Questions and Answers:

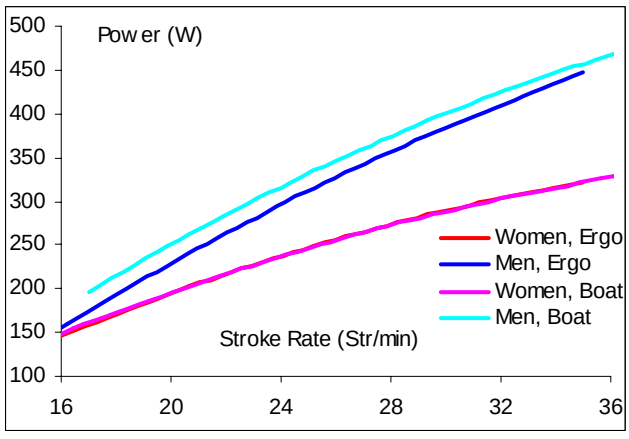
Q: Robert Dauncey from Pembroke College, Oxford asks: "I was wondering whether the power to stroke rate tables you published in January 2002 could be … transferred to the ergo? If not directly, is there a formula to adjust for the ergo?" Other coaches asked similar questions about evaluation of the ergo performance.

A: In general, the answer will be "Yes" for women and "No" for men. This conclusion comes from comparative analysis of our on-water data and ergo data, which was kindly provided by AIS physiologists Dr. Tony Rice and Gary Slater. The data represents rowing power at different stroke rates. The samples volumes were: Men/Ergo n=950, Men/Boat n=3200, Women/Ergo n=854, Women/Boat n=2538. The duration of the workload was four minutes on ergo, and 1.5-2 min on-water.

We assumed that the rowing power **P** is proportional to cube root of square of the athlete weight **W** (1): $\mathbf{P = kW^{2/3}}$. Relative power **k** was calculated for each rower as $\mathbf{k = P/W^{2/3}}$. Then, we derived regressions (trends) of dependencies of the relative power **k** on the stroke rate **r**:

Men/Ergo $k = -0.0106r^2 + 1.3321r - 10.6167$
Men/Boat $k = -0.0124r^2 + 1.3933r - 10.0180$
Women/Ergo $k = -0.0112r^2 + 1.1094r - 6.4277$
Women/Boat $k = -0.0100r^2 + 1.0383r - 5.4343$

Below is the comparison of the trend lines of power on Concept-II ergo and in the boat, derived from the above regressions for 86kg man and 72kg woman (average weights in the samples):



You can see that in women both trends are represented by virtually the same line. In men the boat trend lays noticeably higher. If we assume the **on-water power as 100%** at each stroke rate, then the corresponding **ergo power** will be:

Rate	16	20	24	28	32	36	40
Men	88%	91%	94%	95%	97%	98%	99%
Women	98%	99%	100%	100%	100%	100%	100%

We can speculate two different reasons of this difference in power.

Firstly, shorter duration of on-water workload allowы men to use their strength reserve better, while women do not have such strength.

Secondly, this fact corresponds to findings of Ingham et al. (1), where male rowers were 7.7% faster than female on ergo, but this difference was increased up to 10.9% on water. We can only guess the reason of this phenomena and further research required to make it clear.

Solutions.

Enclosed is a MS Excel™ spreadsheet that will help you to evaluate the power on ergo at different stroke rates and for athletes with different weight. The spreadsheet is built on the basis of above analysis. You can use both power and/or distance/time data in the worksheet.

We would greatly appreciate your feedback on the worksheet. Also, it would be great if you can send us your ergo data, which will help us to develop more accurate evaluation method.

Ideas. What if…

…you use above evaluation for building a training method, which will help to increase drive power of each stroke. This method is similar to DPS-assisted on water method (RBN 4/2001), but it is much easier to implement on ergo with accurate feedback on power and rate.

The idea is to build the power/rate profile for each rower and then try to lift it up, that means more power for each stroke.

When you input the rower's weight, stroke rate and power into the attached spread sheet, you can use the "Score" values for evaluation of the rower's performance at each stroke. If you have low scores at low stroke rate, then you need more strength and muscle volume. If your score decrease at higher rate, then you need speed qualities in your muscles.

The next step consists in setting desired higher scores and corresponding power for each rating and attempting to achieve them. Start with lower rate and then move it up.

References

1. S.A. Ingham, G.P. Whyte, K. Jones, A.M. Nevill. Determinants of 2,000 m rowing ergometer performance in elite rowers. Eur J Appl Physiol (2002) 88: 243–246.

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