Disadvantages of a pretty boat?

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colinh
Junior Member

Joined: May 2018
Posts: 5
Likes: 0, Points: 1
Location: Lancaster

I'm preparing to start building a 33' cruising sailboat next year and am looking for plans, but also trying out designs (in Delftship). It'd be made in wood-epoxy (Western Red Cedar, strip planking).

I've read (some years ago) various books by Dave Gerr, Ted Brewer's Understanding Boat Design, The Gougeon Brothers on Boat Construction, Larsson's Principles of Yacht Design and maybe some others. Unfortunately, I don't have them to hand at present...

I was wondering about tumblehome. I think it looks nice. But it results in less form stability (at extreme angles of heel). Does it have any benefits? Perhaps gentler/more pleasant motion?

Then there's the question of rake (of the bow, and transom). Modern designs seem to be vertical. Is it still OK to have a raked transom (where it slopes in the same direction as the bow, ie forwards as one moves up)? Was there some benefit to it? It would shift the waterline forwards as the boat heels...

colinh, Jun 29, 2018 #1

Skyak
Senior Member

Joined: Jul 2012
Posts: 1,196
Likes: 27, Points: 48, Legacy Rep: 152
Location: United States

colinh said: ↑

I'm preparing to start building a 33' cruising sailboat next year and am looking for plans, but also trying out designs (in Delftship). It'd be made in wood-epoxy (Western Red Cedar, strip planking).

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I don't know of any better reason for tumblehome than looks -and that is mostly limited to clearcoated power boats that travel on trailers from show to show. It might reduce wind drag by an imperceptible amount. The most noticeable effect will be that the tops of waves striking the topsides will proceed across your deck and into your cockpit. Most sailors prefer to be as far above the water as they can be in the lowest boat -with topsides aiming down or at most vertical.

Modern designs tend to have vertical bows and sterns to maximize waterline per length and weight. There needs to be some overhang under the transom if there is a transom. Some overhang at the bow allows solid things you hit to go under the boat -but most expect to avoid hitting solid things. Overhangs give a softer motion though waves but symmetric overhangs reduce damping and are more susceptible to hobbyhorse motion. Personally I think a vertical bow indicates the designer is serious about performance and examples stretch from antiquity to the present. Transom tilt has gone from "tilt it out for more deck and to let the waves go under" a hundred years ago, to "tilt it forward, we just want the long waterline, not the weight of more boat" of the 1960s to '80s "sugar scoop" to today's "for $3/foot per day give me the most boat/foot ->and the transom is too wide to be anything but vertical!". That 4ft fold down swim deck? that's $12/day, $4380/year, $43,800/decade saved and then it is that much cost consideration for the next buyer to consider in negotiating price.

Building your own boat is an indulgence. If you think any of these features looks better than all the other boats that exist, THEN THAT IS WHAT YOU SHOULD BUILD! God knows there will be days when you will need that affection to see you through the hours of toil.

Skyak, Jun 29, 2018 #2

philSweet
Senior Member

Joined: May 2008
Posts: 2,391
Likes: 225, Points: 63, Legacy Rep: 1082
Location: Beaufort, SC and H'ville, NC

Tumblehome optimizes the RM for a given wetted surface. It actually optimizes form stability by gaining more in displacement than you loose in moment arm (at constant wetted area). Basically, you want the heeled boat to meet the water at 90 degrees by the lee to do this. It is a material

minimization and shell weight minimization technique. It also keeps the live load from going as far the wrong way. Of course, on small boats where the crew hikes out, it prevents the live load from going the right way too. It makes more sense on heavyish boats, at least heavy by modern standards. It might be tough to pull off on a 33'er unless you are 5'2". You'll just miss the deck space too much. You'll need a fussy rig to be able to sheet the working jib inside the lifelines, which are narrow. Double spreaders or more are normally needed. It also demands a built-down hull with low freeboard. Think IOR leadmine that puts her deck under at 20 degrees of heel.

No shortage of RM here, trust me.

philSweet, Jun 29, 2018 #3

DCockey
Senior Member

Joined: Oct 2009
Posts: 4,850
Likes: 394, Points: 83, Legacy Rep: 1485
Location: Midcoast Maine

philSweet said: ↑

Tumblehome optimizes the RM for a given wetted surface. It actually optimizes form stability by gaining more in displacement than you loose in moment arm (at constant wetted area). Basically, you want the heeled boat to meet the water at 90 degrees by the lee to do this. It is a material minimization and shell weight minimization technique.

What are you assuming is fixed? Can you provide a simple 2D sketch illustrating your theory?

David Cockey

DCockey, Jun 29, 2018 #4

fallguy

Joined: Dec 2016
Posts: 3,983

Senior Member

Likes: 621, Points: 123, Legacy Rep: 10
Location: usa

the disadvantage to the stern is mounting any kicker motor is tough and destroys that look you like, so any engines probably need to be internal, but you probably know that, only want to make sure you think that through

fallguy, Jun 29, 2018 #5

fallguy
Senior Member

Joined: Dec 2016
Posts: 3,983
Likes: 621, Points: 123, Legacy Rep: 10
Location: usa

I, personally, think the best point is by phil, who explains the deck thieving done by the design.

fallguy, Jun 29, 2018 #6

philSweet
Senior Member

Joined: May 2008
Posts: 2,391
Likes: 225, Points: 63, Legacy Rep: 1082
Location: Beaufort, SC and H'ville, NC

I'm looking at a midsection shape and considering its properties. This works in isolation, or in consideration of the rest of the boat. I'm assuming a heeled monohull canoe body (in that the centerline is wet, or you still need to connect the two sides with a hull plate, not just beams). If you want to minimize the hull section's girth (or hull plate area) for a given sectional RM (or hull RM), the result is a section shape for the heeled section that is perpendicular at the outboard entry. The exact shape for maximum RM depends on the VCG. But start from the idea of a canoe that doesn't trim when it heels. Consider angle of heel and displacement as variables and VCG and girth(area) as the main independent variables.

If the lee entry is perpendicular when heeled, the topside will have tumblehome when not heeled. I probably should have dropped the wetted area idea in my previous post. It doesn't change things much for heavy boats. Just shell area would have served. I have found some parametric equations that are very good (at least close to optimal, if not actually optimal), but some seemingly simple optimization problems are deceptively difficult. It has taken many years to figure out the shape of the "sofa" with the biggest area that can be maneuvered around a 90 degree corner in a hallway. Moving sofa problem - Wikipedia https://en.wikipedia.org/wiki/Moving_sofa_problem RM optimization, even with simple constraints, gets weird quickly.

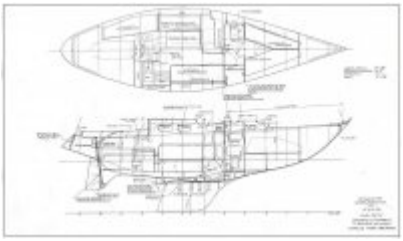
philSweet, Jun 30, 2018 #7

bajansailor
Marine Surveyor

Joined: Oct 2007
Posts: 1,594
Likes: 476, Points: 83, Legacy Rep: 37
Location: Barbados

The S & S 34 is an excellent example of tumblehome being used well.
And they are a joy to sail - well balanced and very stiff - when the wind picks up she heels a bit and just starts stomping along, very happily.
Re the photos below, the blue hull is Earlybird, and the white hull is Kite - both live in England.

Attached Files:



S&S 34 GA.jpg
File size: 190.2 KB
Views: 301

S&S 34 sail plan.jpg
File size: 85.7 KB
Views: 249

S & S 34 - Earlybird (on YBW Forum).j...
File size: 66 KB
Views: 261

S & S 34 - Kite 2.jpg
File size: 71.3 KB
Views: 249

S & S 34 - Kite.jpg
File size: 345.5 KB
Views: 254

bajansailor, Jun 30, 2018 #8

Skyak
Senior Member

Joined: Jul 2012
Posts: 1,196
Likes: 27, Points: 48, Legacy Rep: 152
Location: United States

philSweet said: ↑

I'm looking at a midsection shape and considering its properties. This works in isolation, or in consideration of the rest of the boat. I'm assuming a heeled monohull canoe body (in that the centerline is wet, or you still need to connect the two sides with a hull plate, not just beams). If you want to minimize the hull section's girth (or hull plate area) for a given sectional RM (or hull RM), the result is a section shape for the heeled section that is perpendicular at the outboard entry. The exact shape for maximum RM depends on the VCG. But start from the idea of a canoe that doesn't trim when it heels. Consider angle of heel and displacement as variables and VCG and girth(area) as the main independent variables.

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Phil,
I get what you are saying, there is a theoretical benefit. But if we move on to the actual benefit, my opinion is that there is very little -a slight weight loss improvement, but nothing that couldn't be gained back in a clumsy deck to hull joint caused by the mold assembly needed. My opinion is that the real motivation to this shape was to fool the old IOR rule into thinking that this was a very tender boat that deserved a very generous rating.

I mention this because the OP should know before he spends years building a boat for an obsolete rule, not performance advantages. The first old timer on the dock that he meets is going to tell him.

When someone tells me they like the look of these boats, I say "Great! Your in luck because there are loads of old boats that can be had for a song."

Skyak, Jun 30, 2018 #9

Rurudyne
Senior Member

Joined: Mar 2014
Posts: 1,170
Likes: 39, Points: 48, Legacy Rep: 155
Location: North Texas

Skyak said: ↑

When someone tells me they like the look of these boats, I say "Great! Your in luck because there are loads of old boats that can be had for a song."

Indeed. When I hear the words "Italian styling" or their functional equivalent on these buying yachts shows I think about McMansions that are somehow luxuriously all the same.

That's not to say that styling in past eras wasn't often conformist, just that in any era one can reach the point, however unexpected, that they can look at an immaculate Chevy Nova and think it's a nice looking car compared to current designs ... for me that point was reached in the mid 90s.

... it was followed by a face palm....

Rurudyne, Jun 30, 2018 #10

colinh
Junior Member

Joined: May 2018
Posts: 5
Likes: 0, Points: 1
Location: Lancaster

Thanks everyone!

I don't fully understand Phil's RM explanation, although I can believe it's correct. The upward force on the lee side comes from displacing a volume of water, and *for a given circumference* a circle (cylinder) has the greatest area (volume). On the other hand the distance from the centre line doesn't increase... But, I think the point is moot since there's no particular need for the hull area to be a minimum. For a given beam, flat, vertical topsides would have the greatest volume.

Thanks for the photos of Jazz and Peregrine. What make are they? Are they the same boat type? Actually, from the photo of Jazz, that seems almost bit too much tumblehome and transom narrowing.

So, wetter, less deck space, and in the case of the S&S 34 with its significant narrowing towards the stern, a lot less living space.

But the S&S 34 does look good. And its owners seem to think it's the best boat in the world...

I found a set of lines for an S&S 30, which seems to be just a scaled down 34, or very close to it. So I'm studying those now...

Skyak said: ↑

Building your own boat is an indulgence. If you think any of these features looks better than all the other boats that exist, THEN THAT IS WHAT YOU SHOULD BUILD! God knows there will be days when you will need that affection to see you through the hours of toil.

colinh, Jun 30, 2018 #11

colinh
Junior Member

Joined: May 2018
Posts: 5
Likes: 0, Points: 1
Location: Lancaster

> Skyak said: ↑
>
> *My opinion is that the real motivation to this shape was to fool the old IOR rule into thinking that this was a very tender boat that deserved a very generous rating.*
>
> *I mention this because the OP should know before he spends years building a boat for an obsolete rule, not performance advantages. The first old timer on the dock that he meets is going to tell him.*

This thing about rules is so confusing. I'm not familiar with them at all. I'd just picked up the impression that they resulted in silly designs. But maybe they're intended to keep boats safe - by banning certain excesses - and then you get designers trying to get around the intent by doing even more stupid things...

I don't particularly intend to go racing. I want to cruise -- safely, comfortably and, well, I want my boat to be pretty, damnit! It'd be solo too (I might be able to get some of my family for some gentle island hopping in Greece, but cruising? no) so space isn't that much of a concern. And neither are rules. I don't mind if the boat can go fast, but that's not the main concern.

So, I was reading up on sugar scoop transom safety (in a sailnet.com thread) and someone quoted this, from Dashew - Sailing in Heavy Weather, I think.

> *Today, the vast majority of production yachts are simply not designed for heavy weather.*
>
> *Yes, they have wonderful, livable interiors while in port. If your cruising is coastal in nature, with short hops between protected harbors, these boats are both cost-effective and fun to live aboard.*
>
> *But when you head offshore, with a greater chance of encountering severe weather, these designs simply do not provide the range of tactical options necessary to deal with adverse sea states. They are less forgiving and require far higher skill levels to deal with a given set of conditions. The fact that these boats are typically purchased by neophytes [who? me?] compounds the problem.*
>
> *So what do you do?*
>
> ***Our suggestion is to forgo the flash of the modern, beamy production boat and find a soundly built CCA or early IOR design**. Or, find a yacht that is not influenced by racing rules, but instead designed to*

> *the rules of the sea. You will trade a stylish new interior for a longer, narrower, and heavier design, which is faster in difficult conditions, more comfortable, and much safer.*

So, it's all weird and upside down. I thought I *don't* want a boat that has to adhere to any racing rules (scantling rules etc are a different matter). And here he suggests a boat designed according to early IOR rules. Then I thought I want a safe and comfortable boat - not a brutal racer. And it turns out that the S&S 34 (early IOR rules) is considered to be particularly safe and comfortable. And it's pretty. But it was designed as a racer? Weird.

> Skyk said: ↑
>
> *When someone tells me they like the look of these boats, I say "Great! Your in luck because there are loads of old boats that can be had for a song."*

Oh good! That would, apparently, be a much more sensible thing to do than build a boat. Even if I do enjoy building things...

colinh, Jul 1, 2018 #12

colinh
Junior Member

Joined: May 2018
Posts: 5
Likes: 0, Points: 1
Location: Lancaster

> bajansailor said: ↑
>
> *The S & S 34 is an excellent example of tumblehome being used well.*
> *And they are a joy to sail - well balanced and very stiff - when the wind picks up she heels a bit and just starts stomping along, very happily.*

That's exactly what I wanted to hear

And, to answer my own question, through the magic of google, Peregrine of Bellevue WA is a Catalina 38. Designed by --- Sparkman and Stephens.

colinh, Jul 1, 2018 #13

philSweet
Senior Member

Joined: May 2008
Posts: 2,391
Likes: 225, Points: 63, Legacy Rep: 1082
Location: Beaufort, SC and H'ville, NC

They are Catalina 38's. The hull is originally an S&S design, intended as a one-off One Tonner, but the mold was then sold to Yankee Boats, then to Catalina. Yes very much a rules boat as far as the

girth measurements go (pin tailed). Also too heavy for One Ton rating even when new. Catalina added 5' to the mast and fiddled with the keel and ballast. I think the SS34 came from the same pencil, you can check on the S&S history page.

Skyak I agree completely with your post on the dubious advantages of old IOR boats, I own Catalina 38. But the OP started out with the statement that tumblehome eroded RM. That's not correct. Maximum RM (for a given VCG and girth) is achieved using tumblehome. I wasn't suggesting the OP go all-in on an old IOR hull form. Thanks for pointing that out.

Last edited: Jul 1, 2018

philSweet, Jul 1, 2018 #14

colinh
Junior Member

Joined: May 2018
Posts: 5
Likes: 0, Points: 1
Location: Lancaster

philSweet said: ↑

> *Skyak I agree completely with your post on the dubious advantages of old IOR boats, I own Catalina 38 [...] I wasn't suggesting the OP go all-in on an old IOR hull form.*

Ah. Why not? What are these dubious advantages?

My impression is that the S&S34 (and, presumably, the Catalina 38) have a reputation for being particularly seaworthy boats. As well as being reasonably fast. And I think they look nice.

This being a boat design forum, I suppose what I'm trying to find out is whether, being freed from any rules restraints, one could "improve" on the S&S34 design? Any change can have benefits but also disadvantages.

For example, reducing the overhang of the bow would increase the waterline length (for when the boat is *not* heeled over). It would also increase the volume (living space). But how much influence does it have on slapping through waves? How does it impact on safety and comfort? Increased speed and volume are surely nice to have, but at what cost?

Same with tumblehome - certainly reduced deck space and a wetter cockpit, but gentler motion?

And something I didn't think of initially - the excessive (?) pinching of the stern. Does it have any advantages?

I really miss my books, I'm sure some of this was discussed in them... :-(

I wasn't able to find any details of the early IOR rules. Did they go by waterline length (rather than LOA) thus resulting in ludicrous overhangs? Did they go by deck beam, resulting in tumblehome?

So, starting from an S&S34 type design are there any aspects that are *obviously* silly, with no compensating benefits, and only there because of some obsolete rule?

I'm sorry if I'm being obtuse, but I'd like to get to the bottom of this, before I commit to anything. Looking at the differences between an S&S34 and a modern performance cruiser, I'd like to know exactly what (if any) the costs are as well as the benefits. All the replies so far, and any future ones, are much appreciated.

Last edited: Jul 3, 2018

colinh, Jul 2, 2018 #15

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