

BRITISH MOTH CARBON MASTS....A Reflection

In adopting Carbon Masts [Carbon Booms having been allowed for some time previous the BMBA again showed forward thinking in permitting choice and furthermore development....but are they worth the switch and are there advantages to be gained ?

Apart from the obvious weight advantages...especially in the upper sections what have the benefits been to users thus far ? So this article sets out to reflect on what has happened so far ...not to bombard the reader with figures and theory but a practical resume that may help if you have a Carbon Mast or are thinking about getting one. As winning the first Championship with an all Carbon Rig and one of the Pioneers to use Carbon Masts I feel I may have some user information that may benefit , or not ...you decide !

Several Carbon Masts and Composite Alloy/Carbon topped Masts have appeared from a variety of Manufacturers and self-builders...all very valiant attempts from my perspective, but, have we or are we yet to exploit the full potential of Carbon. Several converts to Carbon have yet to realise how to fully control the Mast and convert this into any improvements or benefit. What is very clear to date is that the Masts produced to date is that, other than the current Superspars Mast ,all the others are very dynamic...need understanding and controlling to get the best out of them rather than to simply rig and go sailing ...adjustment is the key. The Superspars Mast is singled out as apart from being very light [as is their superb Carbon Boom] is stiffer all round by comparison. Fundamentally a Carbon Mast should not be seen as a replacement for your tried and tested Alloy Mast but perhaps a quest for more performance and more sailability. More speed however is not guaranteed !

To advise what Mast to get, what Sail will match the Rig, and a standard set-up for the Rig is definitely NOT the intention of these lengthy witterings .However I would like to thank some of the people who have helped me thus far in trying to develop both the Mast and Sails along this journey since we “went Carbon”... Most Masts and Sails have been re-cycled back into the Class, to I hope , the benefit of all the users...

Selden Mast UK Ltd – 4 Masts

P&B Sails ----- 2 Sails

R&J Sails ----- 2 Sails

NORTH Sails One Design --- 7 Sails

RONSTAN Australia -----Special Hardware

Selden Mast UK Ltd ----- Blocks and HARDWARE

Selden and North must be singled out for their interest and assistance in the projectSelden,s Ben McGrane [now with P&B South] and North,s Charlie Cumbleya big thanks.

PIONEERS....IN THE VERY BEGINNING

The very initial Pioneers with Carbon Mast were Mark “New Boy” Wiltshire and myself. Mark approached Simon Bevan at Superspars and I approached Ben McGrane at Selden. Perhaps almost a

year before the Class adopted Carbon , Superspars had supplied a Mast and Boom and it was being tested at Frampton to good effect on 817 and later on 873" Asbo". A Rowsell matched Sail to suit Mark,s "Petite Physique" on the comparatively stiff mast all worked very well indeed and the rig seemed very tolerant of all wind strengths. Selden,s approach was perhaps a little more scientific with Modelling and load points /bend zones and winding data being discussed. The design brief and aim being to create a Mast with different bend zones and flexible top section to be able to bend off sideways upwind to hopefully make the Rig more manageable...and yes perhaps make the boat quicker. The sailing fraternity refers to "gust response"I hate the term ...bend off will do me! When collected on one of the many trips ,and many since, to Gosport ,the Mast and Boom were visually stunning...beautifully crafted and finished. Bend characteristics and measurements recorded and ready to be evaluated. Being both Frampton Members gave a good opportunity to compare against each other and against a good standard of quick Club Boats. However the Masts were "chalk and cheese". As mentioned earlier the Superspar mast was stiffer and stable compared with the Selden Mast .Mark,s Mast was trussed up ...long spreaders and very tight rig tension would hold the rig but allowing a beautiful bend that Rowsell Sails had matched perfectly. After Class adoption the Selden rig emerged and was initially used on 871 and proved to be an absolute joy to use in lighter breezes.....this all changed when the wind picked up ! The Selden rig has always been quick upwind,,devastatingly so ,,but offwind it took some time to tame. The sought after flexible top section was perhaps too flexible for a heavyweight and I regularly lost out down hill. The Superspar by comparison proving to be a good all rounder and especially offwind when Mark regularly overhauled me on reaches and runs ..regularly smiling and chuckling as he caught and passed me ! Gradual improvements...Spreader adjustments, more powerful Lowers and a calibrated Raking Rig helped greatly to correct this but a Mk 2 was needed. The Mk 2 mast arrived, almost unnoticed other than another new tweaked sail from new Class sailmaker North, and was 15% stiffer in the lower section and a tad stiffer in the top section. All worked well and the 2010 Championships and Somerville bear witness to the rig now on 880 ...new Claridge, Selden Mk2 Carbon Mast a fantastic North laminate Sail. With another Claridge boat [885] due further mods were made sequentially to the Mk 3 and the now current Mk 4 to refine some of the characteristics. While all this qualified approach was going on the Superspar Mast was and still is absolutely consistent and bullet-proof ...a stunning and very strong mast. It has seen and felt the bottom of most of our Open lakes all without any damage apart from a slight beefing up around the gooseneck area.

There have been Carbon Masts from 5 Manufacturers to my recollection ...

As mentioned previously all but one can be considered flexible although the John Claridge offering is really controlled by a fixed Prodder which limits the bend in all directions that result in a Mast being allowed to bend beautifully in a controlled fashion, although the top section still has freedom to do its own thing. Aardvark have made some beautifully finished Masts and Booms...glorious shape and blended features. Ever thoughtful Graham Pope [Severn Sailboats] has an interesting concept of a mast made up different sized proprietary sections bonded together ... this idea has lots of scope and potential to tune to individual weight/requirements. Interestingly there have been two attempts of a Composite Carbon topped Alloy Mast...again this design concept is to my mind has been very under-developed and has considerable potential, again ,as the much sought flexible top section is perhaps more readily achievable BUT would be very dependant on trialling different top sections and this can be expensive...especially if matching sails need to be considered.

USING A CARBON MAST...

Housekeeping first....Carbon Masts and Booms are expensive. Although very strong they are fragile with respect to knocks and sharp blows...whereas an Alloy spar would dent Carbon spars may become damaged or a weak point generated. In addition the surface Carbon [unless protected Paint/Varnish] will degrade slightly and discolour [bloom or look milky] if the protection is not maintained. Drilling holes or making slots – absolutely use the right tools/drills lots of revs and use a Mask/Goggles and Rubber Gloves. Avoid splintering the Carbon lay-up .

Unless you have or intending to use a stiffer Mast [a la Superspar] or say a Prodder equipped softer Mast [from the likes of John Claridge] start off accepting that you will need to control the beast ! I would suggest you consider fitting a powerful Lower system that can be adjusted from the cockpit. A powerful Kicker system is a must and an adjustable Forestay or full Raking Rig that keeps the rig tension constant should also be considered.

UPWIND - Experience to date suggests that in lighter breezes up to Force 2 ,letting the Mast rake back and do its thing upwind [the Carbon build and construction will allow the Mast to bend back upwind] and then offwind holding the mast in column or as straight as you can and raked neutrally [vertical-ish] works best. To do this upwind I let the Forestay go to a calibrated mark to give me a known rake position...when not using a full Raking Rig the Shrouds will go slack...don,t worry just hold the rig on the Lowers lightly the Shrouds go slack but fret ye not ! As the breeze picks up to say Force 3 let the Lowers off to let the Mast bend...put a little Kicker on the take up some of the slack in the Shrouds. When the wind increases above Force 3 progressively lessen the Rake and pull the Mast forward and tighten the Kicker a little more ,also start using the Lowers more to limit the bend.

OFFWIND – Always best to lose what rake you had when going upwind and pull on the adjustable Forestay to rake more vertically on the Reaches and progressively to vertical on dead runs. Pull the Lowers on tight. As the wind increases beyond Force 2-3 pull the Lowers on hard to very hard above F3. This is essential to hold the lower section [up to the Hounds] as stiffly and straight as we can. The top section ,depending on how stiff it is, in a stronger breeze F4 and up will bend forward , A little is OK but if excessive handling problems will result so pull the Boom back off of the Shroud, do not sail quite so square downwind ,sheet in a little sit back and hold on !

SAIL CONSIDERATIONS.....

With our ever increasing possible sail area, especially above the top batten, our humble little boat has a large and powerful Sail that can be a handful at times and a challenge on more Open Water in a blow. If you are under nourished, not a Pie eater or just plainly a lightweight the Boat is hard enough to hold upright in a breeze ...a Carbon Mast will certainly help. Being lighter and easy to hold up [lighter upstairs] and twinned with a Laminate Sail over the heavier Dacron Sails the weight difference and resultant leverage is considerably less. Add this to the flexibility and bend off and the Rig can be made more tolerant resulting in being more comfortable to Sail for the lighter helms and the less energetic...BUT the Mast/Rig needs to be properly set up.

Sail shape becomes more important with Carbon Masts than it ever was with Alloy variants. Available Moth sail shapes available from a raft of amenable Sailmakers are many. To strive for the desired bend off/"blading" effect is the goal and is difficult for the Sailmaker given the various helm

weights etc . A Sail is made up of different zones and cambers and joined together with transition areas that blend one zone into the next and so on. Not all Sails adopt a gradual taper ! The top section of a good Carbon Mast Sail is flatter than previously adopted and developed. Laura and myself have tried many many Sails and arguably have created a Sail in the past that is fantastic upwind on 2 different boats.. 700 and 871. Both were excellent upwind ..excellent height[pointing] with good speed...In fact I would be bold enough to say that 700 was perhaps the best Moth I have ever seen upwind when sailed by Laura...famously she thrashed all of us at Fowey a few years ago !...but that was with stiff Alloy Masts. Carbon Masts due to their construction so far , are probably not as quick as an Alloy Mast upwind in stronger breezes....yet !

Flatter Sails and perhaps stiffer Top Battens on Carbon Masts appear to be beneficial. Below the top section the Sail probably needs to very normal in as much as a well put together Sail with good flow and camber....a full Sail or flatter cut Sail both seem to work well if compliant with the Helms weight and sailing style.

FINAL COMMENT

Carbon Masts GOOD or BAD ?

A resounding GOOD for the Class of course...which was the initial reason for proposing them as a to offer an alternative Mast material/construction and a lighter option that would benefit the lighter helms.

Performance enhancing....not necessarily so.

Advantages over Alloy masts....yes some but NOT significantly in terms of pure boat speed.

The uptake on using Carbon Masts in our Class has been slow, with many standing on the touchline waiting to see what happened . Although the use of Carbon Booms has been more so ...many realising the benefits of a Boom that is so light it can easily lift in light winds,is easier to gybe with and doesn,t hurt if it connects with your nut ! With respect to Masts cost has been a factor but I think it was also down to how well they went and was boat speed improved ? This is subjective of course but I suggest probably no to the latter. Carbon Masts have been used by the majority of the front runners in the Fleet but arguably these would be front runners if they used Alloy Masts. If a Carbon Mast/Sail combination were to be offered that worked over a range of helm weights, as arguably Claridge now offer, the ticket to become Carbon Rigged equipped is all but a Credit Card away !

Actually sailing with a Carbon Mast is the best bit...dynamic and alive and not just something stuck up to hold the Sail. Difficult to describe, at least by me, but I guess alive is as good as any description. A challenge for the thinking helm perhaps, but the reward in knowing that you have to adjust the rig and controls more and that the boat will become easier to sail when all is sorted out is in itself very satisfying.

So there you have it ...the Story so far.

No calculations, no figures, no tensions and no specific “buy one of these “ suggestions.

There is a second Chapter to this article....”Back to Alloy” which is not at all giving up on Carbon but in effect complimentary as the aim is to try and re-develop aspects of an Alloy Mast.

Virtually “stock” Alloy Masts have been offered for years and it is time to try something a little

different... hardly radical more of a collection of ideas that could work.

In the last decade, possibly longer, very few attempts to tweak Masts using available Alloy mast sections has been undertaken so here we go. The first trial Mast has arrived and together with a "modified" Boom will be trialled early in February...weather permitting.

So am I giving up on Carbon...no way!!!

Roger Witts

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