

More about Legs-Trunk Factor

With the purpose of finding an objective evaluation of rowing style, the legs-trunk factor **LTF** was developed in a previous Newsletter. It was defined as the ratio of the seat and handle movements during the first one fifth of the drive length. **LTF** indicates coordination of the two biggest body segments: the legs and trunk, during the beginning of the drive. This is very important for the dynamics of the drive and rowing effectiveness. Table 1 shows the average **LTF** values (n=21490) in various boat types:

LTF (%)	1x	2x & 2-	4x & 4-	8+	Average
Sweep		76.3%	74.7%	73.5%	74.2%
Sculling	78.9%	79.8%	76.1%		78.6%
Average	78.9%	78.8%	75.3%	73.5%	76.0%

LTF was 4.4% lower in sweep rowing than in sculling, which could be related to a higher contribution of the trunk due to rotation of the shoulders at the catch. In bigger boats, **LTF** was lower (in eights it was 5.4% lower than in singles). This could be explained by faster handle movement in bigger and faster boats, which require more upper body contribution because legs cannot provide sufficient speed. A rower's gender had no significant correlation with **LTF**.

The data above could be useful for developing an optimal learn-to-row strategy: **younger rowers should start learning correct technique in sculling**, which would help to develop a correct rowing style and reduce the risk of injury. In experienced rowers, **regular training in small boats, and in sculling for sweep rowers, could be a positive stimulus for maintaining the correct sequence of their body segments.**

An interesting practical question: how extensive ergometer rowing during the winter affects rowing technique in general and rowing style specifically? To answer this, we have reanalysed data obtained in the previous experiment on a group of five female scullers (RBN 2005/03), which were tested in singles, on a stationary Concept2 erg and on a mobile RowPerfect erg (RP3 now). Two 1-minute data samples were taken in each condition: at a training stroke rate (average 21.0str/min) and at racing one (33.5 str/min).

Catch Timing Factor **CTF** (Table 2, RBN 2015/09) was similar in all conditions at low rate, but at racing rate its negative magnitude was higher on Concept2. This means, on the stationary erg, rowers had to change direction of the seat movement earlier at the catch to overcome much higher inertia forces.

CTF (ms)	Training	Racing	Average
Boat	-18.2	-5.9	-12.1
Concept2	-21.6	-11.6	-16.6
RowPerfect	-20.0	-6.5	-13.2
Average	-19.9	-8.0	-14.0

LTF was significantly lower on a Concept2 erg (Table 3), especially at a racing stroke rate (by 12.6% compare to

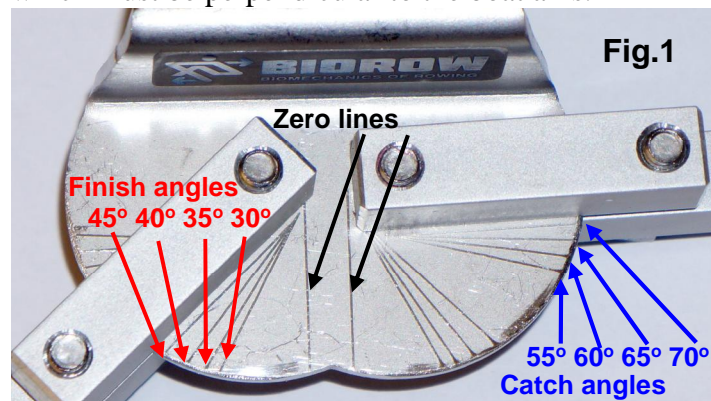
the boat and 10.1% compare to RP), which means the rowers had to use their upper bodies much earlier on the stationary erg to apply power to the handle. In a boat and on mobile erg, they could use their legs to transfer power through the stretcher (RBN 2008/12).

LTF (%)	Training	Racing	Average
Boat	80.5%	79.4%	80.0%
Concept2	73.7%	66.8%	70.2%
RowPerfect	78.0%	76.9%	77.4%
Average	77.4%	74.4%	75.9%

Therefore, **ergometers with mobile foot-stretchers have much a better correlation with on-water rowing in terms of legs-trunk coordination and rowing style. Extensive training on stationary ergs could change rowing style towards higher usage of upper body after the catch, which may have a negative effect on rowing technique in a boat.**

News on the BioRow™ Oar Angle Guides

A few useful improvements were made to the BioRow™ Oar Angle Guides. The base is now made of stainless steel instead of aluminium, which is only 24g heavier, but more robust at installation. A scale was laser-engraved on the base (Fig.1), which shows approximate oar angles ($\pm 2\text{deg}$). Accuracy depends on the thickness of the oar shaft, the sleeve design and its position in the oarlock. To use the scale, the base must be aligned during its installation using zero angle lines, which must be perpendicular to the boat axis.



A foldable version of the Guides was developed (Fig.2), which allows a quick switching ON/OFF on water and easier boat storage on racks. It is a bit heavier (205g compare to 160g of the standard version) and twice more expensive.

