



AMATEUR BOAT BUILDERS' ASSOCIATION

April May 2015

'BLUE RIBAND' and a WHOLE LOT MORE

Our May Toolbox visit was to the premises of AJW Shipwrights in Lerista Court, Bibra Lake. It was very apparent from the start that our host, professional shipwright and director of the company, Aaron Woodall, had put a lot of thought into providing us with a structured visit to his premises with not only the opportunity to inspect a range of works in progress but a very informative commentary/technical talk throughout the afternoon. Aaron also kindly put on a very much appreciated afternoon tea during a break in proceedings.



Aaron commenced by describing his business as a timber/composites boat specialist and he certainly has the facilities to go with that function. The premises themselves – only two years old – are palatial. Designed to accommodate up to a 70' vessel, the sliding access doors measure 8 metres by 8 metres. Apart from substantial storage for materials which Aaron purchases by the container load there is also a separate permanent machining shop.



The afternoon commenced outdoors with inspection of a lap strake or clinker construction dinghy which had been purchased second hand with the intention of it being used as a tender for Pollyanna, a 60 foot Halvorsen classic cruiser which Aaron had completed a major restoration on in 2006. However, the dinghy's condition has now been assessed as not worthy of restoration and the full lines and details have been taken off so that construction of a new dinghy along similar lines can proceed.



The other outdoors project we inspected was a 24ft Scruffie design (see www.scruffie.com) which was completed as a bare hull upside down awaiting fit out. This boat had been completed to a basic timber hull stage by the owner who has now enlisted Aaron to assist with further progress.



We then moved inside to inspect the current major project. This boat – Blue Riband - is a 35 ft Raymond Hunt designed sports fisherman type built in 1968. She has a deep V design typical of these boats primarily designed for game fishing when it was a relatively new sport. The work being carried out on Blue Riband comprised a complete replacement of the bottom and reinstallation of engines, rudders stern gear and associated engineering. This had become necessary because the original laminated bottom had begun to leak and on investigation was found to be substantially water logged due to age and the onset of delamination.

The technique was to remove all but the inner most original plywood lamination and commence a rebuild from there. This involved cold moulding multiple layers of ply diagonally and continuous across the bottom of the vessel from chine to chine. The resultant hull is 28mm thick on the sides and 34 mm thick on the bottom with some thickening around the bottom below the engine beds. The design uses the ply curvature to reinforce the structure of the hull and the substantial jarrah keel was internal.

At the time of our visit, the vessel owner and friends were applying the first colour coating to the bottom. This will be followed by reboring of stern tubes for the two diesel engines and installation of all the engineering systems including the rudders, all of which had to be removed to accommodate this major rebuild process.



Aaron's description of the works being done on Blue Riband and our inspection of the project led nicely into the next segment of our visit in which Aaron stepped us through some of the techniques that are regularly used in a specialist and traditional boat building business such as his. He commenced with an explanation and display of the tools used for drilling out a deadwood or the like prior to fitting a stern tube for a propeller shaft.

This process commences with the drilling of a pilot hole to accommodate the boring bar using an auger or spade/shell drill bit. The boring bar - in this case a round steel bar of about 25mm diameter - is fitted along its length with radiating square cross section cutting tools retained with small set screws which facilitate adjustment of the diameter that each cutter will generate. The projection of these cutters is adjusted along the length of the boring bar so that there will be a pre-determined increase in the diameter of cut from one end of the bar to the other. Each end of the boring bar is mounted in bearing blocks and the cutter arrangement results in the diameter of the stern tube hole be increased as the boring bar progresses into the deadwood being machined.



When this main stage of the process is complete, a faceplate cutter is fitted to the boring bar and similar cutters mounted thereon are used to face off the area around each end of the stern tube hole so that it is square to the hole ready for accurate mounting of the stern tube flanges. The boring bar is powered during this process by a slow speed, high torque power tool. A similar process is adopted when required to accurately drill a tube for a rudder post.

In the next segment of this most informative Toolbox afternoon, Aaron set the scene for a demonstration of lap strake construction later in the afternoon. This was centred on his collection of different planes and chisels, their specific uses, blade materials and sharpening techniques. The specific tools used to create lands and gains for lap strake construction are the rebate plane and carriage maker's plane. Aaron uses both English and Japanese tools, the latter requiring the artisan to work towards rather than away from him/herself. One needs to use a plane that is no wider than necessary for the job as these get very heavy when working professionally over a longer period of time – No 2 and No 4 planes are used most regularly in the trade. Other tools mentioned that are used along the way are low angle planes and short butt chisels.

There are three alternative materials that can be used to sharpen the blades for all these tools - diamond, natural water stone or manufactured stone. In the trade it is important to use blades made from the best tool steels available. Aaron indicated a preference for Sheffield (English) tool steels with superior hardness, which is measured on a Rockwell scale. A good number to look for is a blade with tool steel Rockwell Hardness 64. Aaron mentioned Veritas & Lee Valley as a brand to look at (see www.leevalley.com and click on the 'woodworking' tab).

An important point to note for amateurs was that cheaper, general purpose blades should not be sharpened on a stone with too fine a grit as this forms a burr on the cutting edge that subsequently breaks off leaving a less than desirable edge on the blade.

Following a break for afternoon tea and eats which Aaron kindly provided, he commenced the demonstration of lap strake construction with specific relevance to the fairing in of the planks to fit flush at the bow and transom of the vessel.



The process commenced with the marking of the land and gain using a marking gauge so that the overlapping planks had an overall thickness that tapered from two plank thicknesses to one over a chosen distance from the stem or transom as the case might be. The rebate equal to half the plank thickness was then planed into the face of one plank and the reverse side of the other using a carriage maker's plane.

The joint then needs to be nailed together. This requires the use of copper nails and roves. Aaron recommended that for plywood, the drill size should be equal to the shank size of the nail – noting that our nails are generally square but in the US they use round copper nails. For hardwood timbers such as jarrah, the hole size should be one drill size bigger than the nail shank size.



The nail needs to be driven with the minimum number of hammer strokes to avoid bending the nail. If the nails are to be a feature, then they can be set just to the timber surface. Otherwise, they should be punched into the first veneer. For hardwoods, this may require the hole to be countersunk prior to driving the nail.

The next part of the process requires a dolly (with a spring loaded counter weight) to be held up to the nail head and a copper rove driven over the nail from the inside with a rove punch. The nail is then cut off at a distance equal to the nail thickness clear of the top of the rove. With the dolly in place the cut off end is then hammered over and rounded off with a ball pein hammer.



ABBA members 'having a go' at nailing, roving and holding up on the dolly

The final demonstration for the afternoon was the caulking of the planks in carvel construction - an alternative to the lap strake method. Aaron pointed out that we should use modern caulking cotton as this is compatible with modern sealants. The caulking line goes only half way through the plank thickness and is created on only one of the pair of planks to be caulked. For smaller boats - less than about 12 feet - the cotton can be rolled into the seam using a roller similar to that used to repair fly screens. However, for larger vessels there are specialist tools known as caulking irons which come in different configurations for different uses. There are 'raking irons' for cleaning out the seam prior to caulking, 'making irons' for driving the caulking into the seam and 'finishing irons' to smooth over the caulking and prepare it for the putty or sealant that follows.

Before commencing to caulk the seam, the cotton off the roll needs to be sized to the seam to be caulked. This involves selecting enough strands of the cotton so that when spun or twisted together, the size is just less than the seam width. The caulking can then begin by forming tufts and then driving them in with the iron using a caulking mallet. The caulking is driven in to about half plank thickness and it is important not to drive it too hard. This will depend on the seam width and the depth of the caulking line.

As the afternoon drew to a close, Aaron returned in some sense to where we had started. Laid out on a sheet of MDF on top of an adjacent workbench was the full size lofting of the clinker dinghy that we had inspected at the commencement of our visit. This was the starting point for the recreation of a new dinghy of similar lines. Aaron pointed out that the lofting allowed some movement in the old timber dinghy to be corrected to the original lines. It also allowed him to do full size design of some of the detail for the construction phase. This was a very pretty traditional shaped dinghy and it will be very interesting to see the new version which will no doubt be built to the highest standard which is apparent in all of Aaron's projects.

This was a most interesting Toolbox afternoon. I'm sure all those present learnt a great deal from Aaron's most informative commentary on such a great range of subject material. ABBA thanks Aaron for contributing his valuable time and so willingly passing on his knowledge of his trade for the benefit of our members.

Very Important Footnote!

As well as the projects undertaken by his two businesses – AJW Shipwrights (www.ajwshipwright.com.au) and Legacy Nautical Boat Builders (www.legacynautical.com.au), Aaron is a supplier of a number of quality products which all of us building boats will need at some time. This includes boat kits as well as certified marine plywood, silicon bronze and stainless steel fastenings. All these products and more are detailed on the above websites so please support Aaron if you need any of these items.



ROSELT CROESER ON WIND VANE SELF STEERING

At our April Tech meeting, we were very lucky to have member Roselt Croeser once again address us – this time on wind self steering for yachts. As anticipated, Roselt acquainted us with the many alternative ways of achieving satisfactory wind vane self steering and the detail and refinement required to achieve this outcome. Members will remember Roselt's previous talk on his junk rig developments based on a Spacesailor 18. This boat was also the platform for his experimenting with wind vane self steering.

Roselt commenced with some background on the early development of wind vane self steering. Early work was based on model yachts in the 1930's and although there were earlier proponents as far back as Joshua Slocum it was not until the mid 1950's that the principles were applied on full size yachts in the UK by Ian Major on *Buttercup* and Michael Henderson on *Mick the Miller*. The development of vane gear was also greatly boosted at this time by Blondie Hasler and the advent of the Observer Single handed Transatlantic Races which commenced in 1960.

Prior to this time, sailors relied on their yachts to be well enough balanced to steer themselves or they simply hand steered them for days on end. Alternatively, they may have used a rudimentary method involving the tying the sheet to the tiller. However, the development of wind vane self steering allows for much more efficient sailing under most conditions.

There is a good deal of reference material available on this subject and Roselt referred us to two books that contain the design principles and some plans; 'Wind-Vane Self-Steering: How to Plan and Make Your Own' by Bill Belcher and 'Self Steering for Sailing Craft' by John S Letcher. There are also numerous resources available on the web including <http://www.faymarine.com/> - Paul Fay and <http://www.jesterinfo.org> – Blondie Hasler

With that background, Roselt launched into the more technical part of the presentation with the question;

Vanes – Vertical or Horizontal Axis?

There are two versions of vane – either vertical or horizontal axis and these in turn produce self steering by direct connection to the tiller or via one of two systems - either a trim tab or servo pendulum.

The axis or 'stock' for the vane may be vertical or horizontal. The vertical axis vane only moves about the vertical axis by the same amount (in degrees) that the boat goes off course. The vertical axis vane is probably simpler to construct but the adjustment requires some fiddly bits, usually a moveable pin in a wheel or a jam on a geared wheel. Notwithstanding, the vertical axis vane and trim tab steering system has served many people very well.

The horizontal axis system is a lot more sensitive because the vane can move through a much larger arc when the yacht goes off course. This movement can be up to 90 degrees both sides of vertical but is normally limited to 45 degrees. The axis can be laid back up to 20 degrees which makes the system more stable and achieves better results. The linkage can be line which is very simple but care needs to be taken to ensure it does not twist. Alternatively, a rod can be used. This requires use of some swivels and generally requires more engineering. Roselt noted that a right angle gear out of an old hand drill can be used for this purpose.

This system can also steer the tiller, trim tab or servo pendulum whereas the vertical axis vane can only steer the tiller or a trim tab.

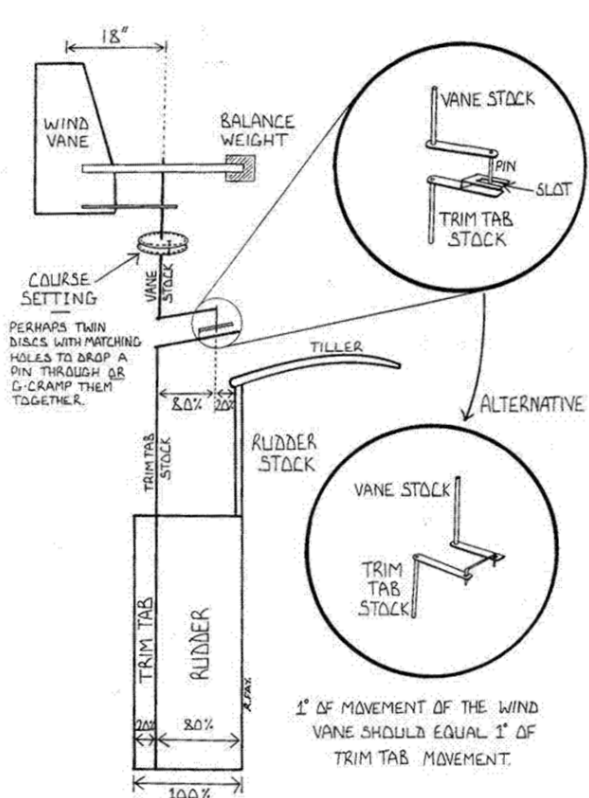
In comparing the two systems, the horizontal axis vane is a lot simpler than the vertical axis and can be smaller, lighter and more sensitive than the vertical axis vane. The linkage on the horizontal axis system is simple if rope is used but requires some engineering if constructed with rod.

What do we steer?

Tiller Direct

The tiller direct connection requires a large vane and works best for a light tiller, particularly where the rudder can be balanced up to 20%. This was used by Acrohc Australis – the 12 foot boat that sailed around the world. Roselt has used this system on the Spacesailor 18 but it only worked into the wind and up to a reach because he found the vane was too small.

(Ed – notwithstanding its rudimentary nature, there are accounts on the web of ocean crossings apparently completed successfully using this form of self steering)



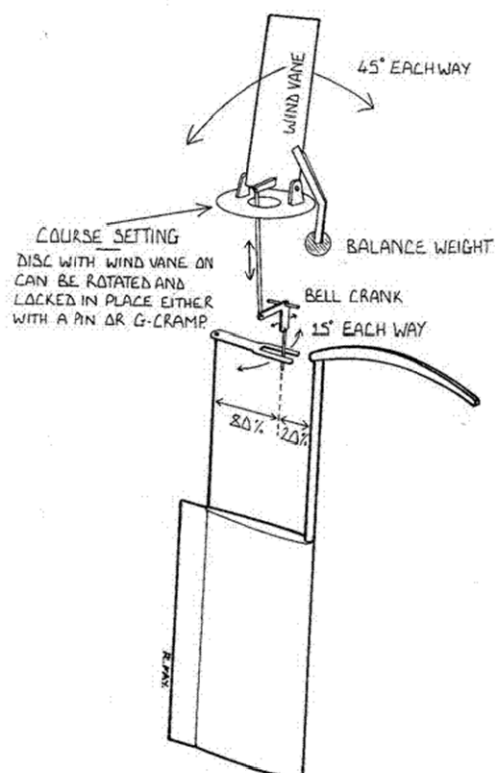
Fay Marine design – Vertical axis wind vane with trim tab

Trim Tab System

Trim tab systems comprise the vane and a counterweight equivalent to the weight of the vane. The rotating shaft of the vane is connected via linkages to a small tiller which moves the trim tab that is connected to the trailing edge of the transom hung main rudder. The trim tab tiller arm must be between the rudder stock and trim tab stock. If it extends forward of the rudder stock, this will result in positive feedback and the main rudder will slam across.

This system involves deploying some method to engage and disengage the vane stock from the trim tab stock and a method to lock the trim tab to the rudder to facilitate manual steering in port. Some of this function may be accommodated using the ‘course setting disk’ which deploys a pin or friction fit to adjust the course.

The trim tab system is not as powerful as other alternatives and the trim tab can get in the way but the system is very safe because the trim tab will just stall or create some turbulence if over steered and no components are likely to break.



Fay Marine design - Horizontal axis wind vane with trim tab

Servo Pendulum

This self steering system uses a horizontal axis vane to twist a blade suspended over the stern. This blade is able to articulate like a trim tab on a vertical axis but at the same time move in pendulum fashion through an arc (about 30 degrees each way) on a horizontal fore and aft axis. The servo pendulum is very powerful because it uses the pressure of water on the side of this rudder/oar blade to steer the boat and the water pressure is many times more than the air pressure deployed in other self steering systems.

Servo pendulum systems have the advantage that they can be fairly small and balanced and can be made by the amateur. However, they involve very large forces and therefore must be much stronger than the other types. Their downside is that they pick up ropes and other debris and can be more susceptible to breakage.

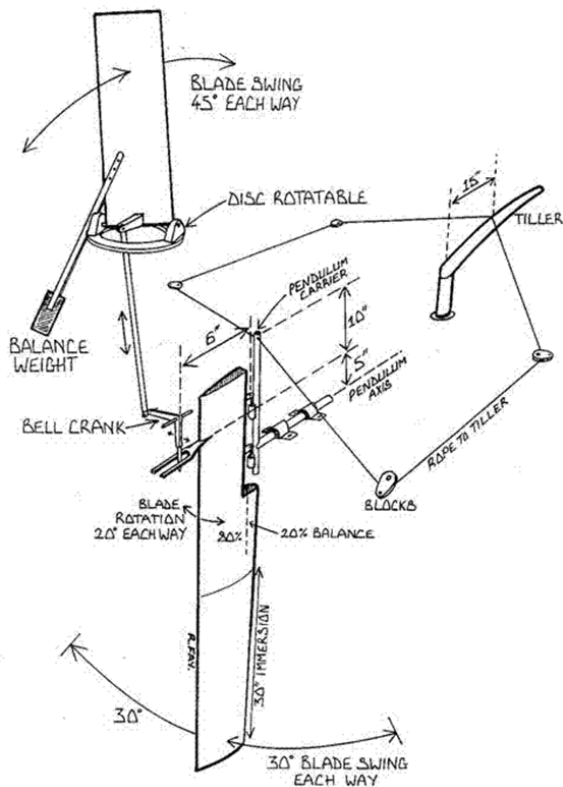
Building Tips

It is always good to learn from those who have already done it!

When making your self steering gear, Roselt's advice is to use good size pulley blocks and set the rope linkages up so that they are not too tight. The recommended bearing material is high density polyethylene. This is the same material as white cutting boards at home. For the vane, one option is to use just an aluminium tube frame with a 'sock' over it to form the vane panel.

And if you are not into your own construction, Roselt informs us that there are kits available that are simple and low tech to assemble. These include the Hebridean, a servo pendulum wind vane (details at www.windvaneselfsteering.co.uk). Your editor also found Holland Wind Vane at www.hollandwindvane.com/self-steering.

On the commercial front, other than those mentioned previously, the Fleming is a major long standing self steering gear brand that has rounded Cape Horn many times and works well on all points of sailing.



Fay Marine design - Horizontal axis wind vane with servo pendulum

In Conclusion

Roselt concluded that it is possible to make your own wind vane steering for not too much money. The product of your efforts does not require any electricity, is fascinating to watch work and can free you up to do many other things on a longer trip.

A big thank you to Roselt for another great presentation which, in this case, I guess whetted our appetites to examine the design and amateur building of a wind vane self steering system in more detail and get started on our own projects.

ADMINISTRATION NOTES

ABBA COMMITTEE

President/Editor	Chris Davis	9387 5042
Sec/Treasurer	Bruce Cadee	9259 0844
General Committee	Rob Bingham	9246 0202
	Ed Essers	0406 050 989
	Harry Speight	9295 4518
Library	Rosemary Nayler	9455 1470

JUNE TECHNICAL MEETING

Our presenter at the Wednesday 3rd June technical meeting is Gary Martin, owner and manager of Boat Paints in South Fremantle. Gary opened Boat Paints in 1991 in Fremantle to cater for the growing demand for technical advice in Marine Paints from Commercial and Pleasure boat owners. Boat Paints supplies a comprehensive range of paints and painting materials as well as fibreglass materials for boat repair and finishing. Gary originally trained as an Automotive Refinisher and has over 33 years of continuous experience in painting. With these skills he was heavily involved in the Americas Cup in Fremantle and then the later Whitbread/Volvo ocean racing boats. In his talk, Gary will be giving us a broad introduction to marine paint and antifouling systems for various substrates.

That's in the Heritage Room at South of Perth Yacht Club, 7.30pm for an 8pm start.

JULY TOOLBOX VISIT

Our toolbox visit on Saturday 4 July 2.00pm to 4.00pm will be to Maylands Boatyard where we will be visiting Ralph Newton's Eun Na Mara, a W. Fyfe III 1905 design 36 Linear Racer (similar to the 8m class) built in 1907 in Sydney. Ralph has owned Eun Na Mara for a couple of years and presently has her out of the water at Maylands where her hull is undergoing major restoration under the guidance of Kim Klaka with Nick Truelove as shipwright. Originally a gaff cutter, her current masthead Bermudan rig will also be upgraded to a 7/8 fractional Bermudan rig. Ralph is a member of both Fremantle Sailing Club and South of Perth Yacht Club, and has owned a wide variety of boats throughout his sailing life, starting in dinghies, followed by an S80, Sorcerer, two Viking 30s, Beneteau 1st 375, Beneteau 411 and currently a Seawind 1160 catamaran, berthed at FSC. He also owned an H28 at SoPYC, where Eun Na Mara is now based. In recent years he and his wife, Lynne, have cruised widely around the Australian coast and into Indonesia, the latter beginning in Bali after coming 1st in the Cruising Division of the 2013 Freo to Bali Race.

SPECIAL NOTE -- SHIRTS & ABBA LOGOS

Don't forget — if members wish to bring along their own shirts to the next meeting then Bruce Cadee can arrange for logos to be embroidered. Members can bring as many shirts as they like but the club will pay for up to 2 logos. If we could do this in batches if at all possible this would be best for our supplier.

ADMINISTRATION NOTES (Cont'd)

ABBA LOGO

Members are reminded that Bruce Cadee has made arrangements with Shaun Luong of Image Embroidery at 26 Tulloch Way, Canning Vale (Phone 9456 2324 Mobile 0403 250 389) for an embroidered ABBA logo. The logo can be applied to your own clothing (assuming it can be accommodated in their equipment) or to shirts, caps or hats purchased through Image Embroidery. Feel free to call in on Shaun to look at the limited range of clothing he has on site or visit the following web sites to choose your preferred style, size and colours. The weblinks below are only examples of the wide range available. Half chest measurements are included on the web sites to help ensure you select the correct size. Ladies styles are also available.

Clothing (excluding Logos)

Style 1300 – Aussie Pacific Mens Murray Polo, Navy/White/Ashe or White/Navy/Ashe - **\$20.00 + GST each**

Weblink: http://www.aussiepacific.com.au/the-murray-polo-navy-white-s?color=Navy%2FWhite%2FAshe&primary_color=Navy&secondary_color=White

Style 1304 – Aussie Pacific Mens Eureka Polo, Navy/White/Ashe or White/Navy/Ashe - **\$21.00 + GST each**

Weblink: http://www.aussiepacific.com.au/mens/polos/eureka-polo-sky-navy-s?color=Sky%2FNavy%2FAshe&primary_color=Sky&secondary_color=Navy

Hats/Caps (excluding Logos)

Style 4199 – Headwear Brushed Heavy Cotton Cap, White/Navy (many other colours available too) - **\$6.50 + GST each** **Weblink:** <http://au.headwear.com.au/productDetails.cfm?&prodID=53&prodCatID=2&pageNumber=1>

(Also refer poly/cotton legionnaires hats Styles 4057 or 4126 for maximum sun protection under website sub heading 'Hats, Visor & Beanies' <http://au.headwear.com.au/productList.cfm?&pCategoryID=7>)

Style 4199 – Headwear Brushed Heavy Cotton Cap, White/Navy (many other colours available too) - **\$6.50 + GST each (includes poly/cotton legionnaires hats for maximum sun protection under website sub heading 'Hats, Visor & Beanies')**

Weblink:

Style 4223 – Brushed Sports Twill Bucket Hat, White/Navy (many other colours available too) - **\$8.00 + GST each**

Weblink: <http://au.headwear.com.au/productList.cfm?&pCategoryID=7&page=2>

To make your annual membership even more value for money, ABBA will pay for up to 2 logos per financial year to be applied to your items of clothing. The current cost to ABBA is \$7.15 per logo. There is no intention for this to be an ABBA uniform so the choice of style and colour is totally yours. If you are seen wearing the logo while building, working on or using your boat or anywhere for that matter it might get people asking questions and wanting to join our association. You are free to deal direct with Image Embroidery but please ensure you get an itemised invoice showing a separate price for the logo and present this to Bruce Cadee for reimbursement. Bruce Cadee is happy to take orders and liaise with Image Embroidery if you so wish.