Ship Report Transcript
Thursday, May 16, 2024
By Joanne Rideout

It's time for the ship report the show about all things maritime. I'm Joanne Rideout. It's Thursday, May 16th, 2024.

Well, I'm always on the lookout for and interesting maritime things that I can talk with you about here on the show, especially things that have to do with stuff we can see here locally on the water or related to it.

And I was driving along the Astoria waterfront yesterday and I noticed that at least two of the ships in the Astoria Anchorage have what is called a plumb bow, meaning a bow that goes straight up and down And I have not talked about this on the show in a while, but it's something quite common to see on the river. And ships are designed this way for particular reasons. So it's the slanted bow that we're used to seeing ships where the bow part of the ship ends at the waterline. But the top edge of the deck and hul continues forward of that on a forward slant into a point. This is the graceful profile that we're used to seeing on ships and most recreational boats.

It's a beautiful, traditional sight, but newer ships and boats and sailboats to have in some cases gravitated toward this plumb bow design. and I thought I'd talk about that today, at least what I knew about it. Now, ship design is a complicated subject that is truly the province of engineers and naval architects. But there are a few things I can touch on today that will perhaps make you take a second look at the ships you see and notice their design features like a plum bow.

So let's start with the name plumb. We're not talking about fruit here. We're talking about the word plumb, which means vertical, straight up and down, and can be measured with a small, pointy, heavy piece of metal that you can tie to a string and use it to measure verticals. It's called the plumb bob.

My dad had one in his toolbox, and I was fascinated as a kid when he showed me what it could do and how people building things could use it to tell them when something was straight up and down. You can see how that would be very important.

The origin of the word plumb comes from the Latin word plumbum, which means lead. Early plumb bobs used lead weights connected to a string to find a perfectly vertical line, thanks to gravity, and lead is very dense and heavy for its size. And so that's a good choice for a plumb bob. Nowadays you see them made of brass and other dense metals.

Sothe plumb bow on a ship or a boat is about the front edge of the ship. For our purposes here, that is straight up and down instead of on the slant.

Boat and ship designs are always evolving in different ways. And so there is the traditional slanted bow, the plum bow, and even something called an x bow, where the bow of the ship slants aft or backwards at the top. So the water line is longer than the top edge of the hull at the very front of the ship, the bow on an x bow slants backwards, which looks odd, but is apparently very good in some situations. You see some newer support vessels with this design, which is supposed to help the vessel be less affected

by rough seas, so more stable and a more comfortable ride for those on board. That's always a good thing because uncomfortable rides cause crew fatigue, which can be very dangerous.

So those are some of your most obvious options with regard to bows, when you're designing a ship or a boat, and why would you choose one over the other?

Well, form follows function in ship and boat design. It's important to know how the type of bow you have can affect your ship or boat's performance. So let's talk about something called hull speed. Every displacement hull has a maximum hull speed that's as fast as it can go. Displacement hulls are regular boats whose hulls sink down in the water, and they have to push the water aside to get where they're going. so we're talking about now does not apply to fast boats like catamarans, which essentially skim across the top of the water and don't have to deal with as much drag as displacement hulls. But a traditional displacement vessel pushes aside or displaces a volume of water equal to its own weight. That is a lot.

In many cases, the decision on how long a boat will be has to do with how fast you want it to go. And the longer a displacement hull on a boat or a ship, the faster, in theory, it can go.

How did they figure this out? Well, here's a quote from an article on the M.I.T. School of Engineering website. In an article entitled “What is the relationship between the links of a boat and its maximum speed?”

“In the 18th hundreds, William Freud Researching warships for the British Admiral, He observed that models run at speeds in proportion to the square root of their length. Although his ratio, known as the Freud number, is commonly cited in reference to speed. Nowhere did Freud make reference to a maximum or unattainable speed based on a craft's waterline length. His formula the boats created wavelength equals its whole length. In feet at the waterline is a rule of thumb, providing an approximate maximum efficient speed. Given the size of the wave created by a given boat. A boat moving through the water creates a pattern of waves, including one along the vessel's side that produces a crest of water at the bow and a trough at the stern. When wavelength is close to boat length, it creates a large crest that pushes the boat back to its own trough, and the boat will effectively slam up against A nearly impenetrable wall of water resistance, when it reaches that impenetrable wall, it just can't go any faster. And that limits the hull speed.”

So that's a very wordy way of saying that because of the physics of waves and boats, the longer a boat is or a ship is, the faster it can go. And this is a big deal when it comes to racing boats and other boats were speed is an issue, so a vertical bow could add a little bit of length and maybe make a boat faster.

But there's another very practical reason why a cargo ship in particular might have a plum bow that's to gain room inside the internal structure of the ship. Ships are kind of constrained to the form factor they've got. And while they continue to get larger in general, there's a point where there's diminishing returns on that huge ships are harder to control, as we've seen with some big container ships. And if ships get too big, they can't fit in the ports they need to call upon.

So designers seek to modify the shape of the vessel within the same general form to make more room inside. More room means more cargo, more money, more economies of scale.

And while it might not be noticeable to most observers, newer cargo ships, like the ones we see here on the Columbia, are wider and bulkier and they tend to have plumb bows for that reason. It gains internal

room inside the ship and allows more room for cargo, which is the whole reason for the existence of these ships in the first place, even though we enjoy looking at them.

So that's a little bit, a glancing look at why the ships we see look the way they do. Next time you drive past an anchorage on the river or see a ship going by, take a peek and see if any of those vessels has a plumb bow. Chances are, if it has one, it's a newer ship designed that way to hold a bit more cargo than the older, sleeker looking designs would allow.

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