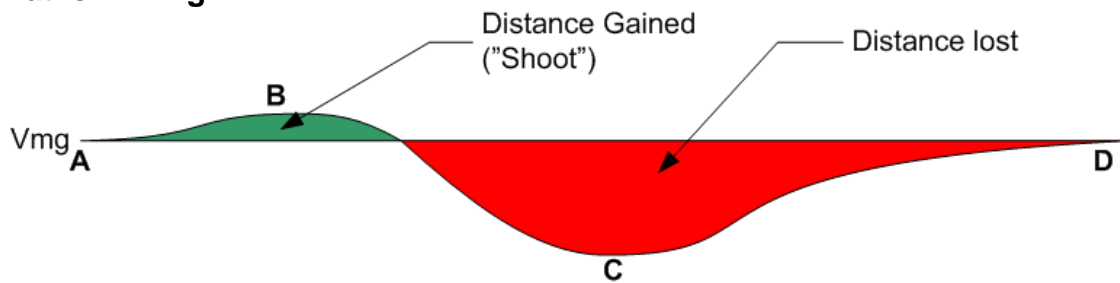


Tack Analysis with DeWiggler

Beginning with DeWiggler Analyst 1.5, tacks are analyzed in detail and displayed. The purpose is to provide the various metrics that will help improve your tacking skill by providing a bottom-line number called DLvmg (Distance Lost Vmg), and several contributing parameters like tHTW (time to head-to-wind) and 14 others.

What is DLvmg?



DLvmg is the net sum of these two areas.

When you begin a tack [A], as you head into the wind, the true wind angle goes to zero. Boatspeed continues because of inertia, so at first, Vmg shoots up [B] (consider that when pointed into the wind, all your boatspeed is Vmg). As you continue around, boatspeed continues to fall, and the true wind angle increases, both reducing Vmg. As you steady up on the new tack boatspeed stops decreasing, and true wind angle stops increasing [C]. As you accelerate on the new tack, Vmg gradually returns to normal [D].

DLvmg is the net sum of the gain (green area) and loss (red area), and represents the distance lost to windward caused by the act of tacking.

It should be mentioned that 'shooting the finish' is a tack where you maximize the green area (gain) by trading in all your energy to windward. If you were to complete the tack, the loss would be catastrophic. For this maneuver, there is a simple way to judge if you got it right: Your boatspeed should fall to your pre-tack Vmg just as you cross the finish line.

The art of the tack

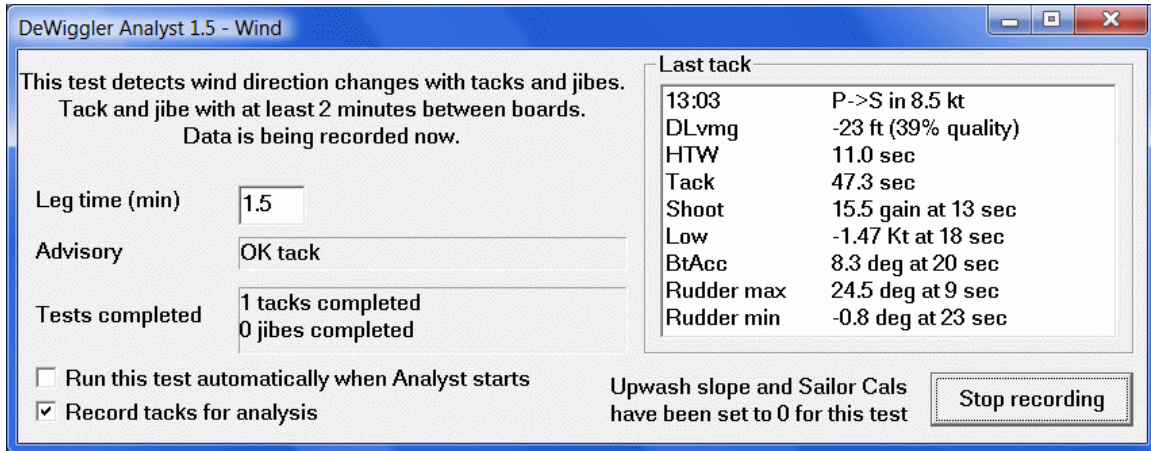
A good tack is a balance amongst many factors, only some of which are under control of the crew. The 'independent variables' - wind speed, sea conditions and wind shear are what they are. The rest depends on the helmsman and sail trimmers actions in response to them.

- Should you jam it or ease it to head-to-wind? Jamming it requires more rudder angle which slows the boat, but you'll get on the new tack faster. Easing into the tack reduces rudder drag, but the boat will be unpowered longer. This decision is probably affected by the sea state and the weight of the boat.
- How far below target angle (BtMax) should you go as you accelerate on the new tack? More BtMax means more acceleration and therefore less time until you are up to speed. However, more BtMax means lower Vmg as you accelerate.

- How should you trim the sails? Do you go for a big BtMax with the sails trimmed out and then grind them in against the wind pressure as you get to speed? How is the main handled?

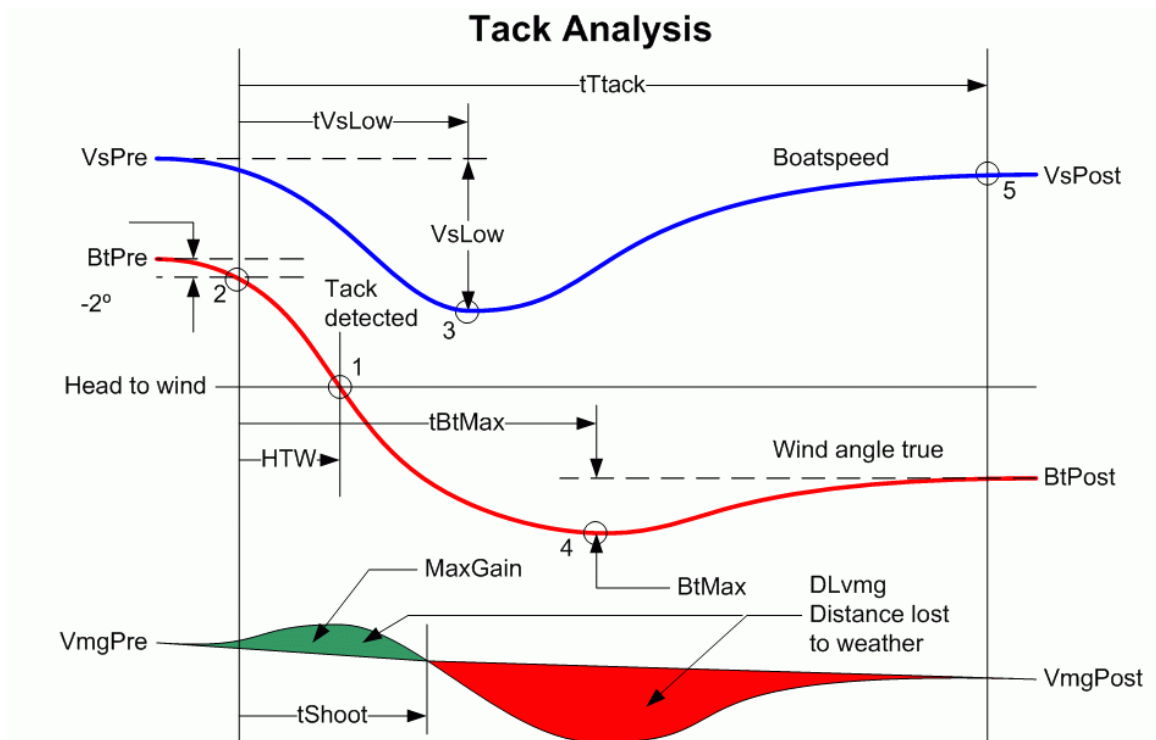
The answers probably depend on the independent variables, but minimizing DLvmg is the way to decide which tacks are the good ones.

Using DeWiggler to grade a tack



- DLvmg This is the overall score for the tack. It is the number of feet to windward you lost in the tack.
- Quality There are many things that can pollute the DLvmg number – e.g. shear and unequal boatspeed or true wind angle before and after the tack. Quality represents the consistency of the data, not the tack result.
- tHTW The time from the start of the tack to head-to-wind. A short time implies ‘jamming it’ with lots of rudder. A long time implies ‘coasting up’ with less rudder.
- Shear The amount the wind is turned to left or right aloft relative to the center of the sail plan (positive shear is clockwise). Shear makes tacks unsymmetrical – tacks to port will be worse than tacks to starboard when the shear is positive, and vice versa.
- tTack This is the time for the complete tack. The tack starts when you depart your pre-tack wind angle, and ends when you achieve your post-tack boatspeed.
- MaxGain The distance gained to weather at the beginning of the tack (the green area), and the
tMaxGain time from the beginning of the tack where gain stops.
- VsLow The low point in boatspeed, and when it happened relative to the start of the tack.
tVsLow
- BtMax The maximum true wind angle on the new tack, relative to the post-tack true wind
tBtMax angle. This number is how much you drove off in order to accelerate faster.
- RudMax The maximum rudder angle applied at the beginning of the tack.
tRudMax

RudMin The rudder angle applied to stop the boat turning after arriving on the new tack.
 tRudMin



DeWiggler Links

- Web page <http://www.ockam.com/dewiggler/>
- Presentation <http://www.ockam.com/dewiggler/DeWigglerAnalystPresentation.pdf>
- Manual <http://www.ockam.com/dewiggler/DeWigglerAnalyst.pdf>