

Square rig with dipping yards.

Concept:

A rotating-mast square rig (a bit dyna rig I guess) but with yards not fixed aloft. Yards instead travel on tracks on the mast. To reef or lower the sails the halyard is let out by an integer number of sails and surplus yards are belayed to the boom, so yards are not adding weight aloft unnecessarily when the sail is reefed or furled. All of the sails on a mast are continuous, eliminating airflow leakage between yards, and reducing the number of control lines.

Sail angle is set by rotation of the mast.

To be implemented as a biplane rig on a liveboard cruising cat.

Pros:

1. Flat cut sail shape - easy for home design and build, cloth stretch not critical to sail shape, allowing the use of cheaper materials, and extending working life.
 2. Low sail loading - low tech (cheap) materials ok, extended sail life
 3. Mast always to windward of sail - mast turbulence not as detrimental
 4. Few moving parts or adjustments - only halyard and mast rotation control. Sail fullness can also be adjusted by moving the sail attachment to the yard, but requires lowering the sail.
- For performance sailors the lack of adjustments should be put in the "cons" rather than "pros", but I'm looking at cruising only.
5. Positive control of mast angle allows rig to be backed or driven irrespective of vessel heading to wind. In a catamaran biplane configuration this should give an amusing degree of manoeuvring control under sail.
 6. Good to great performance downwind (cruising remember!) without changing sails.

Cons:

1. Not self tacking.
2. No sail twist control. Natural wind induced twist will often be undesirable, as the centre of lift will typically lead the mast. I hope that with a stiff mast the degree of twist will always remain close to zero. Some people will disagree here, but I do not think that any sail twist is necessary for a cruising rig to perform acceptably.
3. Yards add weight aloft. I need to re-do my loading calculations on this but my first draft found the structurally required weight of the yards to be pretty low, around 20% of mast weight for the aspect ratio I'm using (~3).
4. Limits staying options for the mast. While I have a fondness for the simplicity of unstayed masts, I don't want to have to go carbon, and the available bury is very low. My current thinking is to have a strut between the two mastheads and stay diagonally to the strut from the bow and stern of each hull.

Why not Bermudan Sloop?

The common or garden rig is a good rig, but not, in my opinion, so good that it deserves to dominate sailing the way it does.

Where a viable choice exists I prefer to go with the less common option, but also the average sloop rig has some tangible shortcomings for low effort sailors, particularly those working on the cheap.

1. Requires professional rig designer and sailmaker to get decent shape.
2. Requires decent (not cheap) sailcloth to hold the shape that you pay the sailmaker to put it in to...
3. Needs a selection of foresails to get acceptable performance off the wind. (more cost...)
4. Lots of sail trimming to get the most out of it. Luff tension, foot tension, sheet tension, sheet position, boom downhaul, mast bend...
5. Not an efficient way of getting a large area of canvas on a given length of mast. Need to add a variety of foresails, and/or roach.

Why not Junk?

Junk was my leading contender for a long stretch. It's a nice low maintenance, low tension rig, and not too common while still being well proven. But there are some issues, and I couldn't help wondering how to get around them...

1. Junk sail camber is the opposite of good. Sails flat in low wind, full in high wind.
2. Sheeting is pretty complex. Its all low strain, and while most people find it works reliably, I just don't like the large number of blocks and ropes involved.
3. Mast to leeward of sail on one tack. Mast is usually big and round, so lots of turbulence that really spoils flow over the sail

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