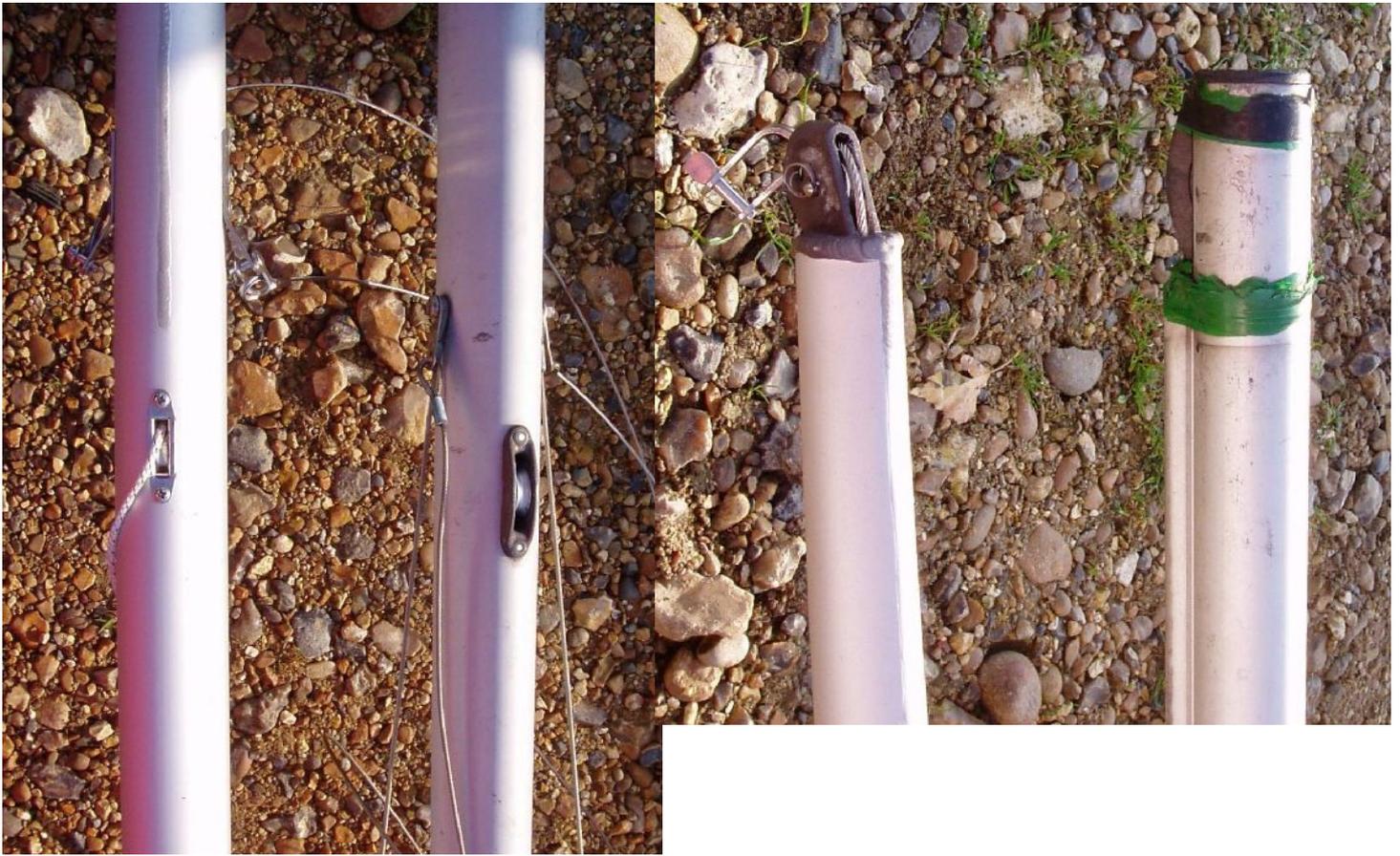
The new section (current mast dimension) is 70mm (64mm) fore-aft, and 57.5mm (52mm) wide with a top tapered from above the trapeze wire attachment point. The section is a conventional teardrop, in stark contrast with the current, almost flat backed, delta section. The location of fittings (measured from the bottom of the mast section) are as follows (note that the dimensions for the current mast were measured off a different mast to that shown in the comparison photographs, but the differences between current and prototype seem consistent):

Fitting	Prototype (cm)	Current (cm)
Gooseneck	58	60
D-ring	117	79
Spreaders	225	225
Pole uphaul	315	300
Shroud tang hole	374	374
Jib pulley top	378	375
Spinnaker pulley top	414	412
Trapeze wire tang hole	426	421
Main halyard pulley top	581	582



Prototype mast is on the left side (bottom of sections aligned)





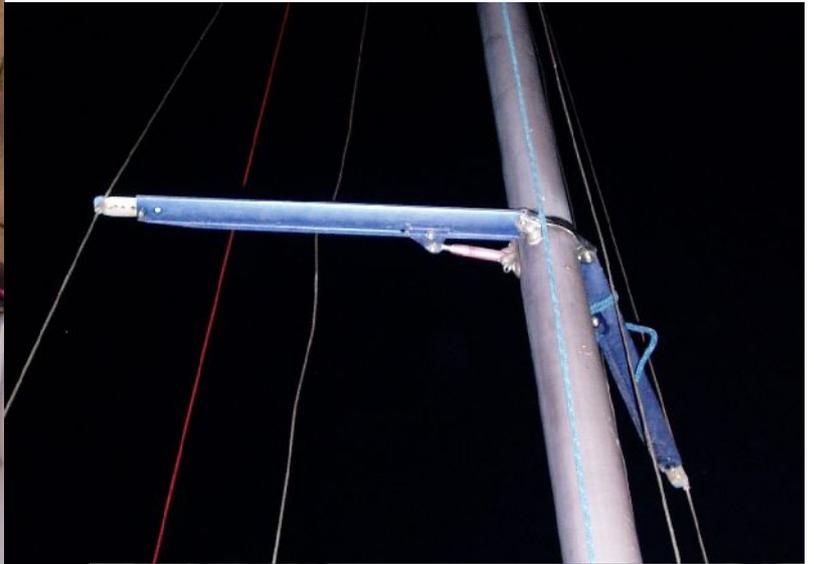
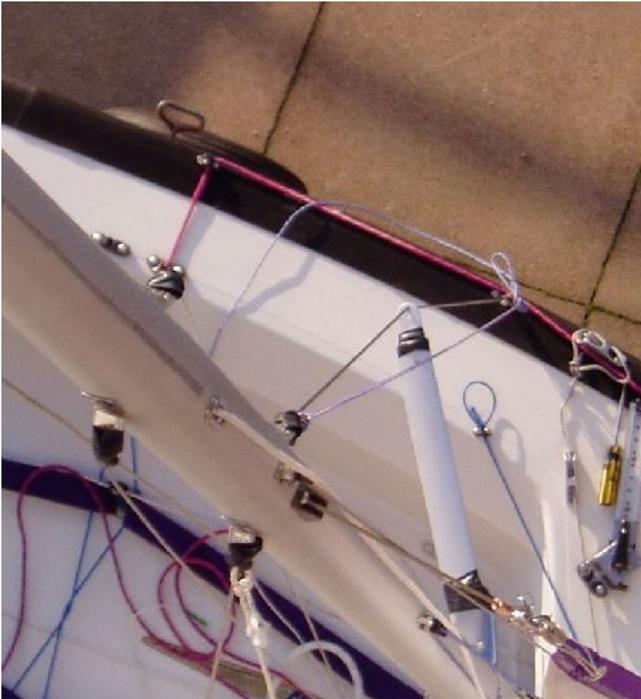
#### 4. Details

- The shroud tangs are the same type as the current mast, but the angle is too great and the shackles were the wrong type (need to have a small pin length to avoid digging into the mast section).

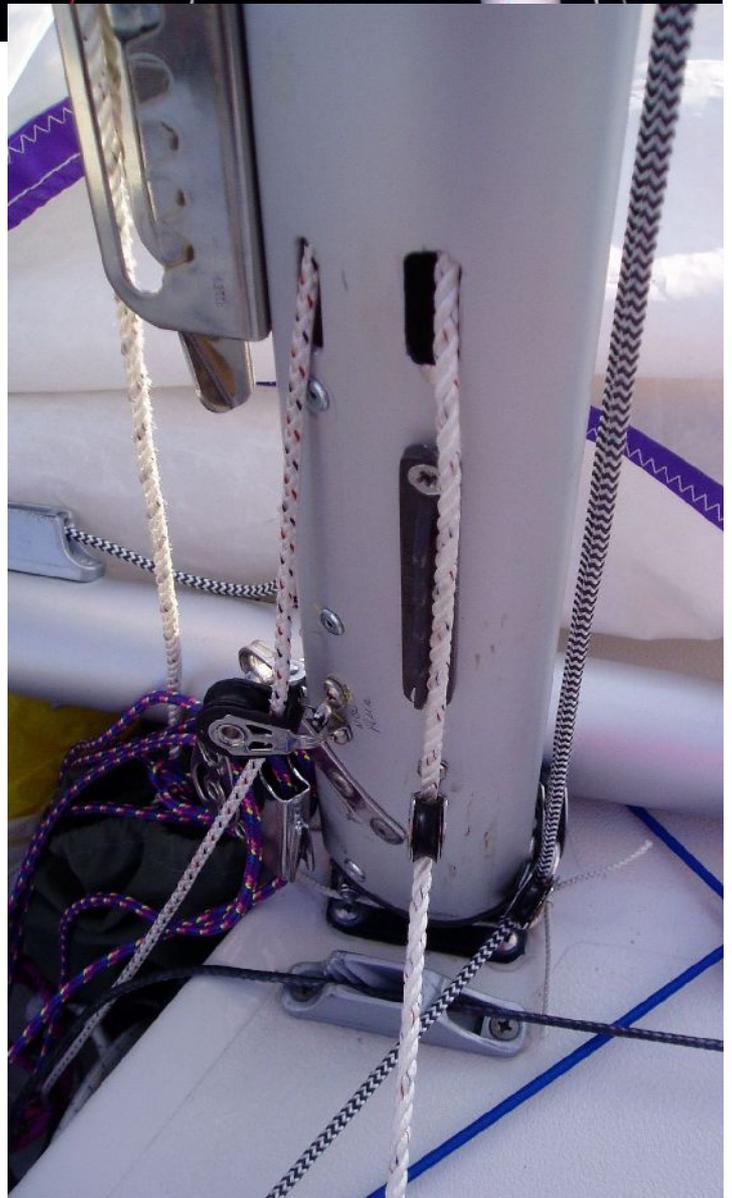


- The spinnaker D-ring was the upper limit of the class rules: all recent masts had the D-ring at the lower limit (785mm from bottom of mast section) which would be the preferred location (much nicer for the crew).
- There was no cunningham clam cleat fitted (usually below the goose neck on the left rear face of the mast).
- The spreaders were too short - we could only achieve about 50mm shroud deflection - Laurie Smith reckons "around 100mm" as a starting point ('Tuning Your Dinghy', Fernhurst Books) although rig tension was on the low side (see Sail Setting, below).

- The spreaders could not be angled back enough (they were set as far back as they would go - photo below left) - a Laser 3000 mast has a significantly longer spreader with a much better angle adjustment arrangement (photo below right) - note that it also uses lowers, although the mast step sits lower in the hull than on a Laser>>.



- The jib halyard was too long - shortening it by 50mm was OK for the fairly upright mast setting we were using (6.34m from halyard full up to top of rudder gudgeon plate)
- The main halyard was too short - by about 2 shackles(!) - could happily be 50mm longer
- 2mm diameter trapeze wire looked vulnerable (current is 3mm)
- Note that the trapeze wires attach to the mast some 49cm above the shroud attachment: Smith advises that this distance should be less than 10cm to avoid the mast 'S-bending' sideways. There is however the risk of interference between the spreader and trapeze wire - another plus for diamond spreaders!
- The pulley below the jib halyard rack should be offset slightly more to one side to minimise the halyard's rope tail wearing on the rack (picture on right).
- The additional block guiding the spinnaker halyard from the mast to the cockpit seemed to work well (picture on right).
- Several fittings were secured with self tapping screws - monel rivets would be the preferred attachment method.



## 5. Sail Setting

Despite (or because of) the highfield lever, it was not possible to put much rig tension on, and as it was a light wind day (F1-2) the test team did not try to add tension, but the traditional bouncing on the forestay method should work.

Due to the spreaders fitted, it was not possible to flatten the lower half of the main sufficiently for the light winds with the rig tension used (generally less rig tension for light winds is required). Nevertheless the mainsail shape looked 'reasonable' to the testers' eyes, with the tapered top of the mast showing noticeable flexibility.

## 6. Sailing

The wind was too light to form any significant conclusions, other than the mast stayed up, the sail shape was passable and the spinnaker halyard worked OK.

## 7. Conclusions

The disparity between the trapeze wire and upper shroud attachment points is a concern, as is the potential for trapeze wire / shroud tip conflict with longer spreaders and / or a lower trapeze attachment point. On the water trials with a revised mast layout in trapezing conditions are required to assess this.

Medium and heavy weather testing is required to get some idea of the mast's behaviour under load, including running with spinnaker in waves.

The various detail changes suggested above, and heavy weather testing, are necessary before the mast can be considered for adoption by the class association.

In view of the multitude of changes introduced by the prototype mast, the class will have to decide whether such a change is beneficial or not, although the alternative might well be no mast at all. Is this the time to remove many of the historical strict one-design restrictions on the Laser >> to enable the existing fleet to continue racing on a (reasonably) level playing field?



*Mike Croker  
November 2011*