Q&A

We have received quite massive positive feedback on our rigging configurator, which you can find at http://www.biorow.com/RigChart.asp . E.g., Jamie Croly from St Stithians College, South Africa wrote:

"As far as your speed and rigging chart is concerned you seem to have got it spot on! In 2006 I coached a W1x at the Junior World Championships in Amsterdam. She finished 4th. Inputting her height 167cm, weight 62kg, ergo 7:17 into the table produces Inboard 87cm, Oar Length 282cm Span 160cm with a race time of 7:53. Kirsten's rig in the heat was 87cm, 281cm, 159cm and her time was 7:52. Her rate however was around 29/30."

Here we answer the most common questions, which we have received about the configurator.

Q: "When I input my data for a light-weight woman's four, I receive an error in the rigging."

A: There is no such an event as LW4- in the program of the World regattas. Therefore, we don't have statistics for such categories as well as normative data for the modelling. You can still use the innovative method for rowers of small height and weight, but you have to select their weight category as Open.

Q: "The boats/oars we have do not accommodate the innovative span/spread/inboard/oar length. How could we use the rigging chart in this case?"

A: You can still use traditional rigging variables. We hope that the innovative method could encourage the production of a wider variety of rowing equipment. In fact, the rower's height can vary more than 20% (from 165 to 200cm), but variation of commercially available oars and sculls is less than 3% (from 367 to 378cm for oars and from 282 to 292cm for sculls). In other similar sports the dimensions of equipment usually varies in proportion to athlete's dimensions: e.g. the ski length in cross country skiing varies 17% (from 177 to 207cm), the size of bike frames varies more than 30% (from 17 to 23 inches).

Q: "We have rowers of very different heights in our crew. How should we adjust the rigging to make the rowing angles the same?"

A: For a number of reasons synchronous timing at the catch and finish is an imperative in crew rowing. On the other hand, there is no biomechanical reason for the angles to be absolutely same, except that they produce better looking crews. Therefore, the drive time is the main criterion of synchronisation in the crew, but it depends not only on the rowing angle, but also on force application and blade depth.

You can use shorter blades for shorter rowers, but make sure to set the gearing ratio (outboard/inboard) in such a way, which provides the same drive time for all rowers. You can check timing of catch and finish with frame-by-frame video analysis and use it as a measure for rigging adjustment.

Q: "When I do the gearing and handle speed calculations for an 8+ and a 4- for different wind speeds, I could only see handle speed as being a constant across the different wind speeds in the same boat type, but not across the two boat types. Where am I going wrong?"

A: Yes, it is correct; the handle speed is different in various boat types because there is a different ratio of boat speed to stroke rate between them (higher speed in bigger boats at the same stroke rate). This is related to a relatively lower drag factor per rower.

For experts, we show the current algorithm of the innovative method of the rigging calculations:

1. Drag factor **DF** was derived as a function of the mass (weight) of the rower **Wr** for each boat type:

$$DF = a_1 * Wr + b_1$$

2. Rowing power **P** was derived from ergo score **Te**:

$$P = Kde * V^3 = Kde * (2000 / Te)^3$$

3. Prognostic speed **Vp** and time **Tp** was derived from the rowing power **P** and **DF**

$$Vp = (P * n * Eb / DF)^{1/3}$$

where **n** – number of rowers in the boat, **Eb** - blade efficiency.

$$Tp = 2000 / Vp$$

Alternatively, prognostic time **Tp** can be inputted straight in the Chart or adjusted on the wind speed and direction.

4. Length of the arc **Larc** is derived as a linear function of the rower's height **Hr**

$$Larc = a_2 * Hr + b_2$$

5. Actual **Lin_a** and measured inboard **Lin** were derived

$$Lin\_a = (180 * Larc) / (\pi * A)$$

$$Lin = Lin\_a - 2cm + Wh / 2$$

where handle width **Wh** = 12cm for sculling and **Wh** =30cm for rowing. Rowing angle **A** is taken as a normative value for each rower's category (RBN 2007/08) and adjusted for U23 as 98% and for juniors as 96% of the value for adults.

6. Average handle speed **Vh** was derived from **Larc** and drive time **Tdr**

$$Vh = Larc / Tdr$$

Drive time **Tdr** was taken as a function of the stroke rate **Rr**

$$Tdr = a_3 * Rr + b_3$$

7. Gearing ratio **Gr**, actual **Lout_a** and measured **Lout** outboards were is derived from **Vh** and **Vp**.

$$Gr = Vp / Vh * Eb$$

$$Lout\_a = Gr * Lin\_a$$

$$Lout = Lout\_a + 2cm + Lbl/2$$

Where **Lbl** is a blade length

8. Finally, the oar length **Loar** was derived

$$Loar = Lin + Lout$$

We keep working on the Rigging Chart to improve it and make it more accurate. We welcome your feedback and questions.

Contact Us:

* *©2009: Dr. Valery Kleshnev,*
kleval@btinternet.com , www.biorow.com