March 2021 Volume 43 Issue 3

The Binnacle

Victoria Model Shipbuilding Society
Victoria, B.C.

Ken Lockley

Lots of Tugs and a great modeller, Vic Smeed.

Edward White

How Much Power Pt. 2. and new takes on sails.

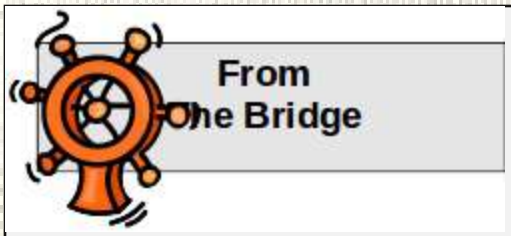
Plus

Ron is getting hopeful and Rick warns that Glasses and Cyano glue don't play nice.

Preussen

Becos!

http://www.vmss.ca



We have finally received some good news about this pandemic. Dr Bonnie Henry is predicting that we can return to some normal activities this summer. I am looking forward to this. Just enough incentive to finish up my Covid model!

Other good news is that the city has reinstalled the loading zone and 3 hour parking restriction at the parking area at Harrison Pond. While parking is a problem along Dallas Road due to construction, it is great news that parking is better for us and the people who walk in the area because local residents can't store their vehicles in those slots.

We still can't meet as a group, either at the church, Harrison Pond or Langford Lake, but individual members can use the pond through out the week. And several of us do.

The Zoom meetings are going well. The minutes from the last one are in the Binnacle. We don't have any business to conduct, so it is a social meeting. Jump in and join the discussion. It's fun to stay up to date with our friends' projects. Just click on the link in the e-mail I send out and you will be admitted to the group.

See you Thursday

Ron

2020 Executive Committee

President: Ron Hillsden	*479-5760*
Vice-Pres: Dave Nelson	*812-1942*
Secretary: Elgin Smith	*384-0574*
Treasurer: Mike Creasy	*888-4860*
Director @ Large: Ken Lockley	*477-5830*
Binnacle Editor: Edward White	*385-6168*
Quartermaster: Vacant	
City Liaison: Mike Claxton	*479-6367*
Membership: Bev Andrews	*479-2761*

All above area code (250)

ON THE RADAR

Upcoming Events

Meetings: Second Thursday 7:30 on Zoom.
Upcoming meeting: 11th March

Sundays 9-11
Harrison Model Yacht Pond (HMYP)
Dallas Road at Government Street

LANGFORD LAKE
Wednesdays 9:30
Langford Lake, Leigh Rd. at Trillium

Victoria Model Shipbuilding Society
Minutes
Zoom Meeting February 11 2021

Welcome: 12 members present. No New Members or Guests

Outreach: Arnold had surgery recently. Is recovering from home.

Old Business

- 26 have paid dues, You can pay dues now, either by cheque or e-transfer,
- Other projects, such as the asset inventory, holding until Covid over . Dave North reports that the Asset Inventory is probably complete, and he is prepared to proceed with the inventory of models owner by club members if members send him information and photos of the models.

New Business

- If you have a new boat, please send a picture or two to Edward for inclusion in the Binnacle
- A discussion about parking at Harrison Pond. It is not a major problem right now because we use do not use the pond as a group. The parking area is one of possibly two areas on Dallas Rd that is not time limited. Mike Claxton will investigate to see if we can determine who we have dealt with in the past. ADDENDUM: On February 12 Rick Gonder determined that the city will be re-installing 3 hour parking limit signs in the parking pull out. Thank you Rick.
- Poll – Do we want to record these Zoom meetings so absent members can view them later? No objections, so we will include it in the review of the Protection of Privacy Act compliance to be conducted by executive,

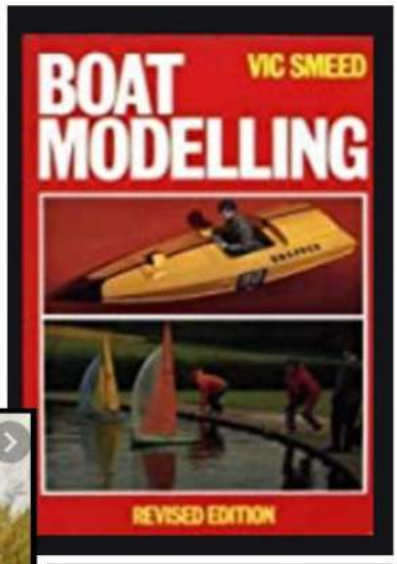
Round-table

- Rick Gonder showed us an airbrush that has an integral compressor and air tank. Lots of interest. He will tell us the website.
- Ken Lockley showed us his current project, a British tug Tusker
- Calvin VanE showed a little voltmeter he found at Quayle. Turns out Mike Creasy has these in the goodies he is selling on behalf of the club.
- Jim Cox showed a small glue injector called a Monojet injector. You can bum used ones from your dentist or purchase from a pharmacy
- Calvin reported he has been repairing or nets and towels from Harrison Pond.
- Jim was leading a discussion about the Wednesday morning gatherings at Langford Lake when the 40 minute Zoom clock

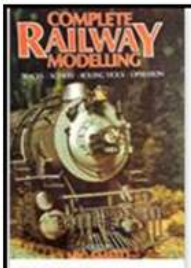
NEXT Build #42: Ken Lockley MARCH 2021

A TRIBUTE TO VIC SMEED

It's ten years since "Vic" passed away and I know many members of the club will remember what a huge contribution he made to model making. His first choice was Aircraft but Boat Modeling was never very far behind. I think over his long career he covered it all. The late Vic Smeed was probably the most prolific designer of model boats and aircraft in the world. Also editor of "Model Maker" and "Model Boat" magazines for many years.



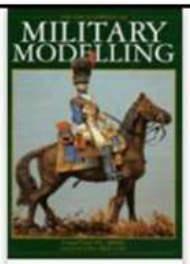
Here's Vic launching a Signet class sailboat around the 1970's . There really wasn't one aspect of Miniature modeling he didn't touch in his lifetime.
The book covers below shown his diversity as a craftsman.
You may wonder about this little tribute in todays modelling . I guess I feel we model he present, the past and future. Back in the 1950-80 's Vic's designs were the present and were very much part of our club's plan inventory and also at that time we had a a library where several of his books were featured. Look at what you see below!!!!



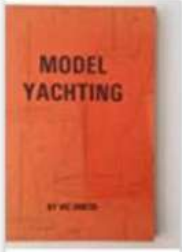
Complete Railway
Vic Smeed
from: **$4.19**

Scale Model Ships
Vic Smeed
from: **$12.09**

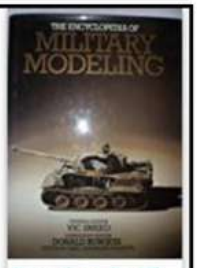
Encyclopedia Of Model Aircraft
Vic Smeed
from: **$4.99**



Encyclopedia of Military
Vic Smeed
from: **$7.69**



Model Yachting
Vic Smeed
from: **$28.09**

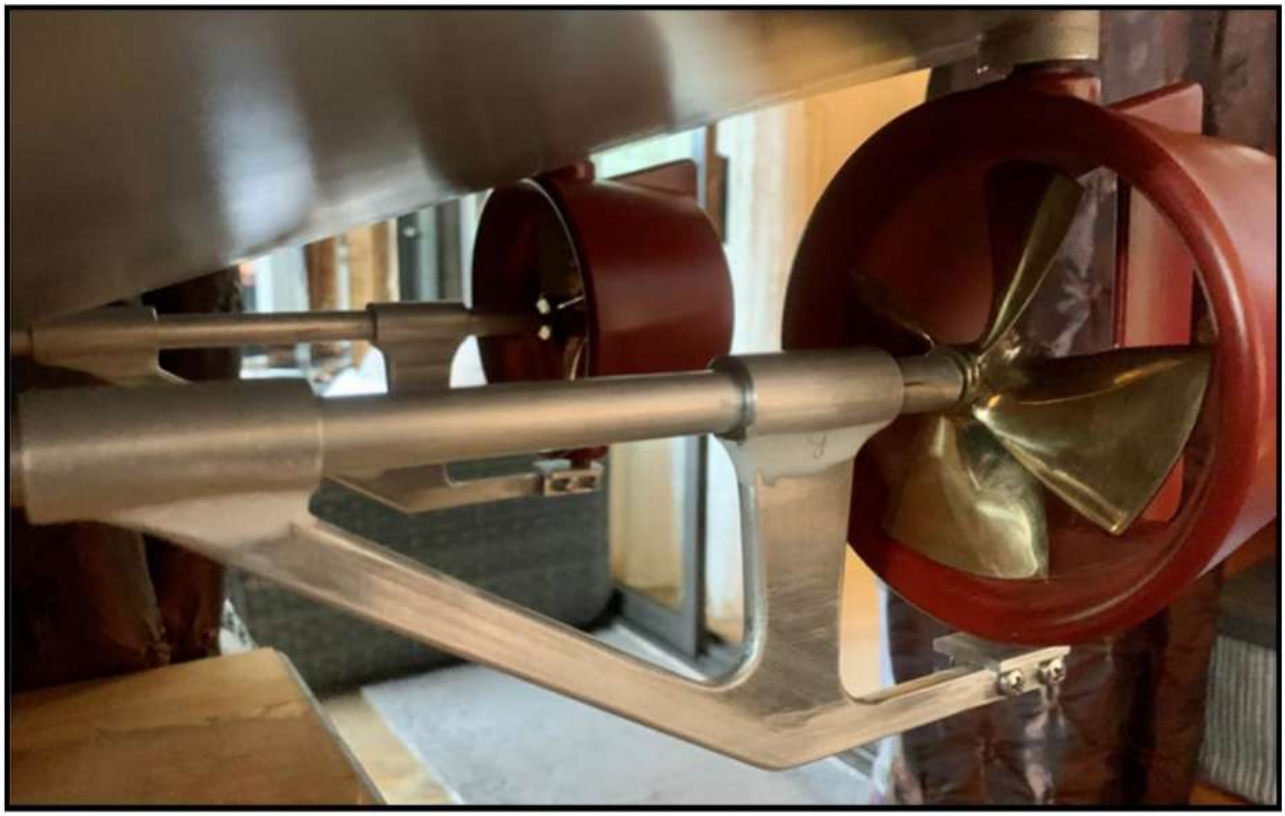


Encyclopedia Of Military Modeling
Vic Smeed, Donald
from: **$4.19**

The picture above is "Salvage Monarch" built in 1958-59 just before the St Lawrence seaway was completed. The vessel was one of the first in Canada to have Hydroconic construction , utilization of flat panels of steel and multi chine construction. This building process has become standard for tugs and fish boats over the last 60 years.
The vessel was built by P.K. Harris in Devon, UK. The April 2018 issue of "Model Boat" has a plan by James Pottinger of a tug very similar to the one above utilizing the Hydroconic construction process.

The picture on the right could easily have been taken at Point Hope shipyard here in Victoria. This the vessel, Meeching was one of the first built by PK Harris using the Hydroconic construction. Note how the flat panels using multi chines for the curve around the stern. Single or twin screw makes little difference once construction has started. The labour saving cost I suspect is substantial and I would be safer for the welders to deal with. The cost today of building a boat like this would be in the 15-18 million depending how equipped it is.

1970's. Refit at Everards, Greenhithe.
Kind permission of Peter Boyd



Harrison sailor, Cory Weins is under way with another build. This time he's contracted Ron Burchett to form the hull and install the shafts and Kort Nozzles you see above. The props look very special and these Korts have the rudders hanging behind.
Ron's had lots of experience with this type of engineering and it shows with the very clean installation. Cory did a great job on the "Smit" vessel he is currently using at the pond, so I'm expecting positive results this time around as well.

The picture here is of the is the vessel that Cory is building.

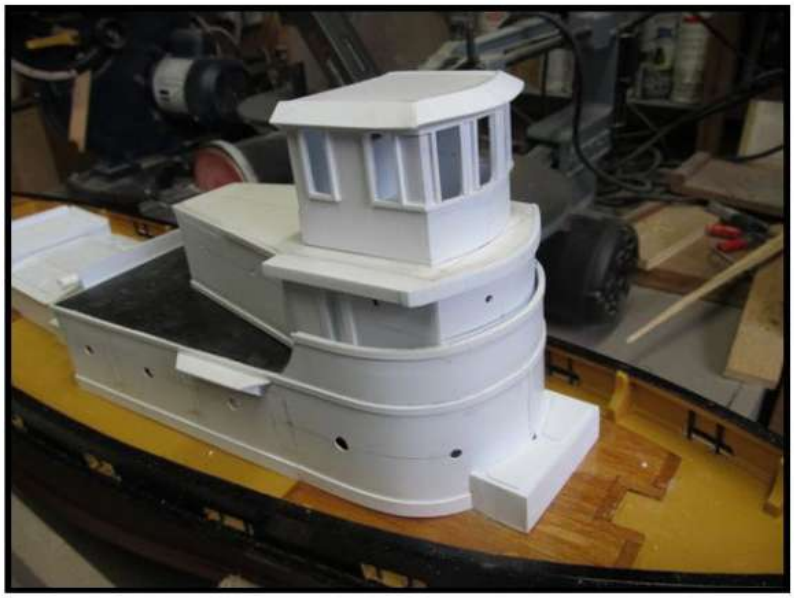
It looks like a harbour tug, working the busy Seattle and Tacoma water-front.

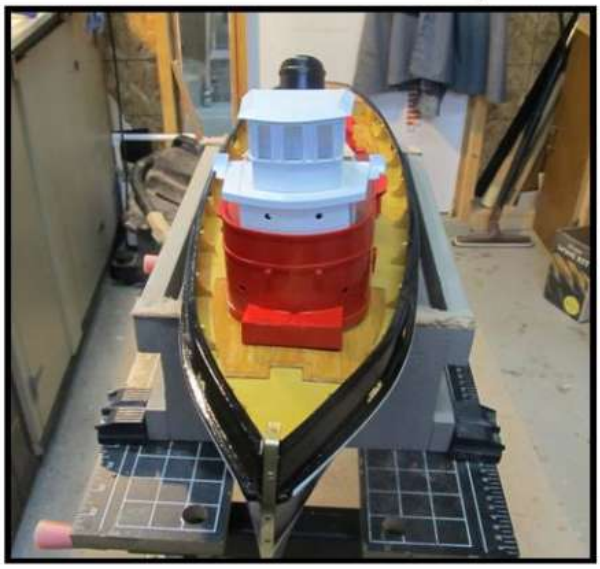
Cory is a profes-sional tug boat man working out Campbell River .

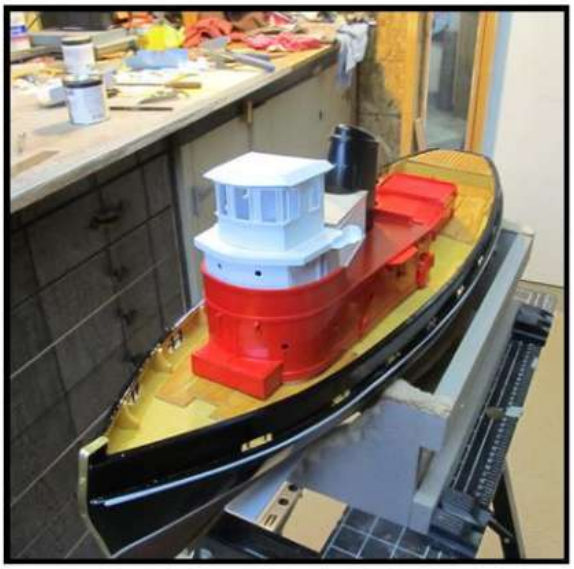
In the workshop!!

"Tusker" is the first three deck vessel I have built and has had me thinking about painting. Specifically the areas that are partially covering. I have decided each deck has to painted unassembled then attached, each deck from the top down.

I really enjoy the styrene construction after about 10 weeks of woodwork and painting.
There's a fair amount of metal railings and tow line guards over the rear deck to consider before I get much further.
I am really appreciating the deck detail that Jim Pottinger drew on the plans. Detail plans make for a detailed and well developed model.

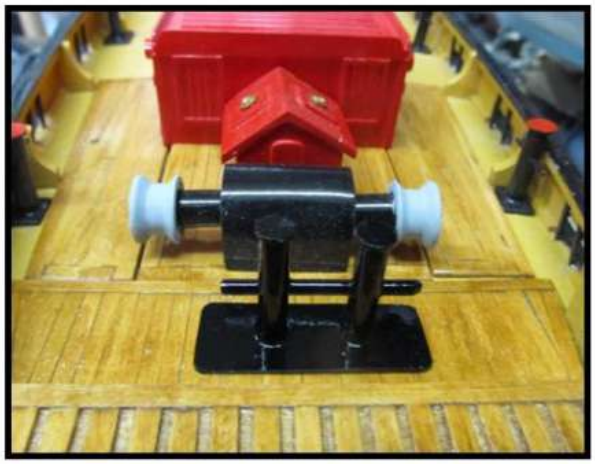






Some random shots of "Tusker" Nearing the final stages of completion.

We have had her at "Harrison" three times now and she seems to be performing as one would hope for. Lots of small stuff to do through the Spring months ahead. The lower right picture shows the handrails which are a bit unique, the silver inserts you see are ladies pieced earring backs, bought at "Micheals ". These earring backs make idea stanchion bases for .048 scale vessels requiring railing and hand grips around the vessel. I have made some purchases from "Harbour Models", port lights and cowl vents as well as life rings. Pretty fast mail service from the L.A. area .
Notice the partial wood just back of the winch made from basswood strips and stained a light oak. There's also the same partial decking in the rear third of the boat as well. This adds some



How Much Power Part 2, Consider the Prop.

It's time to look at the thing that actually converts the motor power into boat movement, the propeller. Or to give it its official name, the screw propeller.

The most important characteristic of the propeller is its diameter. That's because the area of water swept by the propeller is proportional to the square of the diameter. Double the diameter and the area swept is 4 times as big.

The most efficient propellers are, in general, the slowest turning. Because a slow prop produces less turbulence in the water, and turbulence is wasted energy. Theoretically, a propeller whose diameter is one third of the boat's beam, turning at less than 30 or so rpm. would be the most efficient.

But we're not going to achieve anything like that in a model, or even in a full size ship.

The next important characteristic is the pitch. This is the distance that the propeller would move in one revolution if it was turning in a solid medium, like if it was a wood screw. So the total weight of water moved by the propeller in one turn is a product of the area, (the square of the diameter) and the pitch. The pitch is determined by the blade angle and the diameter. But if a real propeller is to work well, then the blade angle must vary between the root, (where the blade meets the hub), and the tip. It must be much steeper at the root. For a propeller on a full size ship, where efficiency means big dollar returns in fuel savings, there is the money to machine the blade surfaces to very complex shapes and to get the blade angle right all the way. (But for our models, where the blades are made typically from flat brass sheet, twisted a bit as a gesture towards the correct angles, we are quite a distance away from the ideal!)

The energy, or power produced by the movement of that mass of water is proportional to the mass and the square of the speed. And the speed is the pitch multiplied by the rpm.

But water is not wood. So the propeller always pushes some of the water outwards as well as backwards, and hence it always moves a smaller distance through the water than the theoretical pitch. The difference is called, unsurprisingly, the slip. Slip and efficiency are related, but they are not the same, because while slip means wasted energy in water being displaced sideways rather than along the direction of travel, efficiency is also affected by random turbulence caused by the prop's speed and the water resistance of its appendages.

Now there's another sizeable problem in building scale ship models, arising from the physics. A scale model boat or ship will look best on the water when it produces the same wave pattern along its length as the full size. And that doesn't happen at the simple scale speed, (the full size speed divided by the scale), but at the full size speed divided by the square root of the scale. So a quarter scale model will look best not at 1/4 of the full size speed, but at half of it. So if our model propellers are to be to scale to look at, they will have to turn much faster than the originals did, in fact by that same square root of the scale factor. So for a 1:100 scale model of a Liberty ship, whose engines

turned at 70 rpm. to get 9 knots, the model's prop will have to turn at at least 700 rpm. to produce 0.9 knots.

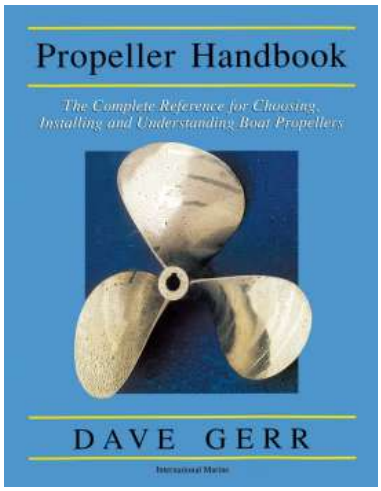
So clearly there are a host of fudge factors that are coming down the road towards us. But don't despair yet, there'll be plenty of opportunities for that later.

The ratio of the pitch to the diameter of the prop is called the pitch ratio. Pitch ratios can range between 0.5 and 2.5, but the general run of props are between 0.8 and 1.8. On full size props, a pitch ratio of 0.8 will produce an efficiency of around 65% and a pitch ratio of 1.4 will be close to the best achievable at 74%.

But efficiency is not the only criterion desirable in a prop. Obviously for a tug, low speed thrust is more important than efficiency, and for a rescue launch, speed is the main purpose. For a submarine, low noise is paramount, and for an auxiliary engine on a sailing craft, low drag when the engine is off.

For a scale model, looks are the most important thing. We want our models to look like perfect miniatures of the real thing. Efficiency is only important in determining how long we can run the thing before the battery dies, and since brushless motors and lithium batteries became available, that's a very small problem.

So we are going to buy a prop or props that are the correct diameter to scale, and in general the pitch ratio is going to be inside the range of 0.8 to 1.4 and a variation in pitch from scale is not going to be noticeable. We'll get a number of blades that is correct and a blade area that is convincing, and that's the end of our prop selection!



The book from which I am drawing most of this information, "Propeller Handbook" by Dave Gerr, has a huge and fascinating discussion of propeller design and performance that can boggle your mind for hours, but most of it is irrelevant to models just because our scale approach and limited range of products make it so.

Buy or borrow the book for its geeky pleasure, but for the rest of this I am going to get back to estimating how much power our boats will need for a typical scale model with it's proprietary brass prop.

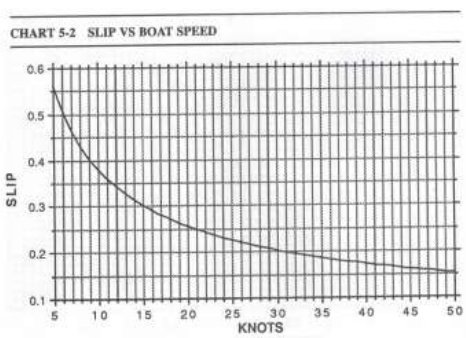


Chart 5-2. *This chart, constructed from Formula 5-2, shows slip as a function of speed. This empirical relationship, derived by the author, checks well against known values.*

So what are we going to be looking at in the way of slip? Gerr gives a boiled-down formula for slip of Slip = 1.4 / (speed in knots)to the power of 0.57. This has obviously been derived from real world data on the actual performance of typical full size props. Here's the chart he derives from it. It seems counter-intuitive that the only criterion for slip is the boat speed, not the prop characteristics, but I guess that his data comes from boats/ships

where the prop choice has already been generally appropriate.

With our Tribal class model of Haida, we left the calculation in last month's part 1 at needing 39 watts on the motor terminals to drive it at 3.7 knots.

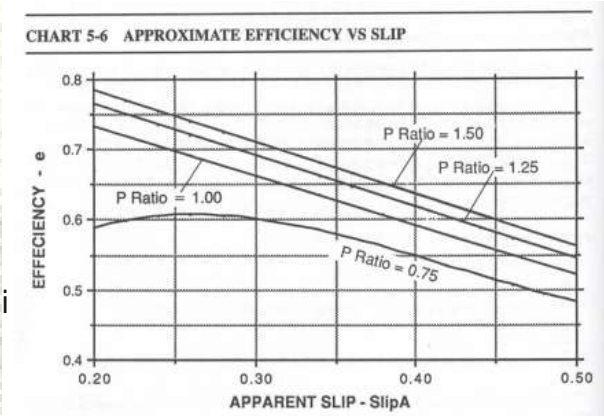


Chart 5-6. *Approximate efficiency relative to apparent slip for propellers of various pitch ratios.*

i

Gerr's formula gives us the slip at 0.66. Here is his chart for the relationship of propeller efficiency against slip. Extending the line of the Pitch Ratio =1 out to a slip of 0.66, will give us a propeller efficiency of only about 40% nstead of the 55% that the 39 watts figure was derived from. So our motor input power must rise to 39 times 55 divided by 40, which is 54 watts.

Haida had two props of 10.25 feet in diameter. That scales to 32.5 mm diameter for the model. The best choice from Harbor Models would probably be the 1 3/16 inch (30 mm) 3 blade brass with a pitch of 1.3 inches (33 mm). (US $ 23.95 each ouch!) But they are solid cast brass so I shan't have to derate them further for twisted flat blade construction.

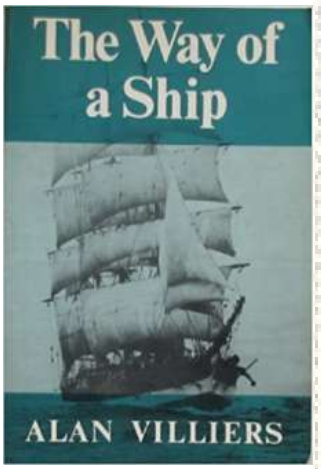
Now with a slip of 0.66 these props should send the Haida model forward 0.858 inches forward with each shaft revolution. We want it to make 3.7 knots, which is 4496 inches per minute. So our shaft speed will have to be 5240 rpm.

So, assuming we use a 3 cell lipo battery at 5000mah and 11.1 volts the full speed current will be around 5.5 amps and we will get 30 to 45 minutes full speed running out of a single charge. We'll need two 550 motors rated 6500 rpm at 12 volts and two 30 amp controllers.

The battery will weigh in at 320 grams and the motors at 230 grams each. That's 1.5 lbs out of our 6.4 lbs displacement. It all seems feasible with a little bit of lead ballast to help stability.

I wonder if any of it is right? Someone's going to have to build it!!!!

A Comeback for Sail.



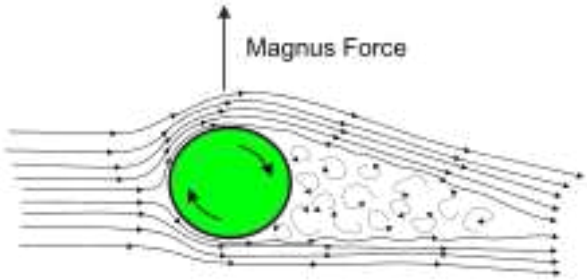
Many, many years ago, I read a book by Alan Villiers, "The Way of a Ship.

The book was about the last days of commercial sail, largely the guano trade around Cape Horn from Chile to Hamburg. One of the arguments made by Villiers in decrying the demise of sailing ships was that the successes of these ships was largely due to meticulous recording of weather patterns by their masters. Thus they could find the fastest routes with heavy favourable winds. Villiers made the point that improvements in weather forecasting made during and after the second world war could have extended the commercial viability of sail.

In recent years, following such sailing races as the Whitbread, (now the Volvo) and the Vendee Globe. I am impressed by the fact that they are dominated by the use of satellite weather forecasts to keep the racing yachts in the heaviest of favourable winds in the Southern Ocean.

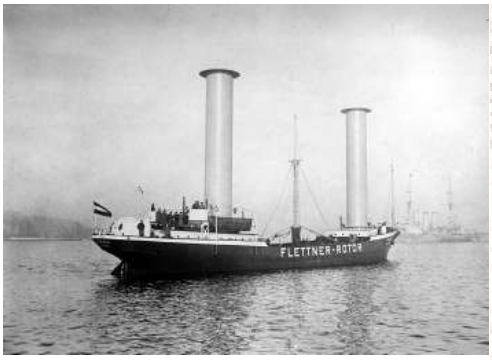
As we search for the means to reduce the pollution caused by world shipping, maybe some form of wind power could take advantage of this knowledge of winds to reduce the burning of "Bunker C", with it's really nasty emissions.

I was provoked into looking a little closer by my sister sending me an article reference on Flettner Rotors. So here, for your interest, are a few pictures of things going on in the commercial shipping world to exploit the wind.



First, the Flettner Rotor. This is a form of sail that uses the "Magnus effect" of a rotating object moving across an air current. It's the physics of soccer's "bend it like Beckham". The rotation carries some air around with it close to the ball's surface, creating high and low pressure sides that produce a force at right angles to the direction of travel and the axis of rotation.

In the 1920s Anton Flettner developed the rotor sail, a vertical cylinder that was spun in a cross wind and thus used the magnus effect to produce a forward force on a boat. He fitted two of these to the Buckau, (later the Baden Baden) which actually crossed the Atlantic using them. But this was the period when oil costs were dropping like a stone, and the savings couldn't justify the capital.



But in 2008, with environmental consciousness rising in Europe, the idea was revived and new ships were converted.

One of the first was the Enercon E-ship, built for a manufacturer of wind farm components to transport their product world-wide. You can see the four Flettner rotors at the corners. These are 27 metres high and 4 metres in diameter. They rotate at about 140-160 rpm.

Here's the Viking Grace, a cruise ferry running between Turku, Finland and Stockholm with a single rotor or trial. It's been successful enough that Viking are building another with two rotors.

And the Estraden, a cargo ship again on the Baltic.

The Sea-Cargo Connector, interesting because the rotors tilt backwards to allow it under bridges, like my old Thames Barge model.

The big one is the Maersk Pelican. A tanker 245 metres long and 42 metres beam.

The two Flettner Rotors on this ship saved 8.2% of fuel costs over a full year of operation. She has been sold on by Maersk and now is renamed Timberwolf.

8.2 % of her fuel bill is a lot of money!

But there's more going on than just Flettner Rotors. There's big experiments with Kites!

Here's the Beluga Skysail. It has reported fuel savings of up to 15% from Germany to Venezuela.

And on the drawing boards.

Oceanbird, 80 metre telescoping wing sails.

And Vindskip, the whole hull is a sail!

Rick Gonder
A Cautionary Tale

I recently noticed that my prescription glasses were getting a bit foggy and that I was unable to fully clean the lenses. This morning I had my Optometrist examine them.

She confirmed that they had taken on a gaseous coating and asked if I was using any glue on a regular basis. I told her that during Covid I've been doing a lot of building and use Cyanoacrylate glue. I'm told that the foggy coating on my glasses is caused by the gasses emitted by the glue. From now on I will wear an old pair of glasses (and a mask) when gluing.

Thought you should all know.

Rick

The Victoria Model Shipbuilding Society is a non-profit club, open to all, established in 1978 under the Societies Act of B.C.