NORTH U.

Puff Response Upwind in Moderate Air

By Bill Gladstone

Proper response to a puff is critical to optimum performance in variable conditions. The best response is a change in trim to match the changing apparent wind angle.

Here's what we mean:

The Apparent Wind

We'll start from our wind triangle before the puff hits. Figure 1 shows the *Apparent Wind* as the vector sum of the reciprocal of *Boat Speed* (called *Boat Wind*) and the *True Wind*.

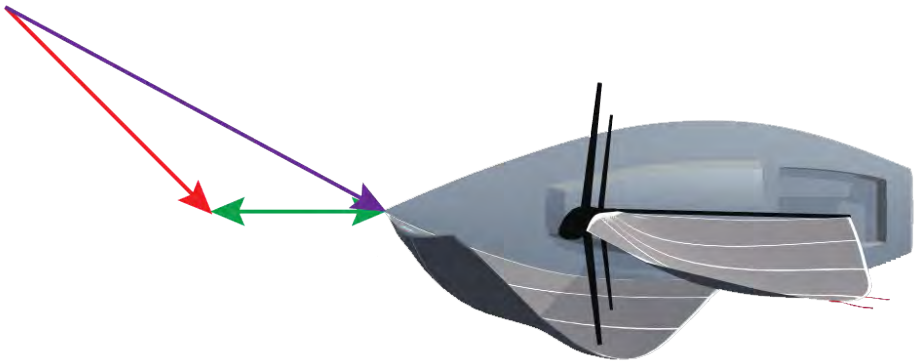

Fig. 1: The Apparent Wind (purple) is the vector sum of the Boat Wind (green) and True Wind (red).

The Puff Hits

When a puff hits the *True Wind* increases (Puff!). The stronger *True Wind* creates a stronger *Apparent Wind* and a wider *Apparent Wind Angle*. The best response is to trim sails to match this wider *Apparent Wind Angle* – usually by lowering the *traveler*. The trim response maintains a balanced helm and consistent angle of heel. See Figure 2.

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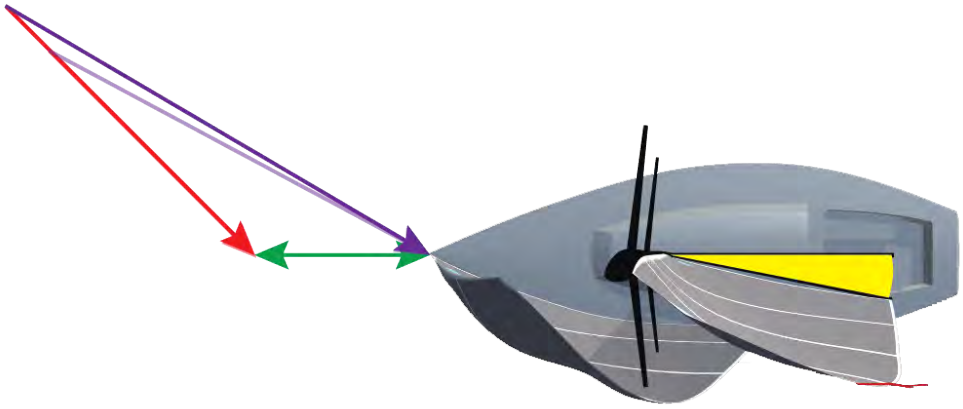

Fig. 2: A puff results in stronger Apparent Wind and a wider Apparent Wind Angle. The proper response is a change in trim - lowering the traveler to match the new wind angle.

Acceleration

The trim response maintains a balanced helm and consistent angle of heel. The boat then accelerates quickly to the match the new wind speed. As the boat accelerates the apparent wind moves forward and we can re-trim to the resulting apparent wind angle. See Figure 3.

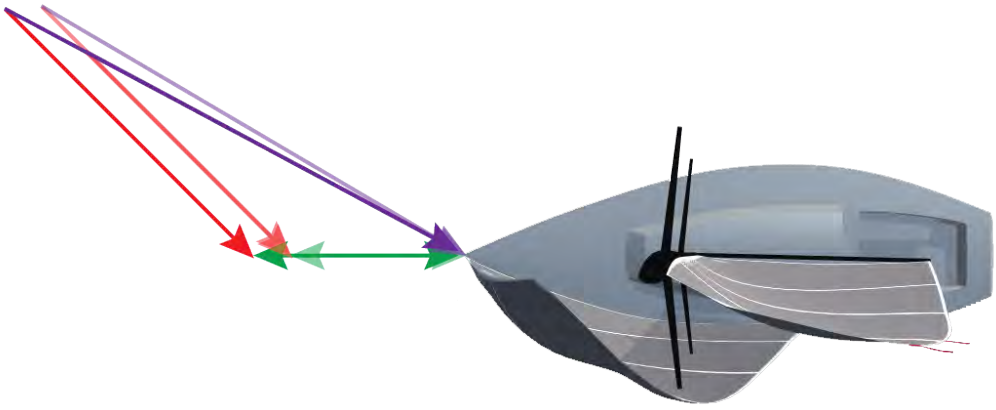

Fig. 3: As we accelerate with the new wind the apparent wind moves forward and we can re-trim.

Wasted

If we don't respond to the puff with a change in trim we waste the energy of the puff in heeling force and weather helm rather than take advantage of it with acceleration. The boat may eventually accelerate – after making leeway – but the initial energy of the puff is wasted…

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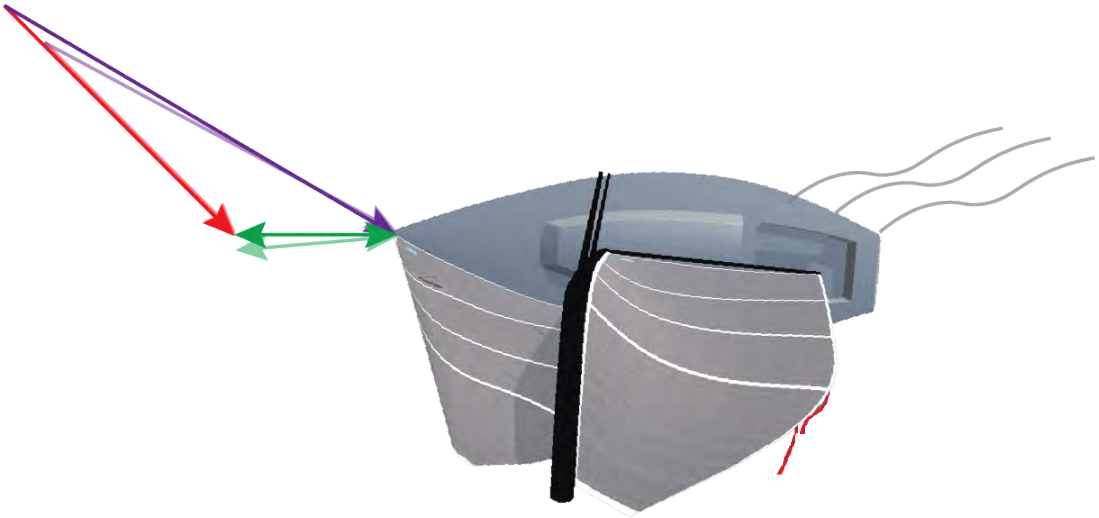

Fig. 4: If we don't adjust trim as the puff hits then the extra energy is wasted as heeling force. With heel comes weather helm and drag so the boat will be slow to accelerate.

More

Why a Trim Response? Why not just feather the helm?

Because a Trim Response is faster. A trim response lets you quickly accelerate. A feathering response gives you a brief bit of height (usually accompanied by more leeway). The trim response gives you speed and the speed then gives you both speed and height!

Why use the Traveler?

In this depiction we use the traveler to respond to a puff. Lowering the traveler reduces angle of attack. This is often the preferred method on a moderate displacement keel boat.

Alternatives to the Traveler

On some other boats – for example high performance boats with square top mains and high aspect keels, and on multi-hulls – it is more effective to play the mainsheet and change twist.

On still others – for example, Etchells – a big pull on the backstay is very effective.

Some boats use "Vang Sheeting" (where the mainsheet controls angle of attack) and respond to puffs by playing the main sheet.

Which is Best?

Snappy Answer: Whichever is fastest.

Longer Answer: You'll have to test to see what works best on your boat; but the bottom line is that a *Trim Response* is preferred to just feathering/ steering through the puff.

Puff Response in Heavy Air

And what about in *Heavy Air*, where more wind doesn't make us faster?

We'll explore **Puff Response Upwind in Heavy Air** in our next segment.

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