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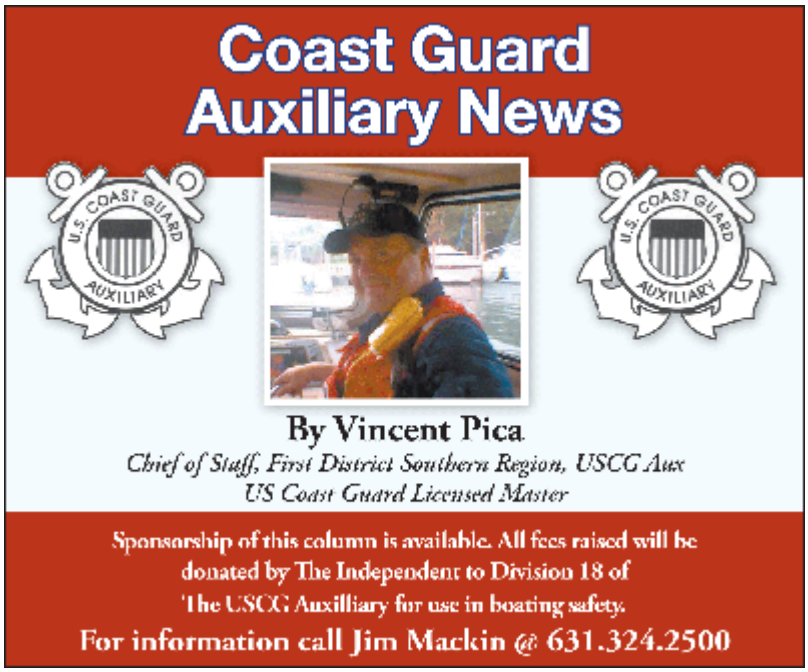

You Know Boat Trim, Do You Know Boat Squat?

When I teach seamanship classes, inevitably somebody raises his hand and asks about how "flat" the boat should be? I ask, "By 'flat', I am guessing that you mean relative to her waterline. But do you mean when she is sitting at the dock, going slowly forward but only at a 'slow bell' or making all deliberate speed?" As their eyes glaze over, I know that we will have to take it by the numbers. This column is about that.

Boat Trim

Understanding boat trim and boat squat are all about control and avoiding running aground. For a planing boat, i.e., those boats we're most familiar with that buzz around the bays and creeks, usually with an outboard engine on the stern, that "climb up" on to the water as they go faster, trim is synonymous with every aspect of the boat.

Whether it be at the dock, barely making way, or operating at speed, how "flat" she is, is largely under the control of the skipper and he or she should be constantly aware of what trim they are assuming. Trim is best controlled by the angle you place the outboard engine relative to the transom.

Usually in the throttle, there is a thumb control that when you press down, brings the propeller in closer to the transom. By bringing the propeller in closer to the transom, you force the bow down from its manufactured waterline. When you would want to do that?

How about if you were heading into strong wave action? If your bow was trimmed up, the force of the waves would accentuate that, possibly making it more difficult to see - and to control the boat.

Commensurately, if you press the thumb control to bring the engine up, it moves the propeller away from the transom, forcing the bow up from its manufactured waterline.

Why would you do that? Well, there are a number of reasons. For one, a powered vessel's fuel consumption improves as you reduce its wetted surface.

So, as you are cruising down the bay, you can trim the engine up and save fuel at a given rate of speed. If you are willing to throw fuel efficiency to the wind, so to speak, a powered vessel simply goes faster with less of a wetted surface. And, as you bring the bow up, you reduce the wetted (in the water) surface.

Boat Squat

Unless you are driving one of those "battlewagons" out there, or are involved in commercial navigation, you've probably never heard of boat squat. Even if you are in those situations, you still may not have heard of it - and it is critical to understanding why a boat with four inch of draft hits the bottom in five inches of water.

When any boat is making way through the water, she starts by pushing a large amount of water ahead of her. If she's a planing vessel, she'll climb up on that wave as she picks up sufficient speed. But if she is a big 'un, she won't be planing anytime in this lifetime.

She is a displacement vessel. So, this water that is getting pushed ahead returns to the side and under the boat's bottom. As she starts to put on some way (speed), imagine this cycle of water building up speed under the ship. This causes a drop in water pressure under the boat. This causes the ship to vertically drop in the water. This is "boat squat."

For a displacement vessel, trim is different from squat. Trim is the difference of the forward and aft draft while the boat is stationary. As she gets underway and her aspect to her waterlines changes, she is affecting "squat."

Naval architects justifiably worry about whether she has forward or aft "squat" (leans forward or aft as she builds speed.) This is largely determined by her center of gravity and her block coefficient, which is the volume of the hull (V) divided by the Length of her Water Line (LWL) times the (maximum) Beam of her Water Line (BWL) times her Draft. If you draw a box around the submerged part of the ship, it is the ratio of the box volume occupied by the ship.

Now, you can say that you do know squat.

BTW, if you are interested in being part of USCG Forces, email me at JoinUSCGAux@aol.com.