

EST 1941

June 2020



Port Curtis  
Sailing Club Inc.  
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PORT CURTIS SAILING CLUB INC.

# Straphanger

## June 2020 Edition

### Commodore's Comment

It is getting closer !! **Return to Sailing will happen in July Saturday 18th.**

We have entered a new era, which everyone is well aware of unless you have been living on another planet this year.

**There will be a Covid Safe Plan in place.** It is imperative that all members become familiar with this plan and abide by it. Stephen McGuigan has stepped up to be the coordinator of the Covid Safe Plan, and it is envisaged that he will need two or three off-siders for policing it. One area of the plan is the recording of a member's name, address and contact number on each day he or she attends sailing. This is very important as the Club is obligated to keep records for a time in case any awareness of Covid virus presents itself. We are investigating the easiest and most user friendly way of doing this. Support boat crews will need to be savvy on sanitising equipment after handling it, and members will need to look to their own equipment as well. There will be Covid Inspectors visiting venues to ensure regulations are being enforced and adhered to. Hefty fines may be applied for non-compliance.

Members will also need to be aware that while around the Club House, in any area that the Yachties is operating, their plan will also need to be observed. This will be particularly so when the downstairs bar is operating.

On the subject of the **Yachties**, everyone is surely aware that the upstairs Bar & Restaurant is operating again. Our Club relies on the Yachties for the majority of its income, so please support them with your patronage. Check out the Gladstone Yacht Club Restaurant & Bar facebook page for their info.

**Membership....** Never in the life of the Port Curtis Sailing Club have I ever known the active membership numbers to be so low.

**Members are the lifeblood of a club.** Your Club has strong commitment from those members on the Management and Sailing Committees and also from the Learn to Sail as well as race control arenas. These members cannot commit themselves for long term service, nor we as a club, should expect it of them.

We need members, participating in active sailing, and taking on roles in committee and course management.

*Continued*

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Special points of interest:

- *Super Freak'ng Cold Series*
- *W17 Trimaran Design, part 1 and 2*
- *Sea Hill Rendezvous with CCYC*
- *PRO Roster volunteers*

# W17 Trimaran Design

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**Why a naval architect trained to design ships and conventional yachts, ended up specializing in Trimarans, leading to the development of the unique W17.**

As a sailing trimaran designer for some 35 years, I was recently invited to write an article about the W17 for your magazine **Straphanger**, as one of your treasured members Billy Feeney, has recently built one and it will soon be launched. He thought members would be interested to know some of the interesting features of the boat, plus 'the how and why' of how they perform as they do.

But first, please permit me a few words of background. I started sailing at 10 in the UK, built my first boat at 12 after reading the forever popular childrens' classic '**Swallows & Amazons**' and started designing boats at 17. This led me to study naval architecture at Southampton and after several years racing and cruising dinghies in the Solent area, found myself 10 years later, designing all types of ships at a progressive French-Canadian shipyard in Canada. But that was 50 years ago! Now long retired from that, I picked a specialty that appealed to me and created a website to share my lifetime of gleaning design knowledge and was soon back into designing sailboats for pleasure ... this time specializing in Trimarans.

Why trimarans one may well ask? Well, I admit I am 'an efficiency nut' and when something works *really* well compared to the options, I tend to get behind it. After meeting many of the worlds experts at the first World Multihull Symposium, I became a convert for life. In fact, your countryman, Lock Crowther designed my very first trimaran..

But I did once sail, race and cruise monohulls, and for sure, most boats are fun on the water, but there IS something special about a trimaran. I would never deny that monohulls can be both practical and beautiful and there will always be a demand for them but from the pure design standpoint, it's really worth looking at options that can outperform them in many ways. A monohull 'takes less marina space' for sure, but there are now many folding trimarans that help solve that possible issue. A monohull will often have more deep-interior living space, but the multihull, will have far more deck space ... so there's perhaps an equal trade-off there, based on ones preference. Ultimate ocean-going seaworthiness is another factor that often comes up, but there are many things a prudent sailor can do to offset additional risks, including often ignored basics such as checking the weather, early reefing and just 'being prepared'.

But there are a couple of really important basic design advantages to a trimaran. Stability is one and 'hull fineness effect' is another, so let's take a look at both, considering the traditional mono and the trimaran. The medium-large mono has a weighted keel that hangs beneath the hull, where-as the unballasted mono-dinghy needs human crew out on the gunwale edge (or hanging on trapeze wires) to keep the boat from being blown over once the sail is up. The heavy keel adds anywhere from 30 to 50% to the weight, so the boat's hull needs to be much fatter under the water to find the buoyancy to support this extra weight. Initially, the heavy keel does little until the boat heels ...thereby guaranteeing it WILL heel and quite considerably too. For the mono-dinghy there is always a physical battle to keep the boat level by having an active, athletic crew out on the rail to balance the capsizing force of wind on the sails. Fun as a sport, but so tiring for the long haul that any cruising dinghy must have lower, smaller sails and a wider beam. For example, the popular cruising Wayfarer has a L/B ratio of 2.67.

# W17 Trimaran Design continued

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By comparison, I find the trimaran format so much more logical and efficient in handling this stability issue, so bear with me to explain why. First of all, the leeward float (we call them 'amas') adds increasing buoyancy only as needed and as the wind tries to heel the boat, but provided the total ama volume is sufficient, it's rare to heel more than 15 degrees and the boat is very stable and stiff like that as long as there is still some deck above the water. But we're not finished. As the ama is pushed in, it now *replaces* much of the buoyancy once supplied by the main hull, so the main hull now lifts out as the ama goes in, so unlike a monohull, you're not paying a weight penalty for



the stability. In addition, there is now the equivalent of a trapeze or hiking bench out to windward, as the other ama is just flying through the air, offering an easily accessible platform to further help the stability. This is one reason that the amas on my boats all have a certain flat area on top, so that there's little risk of sliding off if you stand on them. Even on a relatively small boat such as the W17, this platform feels safe and secure and this pic shows a 64 year old grandmother-to-be, clearly enjoying

the ride, while she adds stability with the minimum of effort. That, to me guys .. is 'high stability efficiency' .. roughly the equivalent of using a foil on a hydrofoil without all the risk and hassle.

Let's now look at the hull form and its effect. Not only do monohulls need 30 to 50% more hull volume to support their heavy keels, but they need beam for their natural basic stability. Mono length to beam ratios (L/B) typically vary from 2 to 4 (from tubby to slim), but even at 4, the angle of entrance at the waterline will still be quite high. This means that water will be pushed reluctantly aside, taking energy, while creating a frothy bow wave that also makes spray which is then blown back over the boat. Relatively wide boats like this with most of their volume in the center, also pitch a lot in waves and this is aggravated by hulls that are heavily vee'd at the ends, often in an attempt to resist this. Personally, I believe this is a design fallacy and I have found that hulls with *minimal* vee and flare to actually have less tendency to pitch and certainly create less spray. More on this later.

For a trimaran, we do not need a wide hull for stability, as we get this from the amas at each side spreading out the total buoyancy volume required, into at least 2 hulls, which can then each be much narrower. If we now look at a little science, we will see from tank tests that a L/B ratio of 13-15 typically gives the lowest overall resistance, so without much demand on these amas other than for 'volume with the least resistance', there is little reason to depart from this ratio.

Stubbier amas are to be avoided if you want low resistance and high efficiency. So if you measure the L/B of my amas it will indeed be close to 13, becoming even higher (slimmer) as the ama lifts out.

*Article provided by Billy Feeney and Small Trimaran Design*

*Continued in August Edition*

**Billy Feeney is looking for a mast from a Hobie 17 /18 or Prindle catamaran. Mobile 0418 158 379**

*Articles reflect the personal opinions of authors and contributing persons, and may not reflect those views of the PCSC.*

# W17 Trimaran Design—part 2

## Recap from June edition

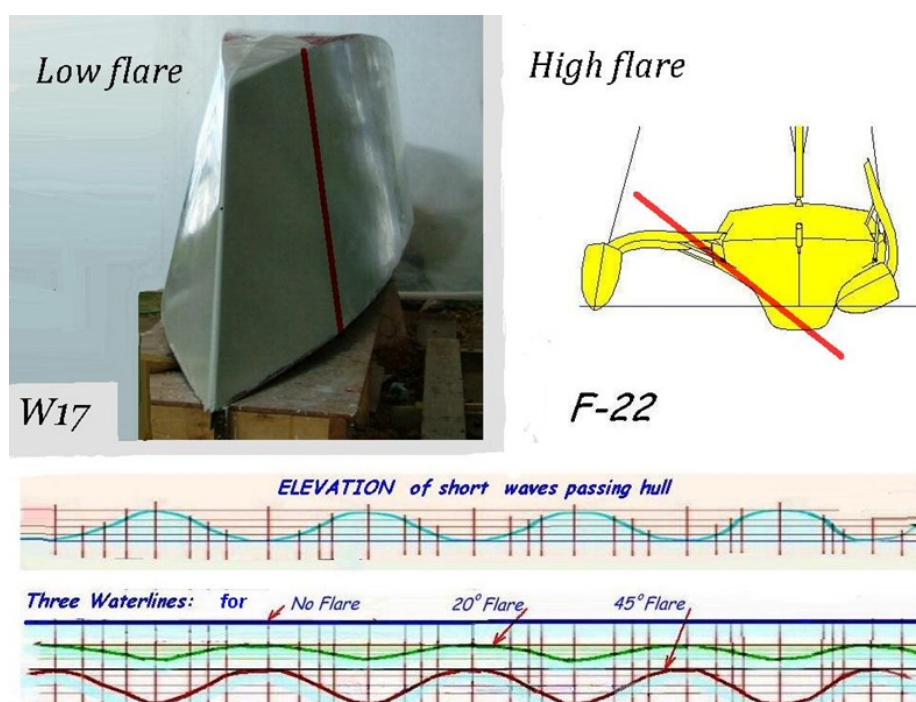
For a trimaran, we do not need a wide hull for stability, as we get this from the amas at each side ... spreading out the total buoyancy volume required, into at least 2 hulls, which can then each be much narrower. If we now look at a little science, we will see from tank tests that a L/B ratio of 13-15 typically gives the lowest overall resistance, so without much demand on these amas other than for 'volume with the least resistance', there is little reason to depart from this ratio.

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## Continued

The main hull has to be bit compromised from this ratio, or it would either have to be VERY long or it will not have enough displacement to carry the weight of the 3 hulls, though making it deeper can help. Making it more flared to carry the weight is NOT a good idea, as this just creates the issues that monohulls have to deal with ... the aggravation of pitching and larger bow waves. I personally consider that, 'how the water is the acted-upon at the surface between the water and air', to be an important visual indicator of resistance and I believe we can all learn a lot by looking at the 'real' shape of our waterlines when actually sailing in waves. While heeling will change this with some interesting effects, may I also draw your attention to the mostly ignored effect of regular waves passing a boats hull, and how hull flare just above the waterline can change your waterline in rather startling ways.

To illustrate this, I have drawn 3 sections with varying degrees of flare from 0 to 45 degrees. Even if considering just the trimaran format, we can see examples over this range. If the hull has no flare, the passing waves show very little change in the waterline shape, but as flare increase, there is a corresponding side bulge for each passing crest and if the flare is high, this bulge is very high too, resulting in a VERY wavy, unfair waterline where inevitably, energy is absorbed.





## W17 Trimaran Design—part 2

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So this is why the sides of my W17 are almost vertical, compromised only a little to give comfort and knee space in the cockpit through a minor side slope. But the positive effect on the waterline and lack of wave creation is quite noticeable as this hull makes its way upwind against short waves at close interval.

Yet another point to consider is this. We have to find the most efficient way to include enough buoyancy in the center hull to carry the weight of all the boat, otherwise both amas could be in the water at the same time and that would add a lot of extra surface resistance for no good reason. An efficient trimaran should never have 3 hulls in the water at the same time. So where should the buoyancy be to keep resistance low? We know from the above that adding beam is NOT a good idea. In fact, to take advantage of the slim hulls possible, the L/B should really not be less than 9, and that's 3 times slimmer than most monohulls! So the only options are a longer hull (good but not always convenient or cost effective) or by making the hull deeper. This is interesting as, like a submarine, the lower the volume is under the water surface, the less surface waves will be generated or seen. So dividing the water deep under at the bow and then slowly opening this wedge with the finest possible bow entry is a very effective approach, as the surface water is barely affected. Check out this image. The water is disturbed so little, that it's still translucent. Only low flare & high L/B ratios can achieve that.



The simple box section of the W17 is remarkably efficient in this manner, as more of the buoyancy is placed low down than with any rounded or vee'd section.

So in summary, for a low resistance trimaran hull, adding to the length or depth is fine, as we do not need hull beam for stability .... only for interior space. And removing as much flare as possible further lowers the wave-making and has the added advantage of also reducing pitching. Some designers add flare to *oppose* the effects of pitching but by doing so, they can actually create *more* pitching. As the Vee bow plunges down into a wave with its inertia, the buoyancy increases so rapidly that the bow is then thrown back up high in the air, only to fall back down in with a repeated motion. A heavy mast top can further add to this and if the center of buoyancy of the amas and main hull are also pretty much in line across the boat it gets even worse, as then nothing is working to stop this motion.

So again, the knowledgeable designer can change this by reducing the flare, lightening the top of the mast and by moving the center of buoyancy of the amas well forward of that of the center hull, so creating a dampening effect.

## W17 Trimaran Design—part 2

All these attributes are incorporated into the W17 hull form and layout and the result is noticeable from the first day out.

The W17 also includes many other tweaks of design that each offer some advantage, such as the asymmetrical ama shape and hull toe-in that when combined, help push the boat to windward ... something that can be demonstrated by pulling out the daggerboard when going to windward. Instead of the wild drift off and loss of control that a monohull would experience, this trimaran will still hold course and track to windward. Even the windward ama does not slap on passing waves but silently slices through them. The lack of water disturbance from their unique hullform, makes for a boat that is remarkably quiet through the water and also drier than most others, even in rough water. So as it's really something unique to experience, try to get yourself a ride some time and see why a scientifically conceived trimaran can make quite a remarkable sailboat.

Even if the ancient Micronesians did not have the advantage of technical studies or tank tests, they still found a similar way to go fast and in their case, it's mainly with a very long, slim central hull. But because their low volume 'amas' of bamboo offer only a very small aid to stability, their sails must be kept small and low and their crews need be very agile and athletic. The larger amas of a W17 change all that and you can safely sail this boat into your 90's.

Take a ride and let me know what you think at [trimarandesign@earthlink.net](mailto:trimarandesign@earthlink.net)

*Article provided by Billy Feeney and Small Trimaran Design*

### **Some of our Members seem to be hobbling about at the moment !!**

Robert Rosendahl is still walking with a crutch post knee surgery. Hopefully he will be back to square one for the Super Freaky weekend.

Rob Auty managed to break both ankles - good to see him mobile albeit with a moon boot still at the Presentation.

We miss our Herc crew member, Dieter Mohrholz and hope for a speedy recovery post hip Surgery. Gute Besserung, Dieter !

### **CONGRATULATIONS Josh and Naomi Young**

Happy wishes go to Josh and Naomi on the celebration of their marriage.



*Photography by  
Marina Hobbs*

