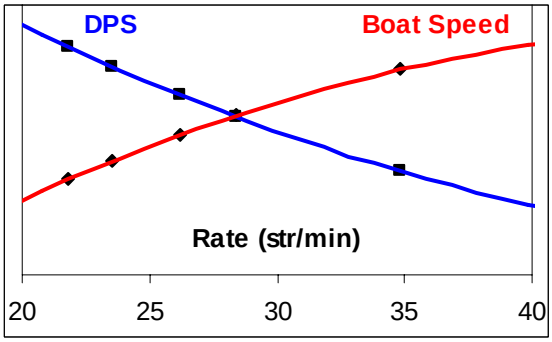
Ideas. What if...

✓ …you use the shape of the DPS (Distance per Stroke) trend as a measure of stability of the force application and stroke length at different rates? Importantly, you don't need any biomechanical equipment to find it out.

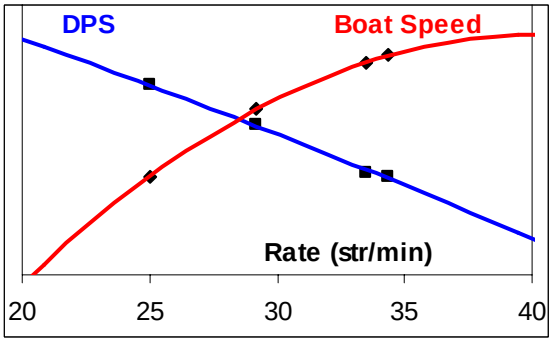
To do this, firstly, you should perform a step test with increasing stroke rate. You need to measure the rate very accurately or, better, count number of strokes during whole piece and then derive the rate.

Secondly, you need to input the data into a spreadsheet (e.g. Microsoft Excel) and plot the boat speed and DPS relative to the stroke rate.

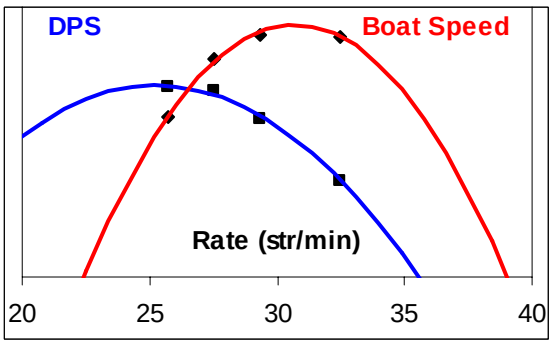
Finally, add the 2nd order polynomial trend lines using right click and local menu. Set desired "Forecast" in "Format Trendline-Options".



1



2



3

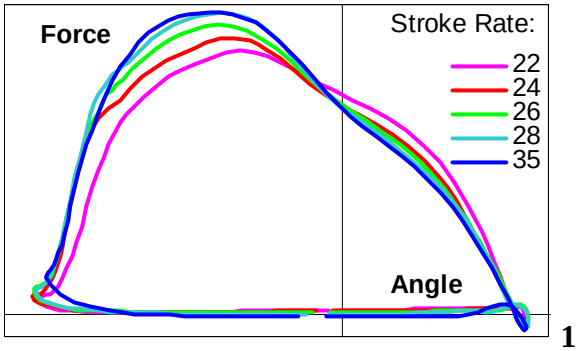
In the figures above there are three examples of the DPS and boat speed trends for different crews. The first crew increases the boat speed with the stroke rate nearly linearly. The DPS trend is concave at the top. It always goes down in all crews because the cycle time shortens at higher rate and boat travels shorter distance per cycle.

The second crew has linear DPS trend, but the speed trend bends down.

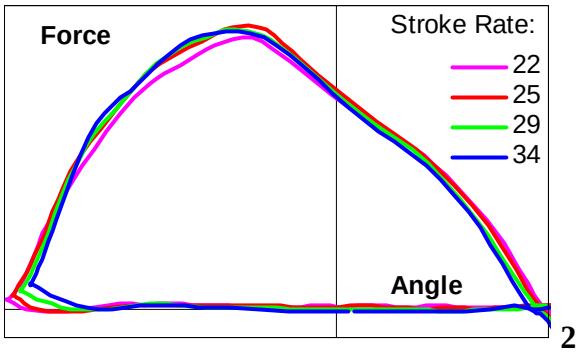
With the third crew both DPS and speed trends are concave at the bottom. This crew starts decreasing the boat speed, when the stroke rate increases higher than certain value (here it is 32 str/min).

Below are corresponding force-angle curves of these three crews. You can see that the first crew managed to increase average force significantly at high rates, providing nearly constant stroke length. Usually, good crews increase force more during the first half of the drive and drop it down a little during the second half. It is interesting that this ability correlates with the earliest position of peak force.

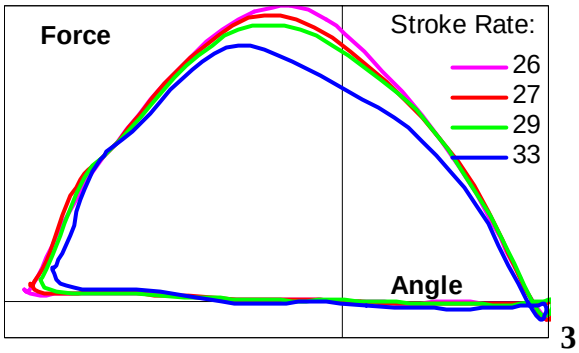
The second crew maintains nearly constant forces, but decrease stroke length at high rate. The third crew decreases significantly both stroke length and force application.



1



2



3

You can practice this method at different distances and comparing the trends, which brings the endurance factor into analysis. Just don't let rowers cheat applying less force at lower rate ☺.

Contact Us:

✉ ©2004 Dr. Valery Kleshnev
kleval@optusnet.com.au (m) +61(0)413 223 290