THE BINNACLE

October 1989.

NEXT MEETING Nov 9th 1989 7.30pm.
AT THE FLEET CLUB.

Victoria Model Shipbuilding Society.
Box 4114 Postal Station A
Victoria,BC.
V8X 3X4.

COMMITTEE 1989.

President	Ron Wild.	478-5430
Vice President	Elwood White.	1-743-5441
Secretary.	Ron Hilsden.	479-5760
Treasurer.	Don McLeod.	478-5380
Director.(Publicity)	Ron Armstrong.	478-1952
Director.(Newsletter)	Tony House.	652-0305
Director.(SHAS Liason)	Fred Haire.	474-3650
Director.(Newsletter)	Stan Jacobs.	479-3989
Director.(Librarian)	Don McCord.	652-0188
Director.(Entertainment)	John Marsh.	385-5740

UPCOMING ENTERTAINMENT.

November. John Gough...Propellers for models.
December...Dinner and surprise entertainment.
All events are subject to change.

UPCOMING EVENTS.

September 16th -17th 1989...The 1989 Golden Gate Scale Concours. Details elsewhere.

October 15th 1989...World Ship Society Annual Amateur Boa and Ship Model Competition. Details elsewhere.

Ron Armstrong says that he is missing his Bassett-Lowke plans for the British Steam tug Rotary. They are 1:48 scale. He believes that he loaned them to a club member. Anyone knowing of the whereabouts of these plans, would you please contact Ron either at the meeting or at 478-1952.

Working from Lines

MANY MODELLERS, when confronted with a set of naval architect's drawings, are completely baffled, and do not know how to use these lines to build a hull. Once the idea has been explained to them the whole thing becomes ridiculously simple.

In the first place, then, let us look at a set of these lines. The figure shows something fairly typical in this direction, but rather simplified; any boat can be drawn in this fashion, and in fact usually is, even though the finished result (in the case of models) may not show all these lines. (The hull shape is always drawn initially in this way, and the actual component parts are derived from the original lines).

Now take a look at the "side view" of the hull, known as the Sheer Plan. The vertical straight lines are of course the stations at which the body sections forming the body plan are taken off. but it will be observed that there are also horizontal straight lines, and what is obviously a family of curved lines. The horizontal lines indicate horizontal slices, known as waterlines and these are drawn out (again superimposed one on the other) on the Waterline Plan below. It will be observed that the cross section stations are also shown on this drawing, and there are again straight lines running parallel from stem to stern on this view. These are the vertical slices which give the buttock lines and the buttock lines are, of course, the family of curves shown in the sheer plan.

If one takes a pair of dividers and steps off on the body plan the distance from the centre lines to the outside of the hull on any waterline, this measurement will tally exactly with the measurement from the centre line to the outside line on the waterline plan at that station, and at that particular waterline. Similarly, if one steps off the distance vertically from a datum line to any of the intersections on the body plan, this measurement will be exactly the same as the distance from a similar datum line to the buttock line at the same station on the sheer plan.

Now having studied the fundamental ideas behind composition of the lines, how can we use them to produce a model? Well, there are two basic methods of building a hull, either by carving from solid timber or a solid block made up by laminations (bread-and-buttering) or by making a framework which can be planked to produce the desired shape.

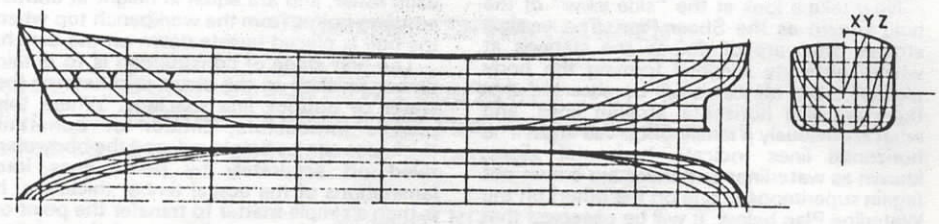
Let us take the simpler of these two first, *i.e.*, the bread-and-butter method. This can be sub-divided into two approaches, bread-and-buttering on the waterlines or bread-and-buttering on the buttock lines. With our previous knowledge we see instantly that the first of these means using horizontal laminations, and the second vertical laminations. The method of building is very similar for either approach, though for a good many years horizontal laminating was standard practice and few people realised the advantages offered by vertical laminates. The chief among these advantages is that work is saved in plotting since the planks will be in pairs as opposed to the horizontal method where each plank differs. Secondly, and almost equally important is the ease with which the symmetry of the hull can be checked during construction, since it is a fairly easy matter to check that corresponding laminations on each side terminate opposite each other, and are equal in height at corresponding points from the workbench top when the hull is placed upside down on the bench.

The first stage of construction is to obtain timber finished to the exact thickness of the water or buttock line spacings. Where this proves impossible, timber of constant thickness can be employed, and the body plan ruled off accurately by pencil lines into laminations of the actual timber thickness. It is then a simple matter to transfer the point of intersection of the pencil lines and the existing cross-section lines on to the sheer or waterline plan at each station, giving a set of points which, when connected up, give new buttock or waterlines to which the timber may be cut. This is an easy matter if a spline of say ⅛ in. sq. timber is used to connect the points, and any inaccuracy or mistakes in transferring the points will show up instantly, since the new curves drawn will not fit in with the "family" already existing.

If the timber is now cut to the lines and assembled into a block, the result will be an embryo hull needing very little carving to outside shape. It will be, however, completely solid, and to reduce the amount of work entailed in hollowing the hull, most builders cut away part of the inside of each plank before gluing the laminations together.

It will be apparent that if one is sawing away the insides, it is desirable to cut fairly close to the required inside shape, and therefore the inside line to which one may safely cut should be plotted. This ploting is perhaps the longest job in the whole process, but the time taken in doing what is after all very light and quite interesting work is more than saved when it comes to hollowing the hull, which is relatively heavy work. The first step is to trace off each cross section of the body plan separately, including the lamination lines, either vertical or horizontal, plus, of course, the centre or datum line, whichever is needed. Note that it is only necessary to trace a half of each section.

The desired thickness of the hull should now be decided and drawn on each section *i.e.*, a ⅜ in. hull thickness means that a line must be drawn parallel with the outside line around most of the body, plus the thickening for the inwale which is standard practice, and, of course, any increase in thickness desired in the hull floor for the lead keel in the case of a yacht. It is now possible to see from any section the required width of any plank from outside to inside (or depth if using the buttock lines) at that particular station, and the inside points can be stepped off on to the timber and joined in a smooth curve. It is advisable to leave a 1/16th in. or so of timber when cutting to the line, just to be on the safe side. When the block is now glued together very little work will be required to complete the internal hollowing, and in many instances, for example, where a hull is not required to be ultra-light, no hollowing at all may be needed, the inside lamination being left as a series of steps.



Gluing the block up under pressure is an operation which has frequently been described and offers no great problems, and it is hardly necessary to say that the position of each lamination must be completely accurate in the fore-and-aft direction, where slight misplacement can escape notice. To this end the separate planks should be placed on the drawing and the positions of the next lowest planks carefully marked. Most glues allow sufficient shuffling time for the planks to be manoeuvred into their exact positions.

It is now possible to carve the inside and outside of the hull to smooth shape, and if the planks are absolutely accurate and no thickness has been taken up by glue layers, the result should be the exact hull shape. Unfortunately some builders tend to leave it at that, with the result that a boat may be oversize or inaccurate in its lines due to minor inaccuracies in assembly, glue thickness, etc. For this reason, a template at each station should be cut from, preferably, ply or metal sheet, although at a pinch, stiff card could be used. These should be full templates, *i.e.*, one half should be traced and then reversed to obtain the complete shape. The centre line should be clearly marked, as should the deck level. Now when these templates are offered to the hull it will be apparent that any high spots, etc., will be easily discovered. The careful builder starts checking with templates when he still has at least ⅛ in. of material to remove.

Before leaving the subject of laminated hulls, let us consider the man who wants to scale a design up or down. Even scaling (X2, X1/2, etc.) is simple with dividers, but for an odd scale the easiest method is photostatic enlargement or reduction. What is not realised is that it is only necessary to have the body plan photostated to the required size and the planks can be laid out direct on to the wood by taking measurements from the body plan. The timber should be marked out with a line at each section station (a simple calculation from the original drawing) and the width of the plank at each station measured from the body plan and marked on the wood. A spline to connect the points in a smooth curve then gives the outside cutting line of the plank; the inside cutting line can be marked in exactly the same way.

For a planked hull only the body plan is really necessary, provided one knows the spacing of sections along the length of the hull. Each half-section should be traced, together with a centre-line, and then the planking thickness drawn in on the sections, plus the thickness of a rib if the section is not to remain as a permanent bulkhead.

For setting up on a building board, a line should be drawn above the body plan to represent the surface of the building board and all sections traced off to include this line, which ensures accurate positioning when the shadows are set up on the board.

Further constructional notes can be found in "Boat Modelling", "Power Model Boats," "Radio Control for Model Boats".

BACK TO BASICS

Back to basic what says he? Well, before I answer the question, let me tell you a couple of tales, possibly true and possibly not.

It appears that one of our more stalwart members was trying to measure voltage in a circuit one day. For no apparent reason the meter kept jumping off scale. It seems that he had it in the position for measuring current. Naughty! Naughty!

The other story is about another equally stalwart member trying to get the lights working in his vessel. The series-parallel dilemma was giving him some difficulty. He wasn't sure whether he needed more volts, more amps, more lights, more wire or what.

My last tale is about my good mechanical friend. When he was working on his latest electrical invention, I heard a spark, followed by a wisp of smoke and that most well known of all expressions - Oh S**t!

So says I to myself, maybe a couple of articles in the Binnacle, about electrical basics, might be of help to all concerned. Who knows - I might even get a smile out of our besieged editor Tony.

So here goes. I think the best place to start is to talk about the three most important terms in the electrical lexicon - namely volts, amps and ohms.

Volts is the term by which one measures voltage. Voltage can be either AC or DC. In this article I will just talk about DC or Direct Current. Alternating Current (AC) is what one encounters in the home. It runs your charger and just about everything else in your home. No, it is not AC that made those old washing machines go back and forth.

A DC voltage is produced by a source such as a battery or a car generator. Voltage can occur in another way as well. If current is passed through a device such as a resistor, motor, light etc. - a voltage will appear across that device.

Current is what a voltage source pushes through wires. One measures current in amps. If the current is very small one uses the term milliamps (1000 milliamps = 1 amp). Likewise if voltage is too small one measures it in millivolts.

A couple of paragraphs back we talked about voltage resulting from current being passed through a device. Sometimes we want to know in advance how much voltage will occur across a device if we pass a current through it. Similarly we may want to pass a certain number of amps through a device and want to know how much voltage is needed by a source.

This question was asked many years ago by one Georg Simon Ohm (1787-1854), a German Physicist. Good old Georg worked out the relationship between voltage, current and resistance and called it Ohm's Law. Just think if it had been a famous Englishman, it might have been called Marsh's Law.

Ohm's Law states that:-

$$V/I = R \text{ or}$$
$$I \times R = V \text{ or}$$
$$I = V/R.$$

In other words if 10 volts placed across a device results in a current of 2 amps, the device is said to have a resistance of 5 ohms. If the voltage is increased to 15 volts, 3 amps will result. Likewise, if one passes a current of 5 amps through a device whose resistance is 2 ohms, one will measure 10 volts on a voltmeter. And to cover the last possibility, 20

volts across a resistance of 5 ohms will result in a current of 4 amps.

It sounds simple, doesn't it. Well sometimes one measures the resistance of a device, follows ohms law and finds that the current isn't what one expected. For example if you measure the resistance of a motor, you will probably find it very low. So you connect a battery and expect a very high current. Your meter however, only shows a high current for a very short time and then settles down to a much lower steady current. So what happened. The simple answer is that although a motor has resistance, it is not a resistive device. So why mention it. Well, we all use motors in out boats and one should understand when to use Ohm's Law and when not to.

So what devices generally follow Ohm's Law. Lights, relays and of course resistors themselves are some. Capacitors, which we sometimes use, are not resistive devices.

I hope this has helped. If it has tell me. If it hasn't or could be clearer, let me know as well. Next month I'll talk about meters and how to use and read them. I might also get into the series-parallel thing. If there are areas that you would like to see articles on, give me a call. Until next time.

Derek Baker
658-2345

JACOB'S LADDER

As most of you are aware, we have a new ladder in the clubhouse at the pond called Jacob's Ladder.

What you probably don't know is the origin of the name. It appears that one of our executive decided, during the last war, to join the navy. One of his early postings was to Halifax on the East Coast. One is led to believe that while he lived on the West Coast he had a bit of a reputation as a roving Casanova.

On arriving in Halifax he thought that he should maintain that reputation. Unfortunately, the girls were all about 10 feet tall. Not to be deterred our stalwart stud built a ladder. To this day it has been know as Jacob's Ladder. What isn't clear is whether our new club ladder has been suitably christened.

From the Pres.....

CHRISTMAS DINNER

Our annual Christmas dinner is fast approaching and will be held at the Fleet Club on December 14. This is our regular meeting night so there is no need to change your routine. Don't forget it is also the time of our annual elections and this is another good reason for attending. The cost this year is $11.00 per person and the menu includes 4 salads, cheeses, fruit, Baron of Beef, B.B.Q. Ribs, veggies & tea and coffee.
Tickets must be purchased prior to the dinner and will be available on the meeting night of Nov. 9 from our treasurer, Don McLeod. No tickets will be sold after Dec 1st. Don't forget, wives and friends are welcome.

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If you read the article by Derek Baker on the previous pages, you may be interested to know that a booklet called "Getting Started in Electronics" is available from Radio Shack. (part # 276-5003 @ $3.59) As well, a number of booklets entitled Engineers Mini-notebook (555 timer circuits, basic semiconductor circuits etc.) are also available. AAsample circuit is shown on the next page.

Ron

ADJUSTABLE SIREN