



PERFORMANCE VS INTERCEPTOR EXTENSION

Misleading information is circulating that claims interceptors with a large stroke and small span are better than Zipwake's wide span interceptors with a smaller stroke.

The following diagrams show this information to be misleading. Indeed, it is always better from a drag point of view to generate lift using as wide a span as possible. Compare flight - long, thin wings mean low drag.

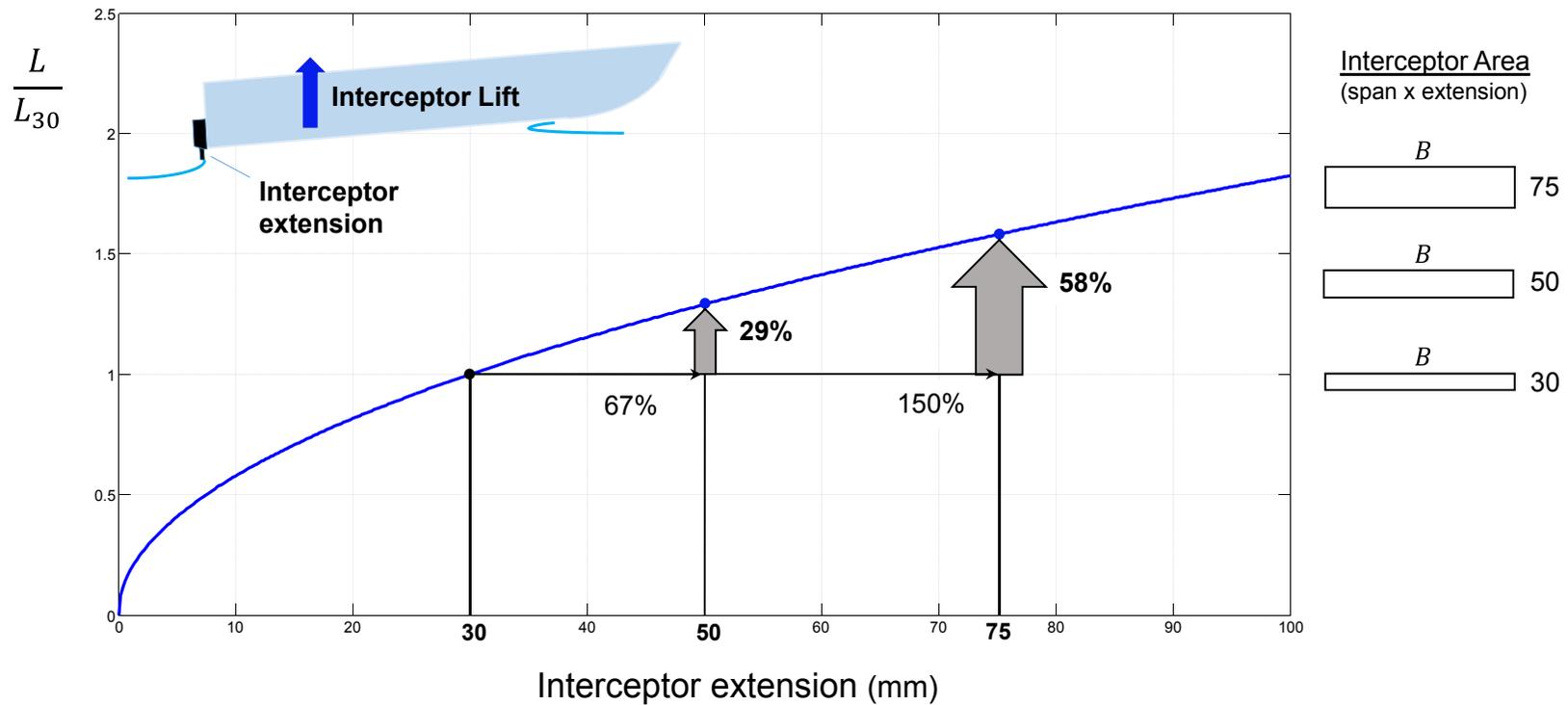
There is no question short interceptors in combination with large interceptor extension generates the greater lift given restricted interceptor length. However, the amount of lift does not vary linearly; rather the ratio falls off with increasing interceptor extension. For example, increasing interceptor extension from 30 mm to 50 mm (67 percent) only results in a theoretical lift increase of 29 percent (less in a real-world installation). Interceptor drag, on the other hand increases by 43 percent, showing that the interceptor lift-to-drag ratio decreases with increasing interceptor extension. **In other words, there can be no doubt that large interceptor extension with a small interceptor span in effect makes the interceptor act as a brake.**

When comparing equal lift forces, a small interceptor extension combined with a large span by making better use of the boat's beam is by far the best alternative with regards to drag. Significant speed gains can then be achieved, whereas the drag resulting from large extensions/small spans can actually cancel the positive effect on hull resistance from operation at a more favorable trim. **It's why people note that in identical boats - where one is fitted with Zipwake and the other with larger stroke interceptors - the same or even higher speed is often achieved by the Zipwake boat.**

With regard to roll damping, it appears better at first glance to have as large a lift force and moment arm as possible. However, there is no significant difference in the moment arm of a short interceptor mounted close to the chine and a somewhat longer one. Drag, on the other hand, increases most significantly, which means the probable speed loss in a seaway might well outweigh the positive effects of reduced roll motion.

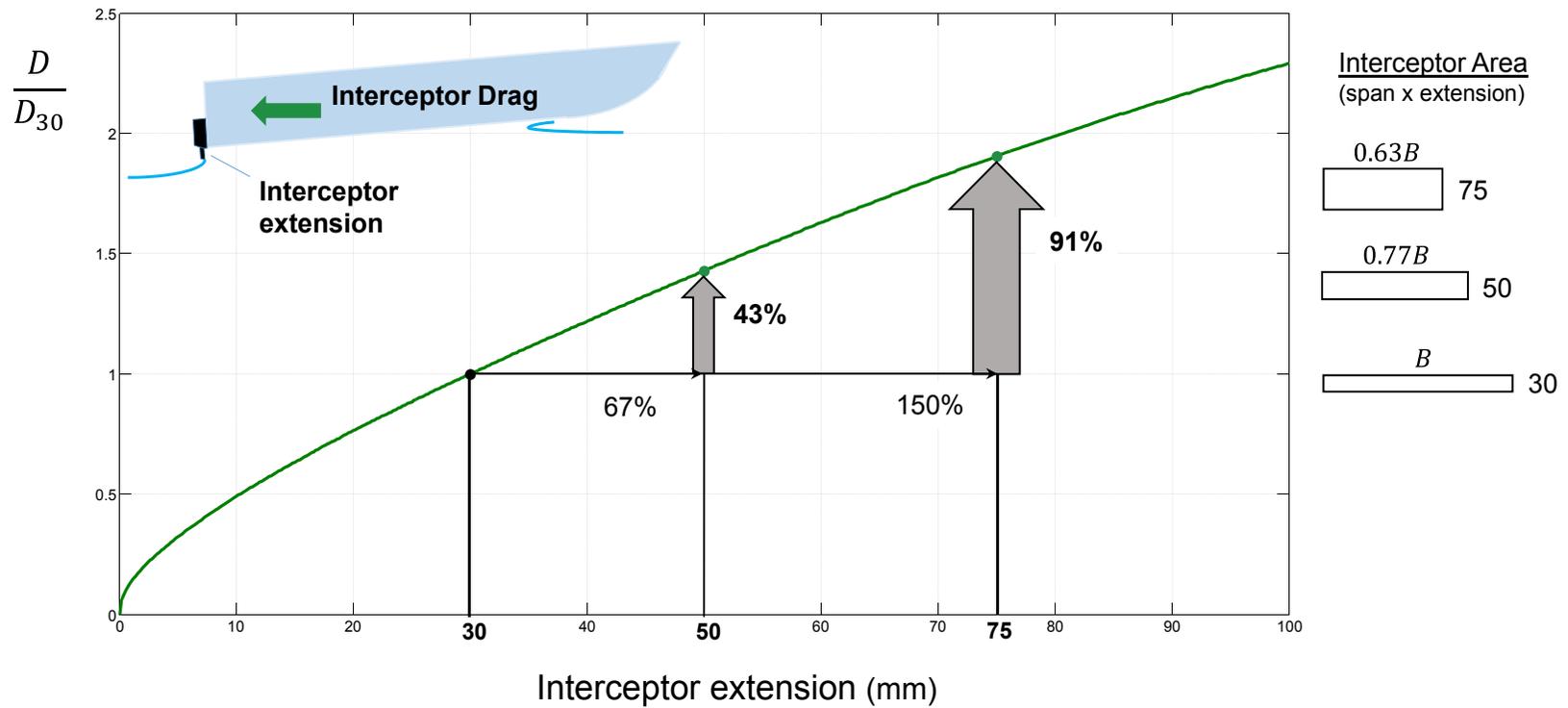
Moreover, applying large interceptor lift for roll control on any planing craft with normal deadrise will inherently **impose a significant side force that tends to have an undesirable effect on yaw and autopilot performance.** Thus if large roll damping is essential, it may be better to opt for moderate interceptor lift and combine it with a roll motion control system that does not affect course keeping, such as a gyroscopic stabilizer.

Interceptor Lift @ Equal Span



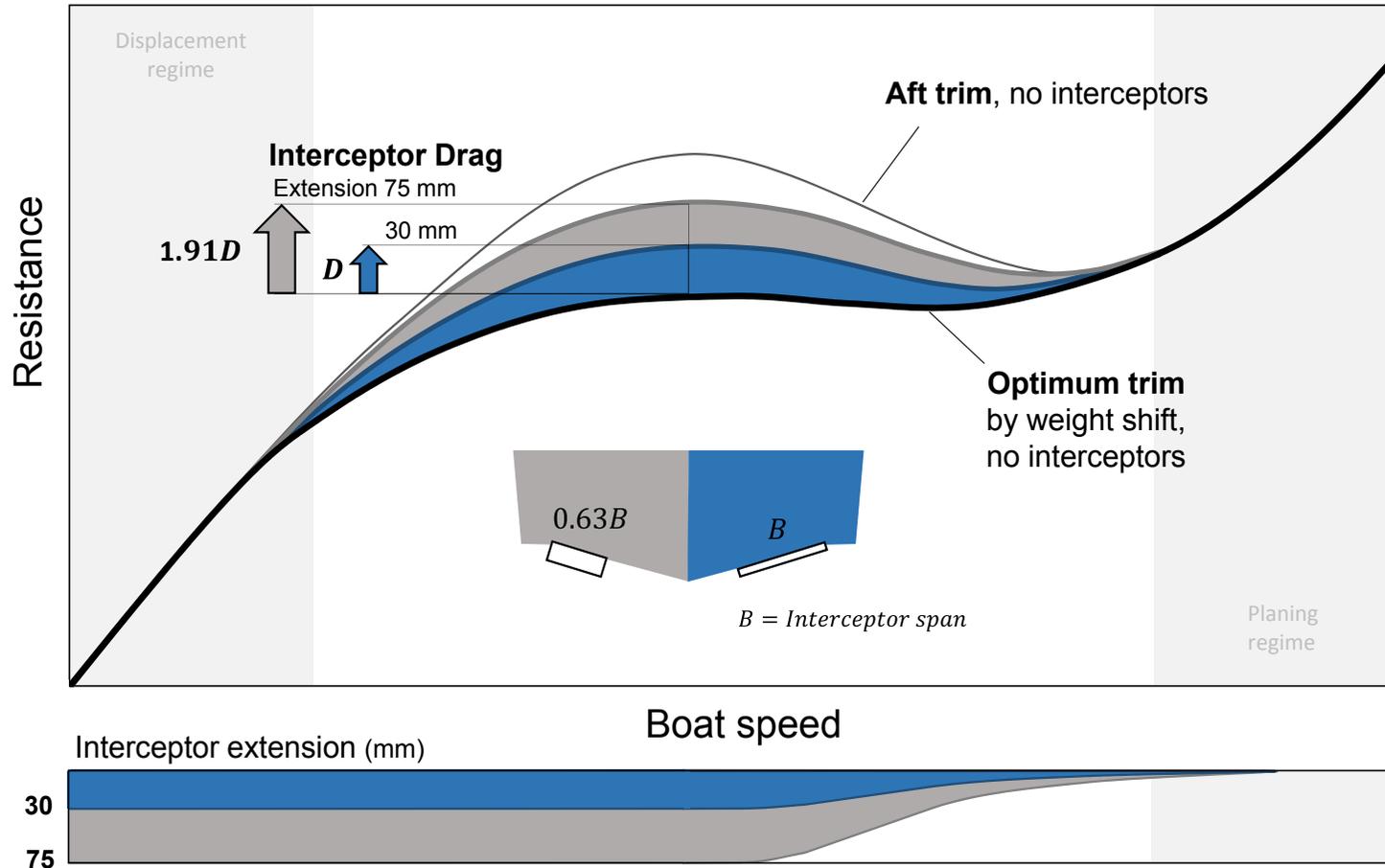
Based on ideal 2D flow of flat planing surface with interceptor. 3D effects tend to degrade lift generation, e.g. large interceptor extension in combination with a small interceptor span effectively makes the interceptor act as a brake.

Interceptor Drag @ Equal Lift

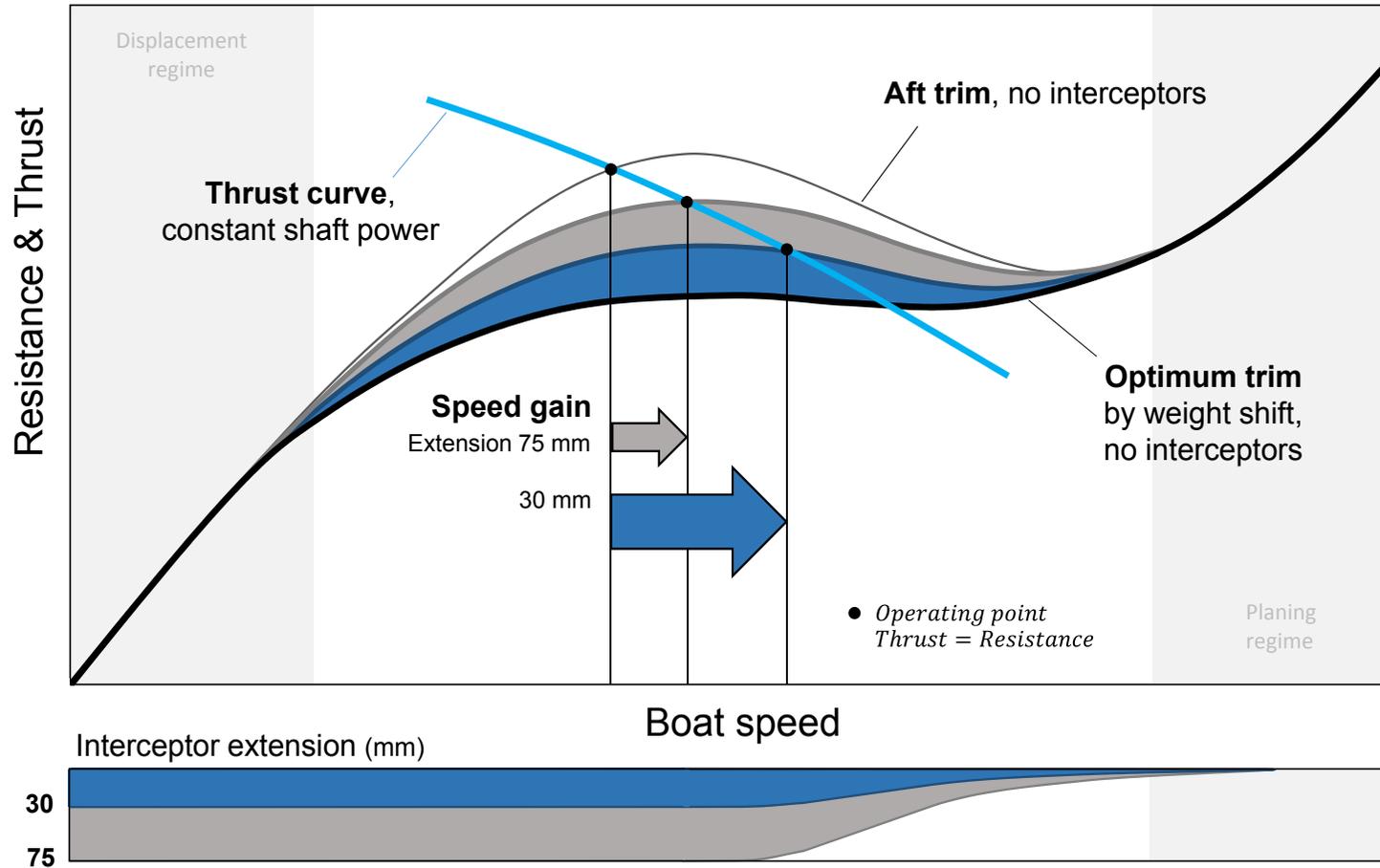


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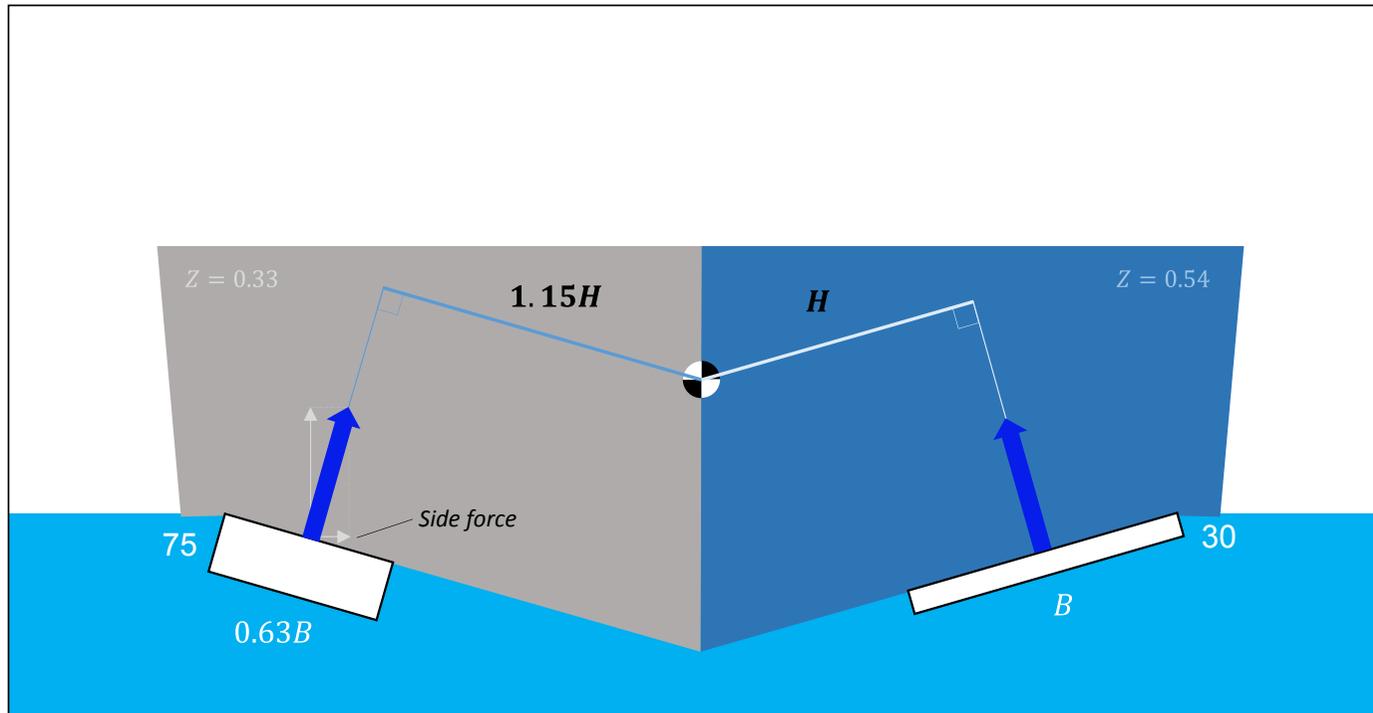
Boat Hydrodynamic Resistance @ Equal Interceptor Lift



Speed Gain @ Equal Interceptor Lift



Roll Moment Arm @ Equal Interceptor Lift



The increase in roll moment arm (H) by an interceptor with large extension-to-span ratio is limited whereas the trade-off in drag is substantial. In the above example, interceptor-induced drag increases by 91 % while roll moment only increases by 15 %.

Moreover, applying large interceptor lift for roll control on any planing craft with ordinary deadrise will inherently impose significant side force that tends to have an undesirable effect on yaw motion and autopilot performance. Thus if large roll damping is essential, it may be better to settle for moderate interceptor lift and combine it with a roll motion control system that does not affect course keeping, e.g. a gyroscopic stabilizer.