GREAT BRITAIN

THE 'ANNE B'

NEVILLE WADE BUILDS HIS MODEL, BASED ON THE GRAIN RACE BARQUE, PENANG

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ABOVE: This is Penang in the early 1930s, when she was still painted white

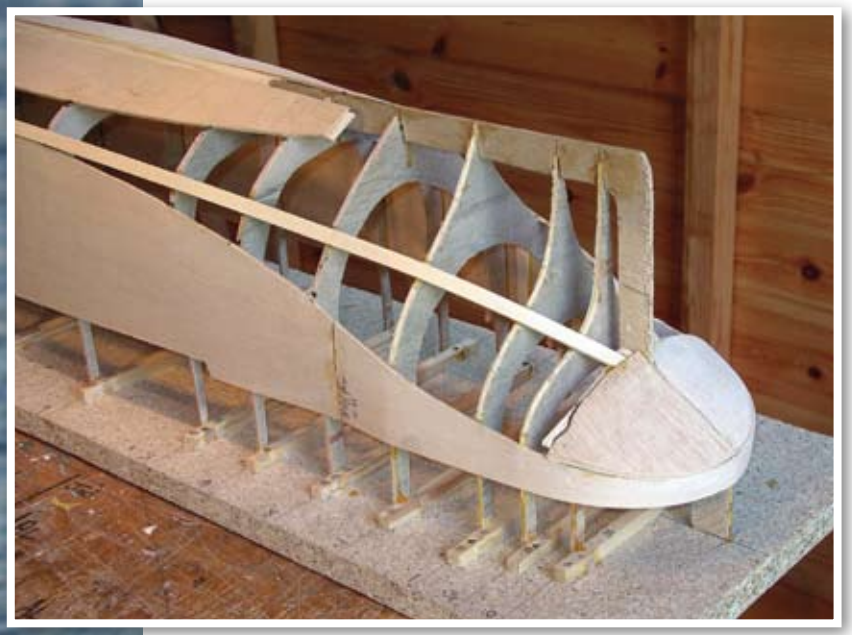
Windjammers were cargo carriers, with hull lines that were sometimes on the full side. From this angle the rather burdensome underwater shape can be seen

PENANG HISTORY

Penang was built by Rickmers, of Bremerhaven, in 1905. She was built for the firm's own account, to trade with the Far East, and was a barque (three masts, the forward two square-rigged, the aftermost fore and aft rigged) of 2000Ts, with a length of 265 ft. When she was built, ships of her size and above were increasingly given four masts. That meant that they had generally smaller sails, but more of them, giving them greater sail area, with sails that were easier to handle. Such vessels were therefore faster, and could be sailed with a smaller crew. Being built otherwise meant that she was at the end of a long line of barques, being on the large side for such a rig (Note that this does not include four masted barques, which were to continue as the very last commercial sailing ship rig). As such, she was a notable vessel, as all 'end of the line' ships are.

She sailed for Rickmers until 1911, when she was bought by the Laeisz, Flying P Line of Hamburg, and put into the nitrate trade with the west coast of South America. The outbreak of WWI found her in Hamburg, where she remained until 1917, when Laeisz sold her to Nurminen of Helsinki, and she passed finally to Gustav Eriksson, of Mariehamn in the Aland Islands, in 1923. He had her in the Chilean nitrate trade until such charters were unobtainable for her, and then she moved into the grain fleet, bringing wheat from Australia in 1928. It speaks volumes for her strength and sea keeping qualities that she should have prospered in the trade to Chile from 1911 to 1928. She may not have been the fastest of sailing ships, but she surely was one of the strongest.

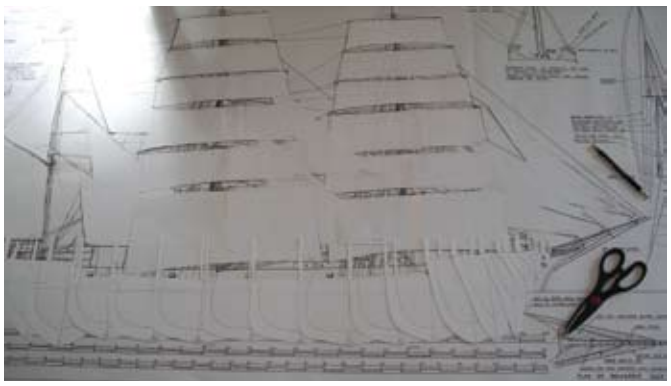
She sailed for Eriksson for the rest of her life, taking part in the annual 'Grain Races' from Australia to Europe throughout the rest of the 1920s and '30s. In this trade the ships more often than not had to sail out to Australia in ballast, but Penang did manage the odd outward cargo. She suffered a partial dismasting in 1938, having to put in at Dunedin for a repair, which took two months, and embarked on a tragic last voyage from Port Victoria, in Spencer's Gulf, in July 1940.



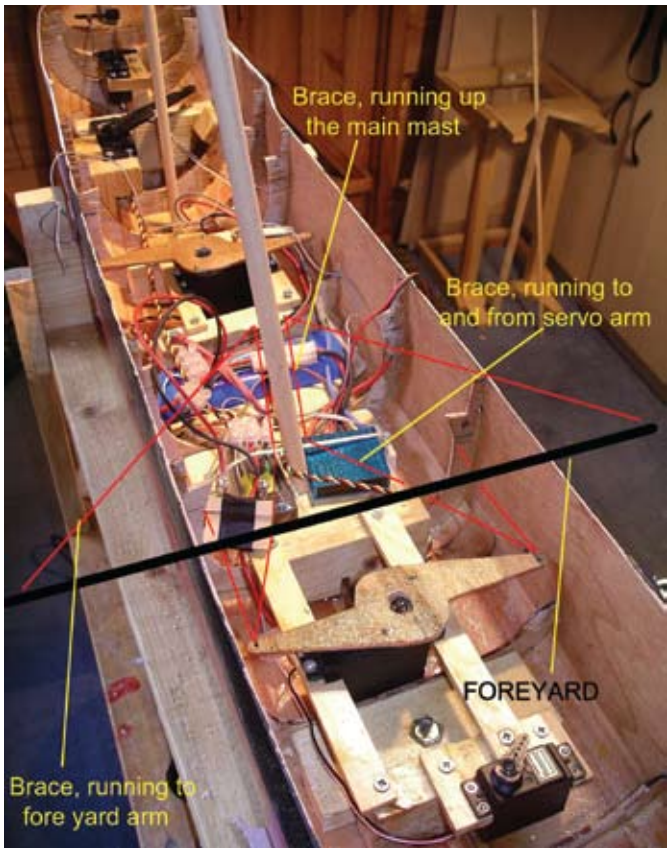
The stern. I use as many large(ish) sheets of plywood as I can, and fill in with lime wood strip

As she was approaching the end of the passage, in December 1940, she was torpedoed by U140, off the west coast of Ireland, with the loss of all hands. She was the last deep-water square-rigger ever to be lost to enemy action.

So, as you have seen, she was yet another 'end of an era' ship, with a long and colourful history, and her rig was of ancient design, and very handy at sea. Both factors were influential in the decision to build a model, based on her, and the following will describe how the Anne B turned out, as a replica of Penang.



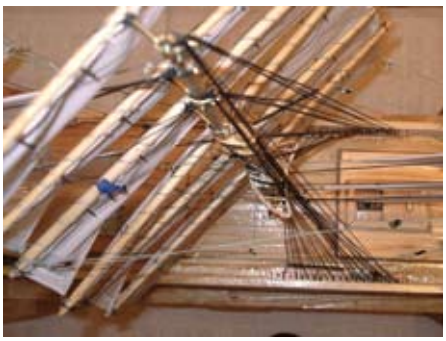
Harold Underhill's General Arrangement drawing of Penang, with the paper templates for sails, and hull frames, laid on it. This is the starting point, with six to eight months work ahead, probably a total of 400 hours work to do



The hull with all the electrics installed, and a schematic of the run of a fore brace superimposed, complete with yard. The sail arm servos for the fore, main and mizzenmasts can be seen, as well as the small servo for the outer jibs. See text for an explanation

The 'false deck' between the fore and main masts, with the small servo for the outer jibs, and the sail arm servo for the foreyards, seen below deck. The large bolt head in the centre of the picture is one of the locating bolts for the detachable sailing keel

The scuppers. The black and white lines are the shrouds and backstays, the standing rigging, attached to 'ring bolts' in the deck. Between them are the buntlines, part of the running rigging, attached to the belaying pins in the pin rail. Behind the backstays are the gunwales, the rail atop the bulwarks. See text for an explanation



Looking down from above the main mast, with the shrouds and backstays fanning out from the mast to the bulwarks. In this picture, the yards are not braced fully round, on to the backstays, they will go further, and will need to do so to sail close to the wind

BASICS: THE HULL

The hull was built using plank on frame techniques, but I used as much plywood sheet as I could to make its 'skin', filling in any gaps with 8 x 2 mm lime wood strip. After sealing the outside, I used fibreglass tissue and resin, on the inside, to strengthen the structure, before the work of rubbing down and painting was done. The rudderpost was made from brass rod, mounted in brass tube, set through the hull. The brass rod was bent in a kind of zigzag, which was sandwiched between two sheets of plywood glued together, which made the rudder blade. The blade therefore turns as one with the brass rod, when connected, within the hull, to the servo operated rudder horn.

At this stage, the electrics were installed in the hull. I used five-channel radio control, to operate the rudder, the fore and aft sails on the mizzen (third) mast, the main mast square sails, the foremast square sails and the two outer jibs. A 7.2 V battery powers the system, and an electronic speed controller is connected to the receiver, to control the output to the servos. I used sail arm servos to operate the yards, and 'normal' servos to operate the rudder and the outer two jibs. The sail arm servos for the yards were fitted with centrally pivoted servo arms, and that for the fore yards was fitted abaft the foremast. The one for the main yards was fitted abaft the main mast, and the sail arm servo for the mizzen, fore and aft, sails had a conventional servo arm fitted, pulling the sheet 'in' and 'out', and was mounted abaft the mizzenmast. The system is fitted with an on/off switch above deck level, under a deck house, and two charging points just abaft the main mast, so it is not necessary to 'go below' to charge the battery.

As in all my square-rigger models, the yards are operated by braces, connected to the frames of the ship, and led through links at the ends of their servo arms. They are then led up through the deck at the side of the next mast astern of the yards that they are to control, up that mast, and then forward to 'their' masts' yards, at the appropriate heights. Thus, the foremast braces are led up either side of the main mast, and the main mast braces are led up either side of the mizzenmast. One of the pictures attempts to illustrate this, with a schematic superimposed on the picture. If you imagine the servo arm at the bottom of the illustration rotating, and pulling the braces, you should be able to imagine the 'yard' bracing around correspondingly. Two yards on each square-rigged mast are controlled in this way, the course yard (the lowest) and the lower topgallant (third from the top). This arrangement attempts to spread the bracing effort all the way up each mast.

The 'normal' sized servos were fitted as was convenient, one to operate the rudder in the normal manner, and one, fitted just abaft the foremast, to control the sheets for the outer two jibs.

The three lower masts, and the bowsprit, were located very robustly into the hull, using wooden blocks at their heels, and, in the case of the masts, in thwartship pieces of wood, at deck height, to set their angle in relation to the deck. These 'thwarts' were also used to set the camber of a 'false deck', made from thin ply wood sheet glued across them. Also set into wooden blocks in the ship's keel were two 8 mm diameter bolts, from which the detachable 7 kg sailing keel is hung.

On the port tack on a cold, blustery day, with the winter sunshine catching the after side of the square sails

A view from the lee bow, sailing close hauled on the port tack

This is 25 mph of wind, and, even with a 7 kg keel, she has as much wind as she can stand, without reducing sail. Even in these conditions, she can be tacked with assurance

Running before the strong wind. From this angle she has a graceful hull, with good sheer

I have used detachable sailing keels from my other square-rigger models to perform the same function on this one, by drilling holes in their mounting flanges, to suit the bolts in this keel. I made a 5 kg and a 7 kg keel suitable for fixing to this hull, and tried them both in sailing trials after the vessel was finished.

After fitting the 'false deck' and gluing in suitable hatch coamings around the deck openings, I thoroughly sealed all the 'corners' against water ingress and fitted each 'hatch' with a flat cover, duck taped in, to seal it as well as possible against leakage. Next, I planked the decks with 8 x 2 mm lime wood strip, and made and fitted deckhouses and hatch covers over all the deck openings. The objective was to ensure that water did not go below, as windjammers will dip their lee rails under. To further aid this process, large freeing ports were made in the bulwarks, the better to drain the decks quickly.

BASICS: THE MASTS, YARDS AND SAILS

The masts are made from simple dowel, the lower masts set into the keel, as described above, and the topmasts and topgallant masts attached as the real thing, via doublings. The yards are also made from dowel, and are attached to the masts by brass rods inserted into their centres, and bent into a 90-degree bend. On the masts are fitted brass sheet 'collars', one for each yard, each of which holds a section of brass tube on the forward side of the mast. The brass rod on each yard is inserted into the brass tube on the mast, thus pivoting it about 15 mm forward of the mast. It is vital to pivot the yards in this way, in order to allow them to swing right around, to within 30-degrees of the centreline of the hull, on each tack.

The boom and the gaff on the mizzenmast are also made of dowel, and are attached to the mast by commercial goosenecks.

The sails are made of kite material, and are sewed on to their yards or boom and gaff. The bottom corners of the square sails are attached to the yards beneath by lines, sewed into the sails, and tied to the yards, except in the case of the topmost two square sails on each mast, and the two courses, the lowest sails on the two square-rigged masts. The two topmost square sails, the royal and the upper topgallant, each have hooks sewn into their bottom corners. These hooks engage in wire 'goalposts' fastened in the appropriate places on the yards below, so that these sails can be removed, to reduce sail in exceptionally windy conditions.

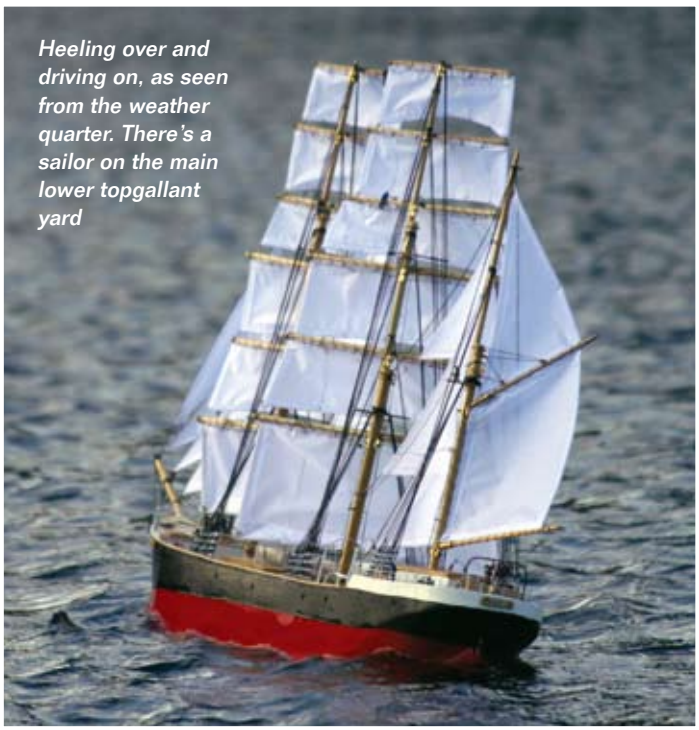
It is necessary to take the wind on the forward side of the square sails sometimes (see later), and sails that are fastened to yards above and below them can do this very well. In the case of the courses, it is rather different. On the real ship, the courses are 'loose footed', their bottom corners are located by lines, called 'tacks' running forward, and 'sheets' running aft. We cannot arrange things in this way on a model, so a different solution has to be found. I use stiff wire, sewn into the edges, and across the bottom, of my courses, so that, when the wind comes from in front, the plane of the sail is maintained, and the sail does not simply wrap itself around the mast. In order to hold the sail in position when the wind is from behind, I attach an 'endless sheet', running from one bottom corner of the sail, to the other, via ring screws, set into the deck, just in front of the next mast astern of the course in question. When the wind is

This is why sailing ships had flared bows! The deeper she drives into a head sea, the more buoyancy she has, and the better her chances of rising to it

Solid water comes over the side in this picture, just like the real thing. These are the best conditions for sailing a windjammer model!

from astern, the sheet holds the sail back, into it, whilst allowing it to be braced to any angle.

The fore and aft sails, (other than those on the mizzenmast), the jibs, set from bowsprit to foremast, and the staysails, set between the masts, are set on stays, and held in place by halliards and downhauls. The gaff upper topsail (highest of the two on the mizzenmast), and the two royal staysails (the highest sails between the masts) are removable, as are the two highest square sails on each mast. Thus she can be 'shortened down' in heavy weather.



Heeling over and driving on, as seen from the weather quarter. There's a sailor on the main lower topgallant yard

SAILING A SQUARE-RIGGER

With the wind from astern, sailing a square-rigger is reasonably obvious, the wind will push her along, and all you have to do is steer, and let out the spanker (the lower fore and aft sail on the mizzenmast), and the jibs, keeping the yards slightly off 'square', across the ship, to better catch all the wind. You will soon run out of space on a pond, as the real ships did, as they went around the world. Or, the wind will change direction, sometimes coming unexpectedly from ahead, and then you'll have to understand how to use the forces involved, just as sailing ships' captains had to do.

A square-rigger will only point so far up to windward. Whereas a yacht can get to about 35 degrees to a head wind, a square-rigger will only manage about 65 degrees. In order to do that, the sails have to be braced to as near fore and aft (like a yacht's) as possible, which means that the yards have to be able to swing as far round as possible, hence the need to mount them forward of their masts (see earlier). Working against our ability to do this is the fact that our model courses have wire sewn into their bottom edges. The masts are supported by 'standing rigging', the shrouds and backstays, which run up from the bulwarks at either side of the ship, to various points all the way up the masts. As the courses on the real ship were loose footed, they could be manoeuvred round the standing rigging easily, to set them up as near fore and aft as possible. On our model, the standing rigging gets in the way of the wired courses, and can prevent them bracing as far round as is necessary.

On models of older ships, with the standing rigging set-up to attachment points outside the hull, this problem is worse than on models of the later square-riggers, where the steel wire rigging was set-up to anchor points within the bulwarks. On my models, I've used two solutions to allow the courses to be braced right round. I try to allow my anchor points to be a little nearer the centreline of the deck

***BELOW:** Looking very lively, on the port tack in 20+ mph of wind*

than they would actually have been, to keep the standing rigging away from the braced courses, and, if all else fails, I miss out some of the forward shrouds, so the interference is removed. Happily, on the Anne B, the former solution worked OK! (See picture of the bulwarks and standing rigging).

So, having acquired the ability to brace the yards as much as necessary, we'll look at what's required to head back, into the wind, after our 'run', with the wind astern. We shall have to turn, back, into the wind, so, if we turn to port, we have to brace the yards around, on to the port tack, with the port side of the yards as far forward as possible. It will help us make the turn if we pull in the sheet of the spanker, and let out the sheets of the outer two jibs. Doing these things will push the stern round, and let the bows come to windward more easily. When we are as close to the wind as possible, say about 60 to 65 degrees, we will centre the rudder, and sail at that course, upwind. The spanker can be let out a little, to give a little more impetus to the vessel, and the jibs pulled in, to keep her head 'off' the wind.

We will sail at that until we start to run out of room on the pond again. At that point we will have to 'go about', by turning, to put the ship on the 'other tack', to continue to make progress upwind, where there is room. Now we have to turn, on to the starboard tack, and the sequence of actions required is as follows. The spanker is pulled back in, and the jibs let out, and the rudder is turned hard to port. As the vessel turns, her head (bows) will come across the wind, and the sails will start to take the wind from their forward sides. As this starts to happen, the yards on the main mast will be braced round, on to the starboard tack, to take the wind from astern, and hold the ship, stopping her from making sternway. Immediately after this, as the bows are across the wind, the sails on the foremast will be 'taken aback', and will push round the ship, so that she successfully makes it on to the new tack. At this point the jibs are pulled in again, the better to cant her round, and then the foremast yards are braced on to the new tack, and will start to drive her forward. As she re-gathers headway, the spanker can be let out, to increase her speed, and away we go, on the new tack.

Progress up the pond can be made thus, going from one tack to the other, until it is time to turn away from the wind, to 'run' back down the pond again. This is simply achieved by turning away from the wind, from whatever tack we are on, squaring the yards on both masts as we go, and continuing back down the pond, until it is time to turn, and return again by tacking.

All these manoeuvres require good judgement of the wind at the boat, but it is something that is relatively easy to pick up, and great fun to do. I can assure anyone that it is never boring, sailing a square-rigger model! The transmitter controls need to be set-up in such a way that all the above can be done with the minimum of fuss, and I set-up my transmitter to use the controls as follows. The left-hand stick controls the fore yards, from tack to tack, in the left/right axis, and the main yards in the up/down axis. The return springs have been removed from both axes, so that the stick will stay where it is put, and, therefore, you can place any yards, in any position, using the stick like a computer joystick. The right hand stick controls the spanker sheet in and out, using the up/down axis, with no spring loading, and the left/right axis controls the rudder in the normal, spring loaded way. The sheets of the outer jibs are let out, or pulled in, by the use of the simple toggle switch on channel 5.

SAILING THE ANNE B

Having covered the theory, let's look at how she did in practice. The Anne B is of about 1/73rd scale. I've built two other square-rigger models to about this scale, both with 7 kg sailing keels. On both of them, I've managed to use 5 kg keels as well, and gained better handling as a result. On the Anne B I hoped to do the same thing, but, in the event, it has proved impossible. She must have a hull with slightly higher displacement, because she needs all of the 7 kg keel, both to look right, and to sail well. This was apparent during trim trials with the empty hull, and on the maiden voyage, but has proved to be no drawback to fine sailing.

She will pick up speed well from a standing start, and is capable of maintaining steerage way, even in very light winds. The ultimate test of a square-rigger model's ability to sail is the ease with which she can be put about, from one tack to the other. It is vital that she should remain under way, as she is turned across the wind, so that she does not stop in her tracks as her bows go through the wind, and end up sailing backwards! The Anne B does very well in this regard, the heavy keel assisting in maintaining momentum, and providing smooth transitions from one tack to the other.

The ultimate model square-rigger sailing pleasure comes as powered models, and some yachts, are taken off the water. When wind strengths rise, and the water is lively, that's the time the square-rigger comes into her own. The stronger the wind, the better will she sail to windward, and the closer she can be brought to the wind. The Anne B is particularly good in these conditions, with individual control of single square-rigged masts allowing them to be braced exceptionally far round, and the large spanker and gaff upper topsail giving excellent guidance to the ship during tacking.

The end. The very sad sight of Penang sinking off Ireland, in December 1940. All hands perished in this, the last sinking of a sailing ship by enemy action

The last item that I can control is the in and out motion of the outer two jibs. This is a feature that I've not fitted to my earlier square-riggers, and I was interested to see what, if any, difference it would make to sailing. In practice, it only makes a small difference, as you might expect, but it is a noticeable one. In heavy weather, real sailing ships reduced sail from the top down, but they also took in the main course early, as it was very heavy, and took a lot of furling. The foresail (the course on the foremast) was treated differently, however, as it gave lift to the bows of the ship, and helped her to rise to the seas at her bow. The foresail was, therefore, left set, along with the lower topsails, during conditions up to, and including, hurricanes. Now the foresail is always set on the Anne B, so its effect is always there, but I can let out the sheets of the outer jibs, which I can't on my other models, and, when they are 'out' the effect is to help the bows lift a little more than is the case on my other vessels. When I pull them 'in', I can still have the advantage they give, of helping to push the bows across the wind, mentioned above.

IN CONCLUSION

Penang was a well-known ship. She had a long career, in many trades. Personally, even though she was a little large for the rig, I think she is a good representative of barques as a whole, and it has been a pleasure to keep alive the memory of her kind. As the Anne B, she has shown herself to be a good sailer, which makes her great fun to have on the water, especially as she will happily contend with winds of 25 mph, and above. The appearance of her hull in the water has been an added bonus, as it is more graceful than I would have expected from such a cargo carrier. She has proved to be an excellent, highly tractable vessel, with no vices, and I wouldn't hesitate to recommend her to anyone hoping to build a square-rigger model. ***MMI***