

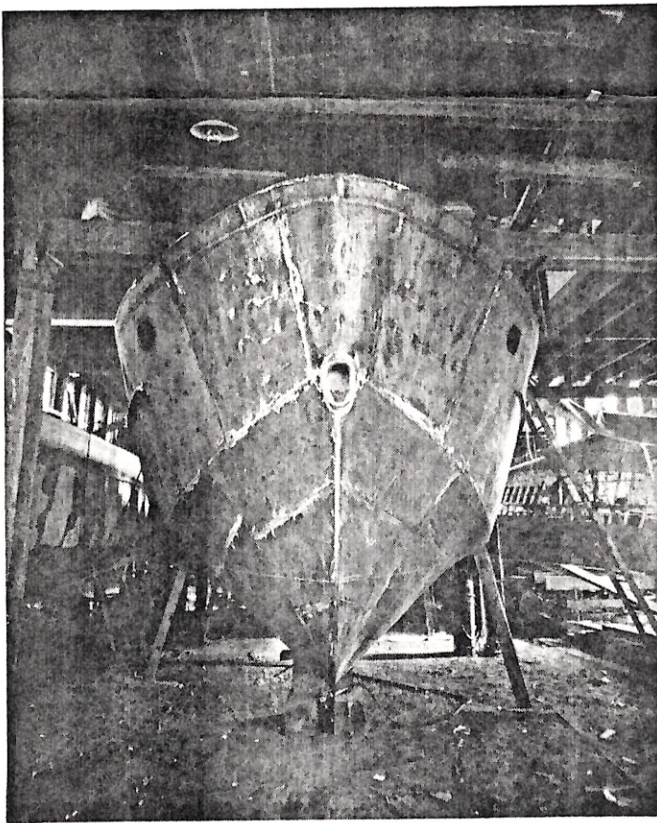
of steel construction. These boats were of round bottom type and had become very favorably known over the years. Weight was generally around 50,000 pounds and a cruising speed of 12 knots was developed with 250 horsepower. Theoretically the speed-length ratio could be called 1.8 and the power to weight ratio 1 to 200.

Quite naturally, owners frequently brought up the subject of more speed and so the question arose as to how best to change the model. It was decided that a speed of 18 knots should be the goal. Here was a theoretical speed-length ratio of 2.5 which, of course, called for some type of planing bottom.

Preliminary estimates indicated that 500 rated horsepower would be required to move 50,000 pounds at 18 knots. But 500 diesel horsepower is both expensive and heavy and the added weight of machinery alone would probably require about 200 more horses. Accordingly, every item in the weight schedule was examined and trimmed wherever possible; trimmed, that is, within the luxury standards imposed by modern cruising requirements.

The final result seemed to indicate that a total weight including 350 diesel horsepower, of perhaps 36,000 pounds, could be attained by the liberal use of aluminum and careful engineering. Notice that this power-to-weight ratio is close to 1 to 100. In other words, the faster hull is not the more easily driven of the two but instead should be regarded as having the capacity to absorb and use efficiently about two times as much power.

It is interesting to follow this particular example a little further. During construction, as always happens,



Soft riding forward sections, high buoyancy and spray-deflecting chines show modern tendency in this well-shaped Burger hull

minor changes and additions were made, little things here and there, whims of the owner, new devices which suddenly seemed essential, many little places where workmen wanted to do it "better", but all of which eventually totaled to about 8,000 pounds. Coming as they did, one at a time, during several months of construction, they seemed hardly worth considering but on her trial trip this new "lightweight" displaced about 44,000 and developed only a little over 16 knots, just about enough speed for semi-planing flow lines. The power-to-weight ratio was back to 1 to 125, a ratio so large that only the high degree of refinement of her bottom lines permitted operation within the planing range.

However, the dynamic forces which add steadiness seem to make themselves felt even when planing action is only partially developed. Even at 16 knots there was a noticeable stiffening against rolling.

Borderline situations of this sort should be resolved on the basis of power-weight ratio. In average pleasure boat sizes, if around one horsepower for each hundred pounds of total weight will be available, then a semi-planing hull is indicated. If there is going to be more than a hundred pounds of boat per horsepower, then more easily driven but proportionately slower forms should be used. And it would seem safe to add that no full planing hull should be contemplated with more than 70 pounds of boat per horsepower. The outstanding example of good planing performance today in standardized cruisers is being made by boats which are loaded between 45 and 70 pounds per horsepower. Incidentally, the cost of operation per mile of these smooth-running craft is known to be as low as that of any comparable displacement hulls.

Any attempt to classify hulls by the terms "round bottom" and "vee bottom" can be quite misleading. However, when "full planing" type is indicated, the meaning is clearly that of a hull having wide beam carried all the way aft and a long, straight run with nearly parallel buttock lines. A semi-planing type would have somewhat less beam, a more moderate transom immersion and finer entrance lines. The semi-planing type would still retain the long, straight run but would very likely show more rounded bilges instead of hard chines. This intermediate type is a good answer to low cost cruising boat requirements since it is relatively easy to build and provides a hull which will absorb enough more power when light to get over the speed-length ratio ceiling of 2.0, and yet when loaded beyond the general one hundred pounds per horsepower line will cruise quite gracefully at intermediate speed.

That there is any ceiling to the speed-length ratio is not willingly admitted by some theorists. However, no one has yet measured accurately the length of flow which extends aft of a planing bottom. And until this is done at all speeds and at various trim angles, no sensible figure for boat length can be put into the formula. What might be the speed-length ratio of a three-point hydro running on little more than her propeller? I suggest that this classic ratio be reserved for comparison among dignified displacement craft only. An equally satisfactory ratio of comparison among planing craft has not yet been propounded and remains as a worthy object of future research.

My own experience of the last few years, guided by the accumulating data of good, bad and indifferent planing hulls for which I have been responsible, leads me to be-