

What!? How Small a Wave Can Capsize My Boat!?

by VINCENT T. PICA, II

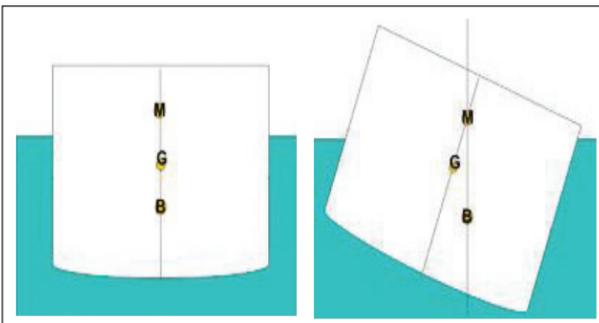
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We've covered many seamanship topics here over the past several years. Topics such as what to do if you're sinking (see SSP, "We're Sinking!", 12/13/06), how to handle heavy seas (see SSP, "Skimming in Heavy Weather", 11/24/10) and what to do if you've run her aground (see SSP, "Hard Aground - Now What?", 7/09/08) have been among the literally hundreds of topics we've covered. One topic we haven't covered is the general topic of capsizing. There is a tremendous amount of data on "righting moments", centers of buoyancy and gravity, thanks to the US Navy and the US Coast Guard, amongst many institutions who literally live and die by these metrics. We've also seen a couple of columns here about wind and waves, which are the agents of capsizing (see SSP, "Wave Theory and Practice", 3/23/11 and "Wave Theory and Practice, Part II", 7/21/10.) But there has been very little direct data on what that translates into in terms of my 25' boat and 8' seas at the Inlet. This column is about that.

Some Background

To understand the forces of a capsizing, and how those forces changes when you load the boat (see SSP, "We All Get Heavier With Age - Including Our Boats", 3/02/11), let's get some terms under our belt. Most of us understand "center of gravity" (G) instinctually. But what is the center of buoyancy? The center of buoyancy (B) is the center of the volume of water which the hull displaces. When a ship is stable, the center of buoyancy is vertically in-line with the center of gravity of the ship. So, as long as the center of gravity (G), pushing the boat down, is above the center of buoyancy (B), pushing the boat up, we're good. How good? That is a very good question and as with many good questions, it requires more information to answer properly. Take a look at diagram A.



What is that "M" sitting up there above our trusty center of "G"ravity and the center of "B"uoyancy? That is something very important called the "M"etacenter. The metacenter remains directly above the center of buoyancy regardless of the heeling (tilting caused by external factors like wind or waves) or listing (tilting caused by internal factors such as poorly stowed cargo or on-boarding of water by wind or waves) of a boat. Take a look at Diagram B. If you are starting to worry about the distance between "G" and "M", called the "Metacentric height" (or "GM" in naval architecture parlance), you've catching on quickly. The math gets pretty complicated from here, but suffice it to say that the ability of the boat to right herself, i.e, her "righting arm" or "righting moment", has a lot to do with GM. The larger the GM acting as a lever, the better.

Sail boats are designed to operate with a higher degree of heel (greater GM) than motor boats, but the principles are exactly the same.

From This to Wave Height?

Yes. You can infer that your motor boat's center of gravity and center of buoyancy can't be too far apart when the entire distance from the keel to the floor boards is probably something like 2' or 3'. Think of

her draft. It isn't a big number, even for a 40'er. No reason to panic but you now realize that M, G and B can't be that far apart - which means that GM just can't be that great either. And GM is a surrogate for the righting ability of your boat.

But wait. I've been out in some pretty steep seas and I think the boat handled it well. Yes, because studies conducted by the Society of Naval Architects and Marine Engineers (SNAME) determined that 3 things must exist for a capsizing to occur:

1. The boat is broadside to the wave. Yes, a boat can be pitch-poled (tossed end-over-end), but the size of the wave needed to do that greatly exceeds the size of the smaller wave needed to knock a boat down when broadside to a wave.
2. The boat is struck by a breaking wave.
3. Wave height must exceed a certain percentage of the boat's length.

At this point the wave contains enough energy to overcome a boat's righting moment.

So, what is that "certain percentage?" At only 30% of your boat's length, (about 6' from trough to crest for a 20' boat), things enter directly into the realm of high danger. At 60%, it is nearly certain that one wave will catch you and then you, the crew and the boat may well come to grief.

So, before trying to transit these inlets and bars that control much of our access to the open sea (see SSP, "Mastering the Inlet", 12/12/07), think about just how much of a righting arm your boat can possibly have...

BTW, if you are interested in being part of USCG Forces, email me at JoinUSCGAux@aol.com or go direct to the D1SR Human Resources department, who are in charge of new members matters, at DSO-HR and we will help you "get in this thing..."

MSC Kyle Sports 3rd Season of Baseball

All the children are ready for our 3rd season of MSC Kyle Sports Baseball. A little cold weather could not keep the kids from our first baseball practice, so with gloves and hats on we were ready to play ball. The team was full of excitement in warm ups with running the bases, catching, throwing and hitting the ball. We have seven teams in little league tee-ball this year and the schedule will be posted on the website for all our games. Our games will start at 6:00 pm and we need all the children at the field at 5:15 for practice before each game. Opening Day Parade is Saturday, April 16th and our first game will be at 11:00 am.

We are asking everyone to come down and show your support and cheer on the Kyle Sports Team. All of our parent coaches will be at the fields along with our Head coaches Jim & Debbie Metz along with assistant coaches Jimmy & Matt Metz, Mike Monaco, Ashley Arnold and Megan Melville. It is a great support system for the children on the team and the parents have enjoyed our ongoing program for the past four years. All the children have a social event every time we get together, on Saturday's at MSC Kyle Sports Program and now at the Shirley Calabro Airport field for our practices and games. We are all here for each other and at every game we have team pictures that will be posted on the www.kylesportsforspecialneedsmsc.com website and in our weekly article in the *South Shore Press* to let the community know we are here for all our special needs children and children with disabilities.

Our 3rd annual MSC Kyle Sports Dinner Dance & Chinese Auction is on June 5th from 1-6pm at the Centereach Knights of Columbus Hall. DJ Keith Ray of Stingray Entertainment will be hosting our event. Brookhaven Town & Councilman Dan Panico will be celebrating the 1st Mastic Sports Club Kyle Sports Adaptive Playground Project that will be built this spring at the Moriches Athletic Complex our fundraiser. Tickets are available for the fundraiser adults \$40.00 children under 18 \$15.00. Contact Debbie Metz, MSC Commissioner at 767-4354.

By Debbie Metz
Commissioner of Special Needs
Mastic Sports Club



Kyle is ready for baseball



Kyle Sports Team 1st Baseball Practice



County Clerk Update

by SUFFOLK COUNTY CLERK

JUDY PASCALE

COUNTY CLERK FIRST QUARTERS REVENUE 2011 SNAPSHOT

Suffolk County Clerk Judy Pascale released the First Quarter 2011 revenue report which highlights a slight decrease in revenue from the same period in 2010.

According to the report, the first quarter revenue in the County Clerk's Office declined slightly to \$63,919,656.

"The total revenue in 2010 increased significantly over 2009, which was one of the weakest revenues posted in recent years. It appears the beginning of 2011 has continued pace with our overall revenue from 2010," stated County Clerk Judy Pascale.

There was an increase in land record recordings, which rose from 41,395 in 2010 to 43,698. This also correlated to a significant increase in New York State Mortgage Tax. New York State Mortgage Tax, a one percent tax on mortgaged money, increased by 20% to \$28,073,933.

"It appears the increase in mortgage tax collection was attributed to an increase in mortgage refinancing in 2011. Lower interest rates in the beginning of the year were favorable to those who had sufficient equity in their homes to permit refinancing to a lower rate," commented Pascale.

Revenues collected and attributable to Suffolk County's General Fund also increased by 11% to \$3,750,542.

Other than judgments, that increased by 22% to 39,789, all other court related filings were down significantly. Notices of Pendency, a document filed when initiating a foreclosure action, declined by 34% to 1,757. Additionally, Judgments of Foreclosure declined by 50% to 302.

"The significant drops in foreclosure related filings are more related to procedural changes in the courts rather than a strengthening in the housing market. I'd anticipate an increase in filings as soon as the banks and attorneys adjust to the new rules and procedures," commented Pascale.

"While the first quarter 2011 revenue differs little from 2010, continued low mortgage interest rates may continue to help homeowners refinance their home loans and allowing us to maintain our overall revenue through the year," concluded Pascale.