

shown to be attainable by the wider bottoms. It is seen that with equal loading per square foot, a hull of .35 aspect ratio may start to plane at a speed-beam ratio of as low as 1.25 while the narrow hull of .2 aspect ratio would probably not develop any pronounced planing tendency until well over a speed-beam ratio of 2.

The curve of identical speed in knots has been inserted to give graphic illustration of how the wider hulls, having greater lift, tend to get up and plane at appreciably lower speeds than narrower hulls.

The two curves of optimum speed are particularly interesting. For strictly smooth water, the inherent speed of planing hulls increases fairly constantly with beam, at least within the possible range of normal marine proportions. However, for rough water or any kind of seagoing service, the optimum curve is of an entirely different character. The speed potential of all hulls throughout the range of aspect ratios between .2 and .5 has been increased due to the lessened skin friction of hulls skimming over wave crests and air bubble cushioning. However, the shape of this rough-water curve clearly indicates that bottoms wider than an aspect ratio of around .4 begin to suffer from the impact of plunging head-on into steep waves. The amount of this loss naturally depends upon particular sea conditions. But it is obvious that a bottom of .5 aspect ratio can have its great smooth-water speed potential at least nullified by head sea impact.

To take the fullest advantage of the optimum planing potential at any given speed-beam ratio below 4, the seagoing hull should obviously be proportioned close to an aspect ratio of .35. The best absolute speed for this hull will be at any point desired which is above a speed-beam ratio of 2 and below 4. Lower speeds are not worth while with a true planing bottom, and higher speeds indicate a hull too small for seagoing requirements.