Validation of an instrumentation measuring oar bending moments on-water in rowing

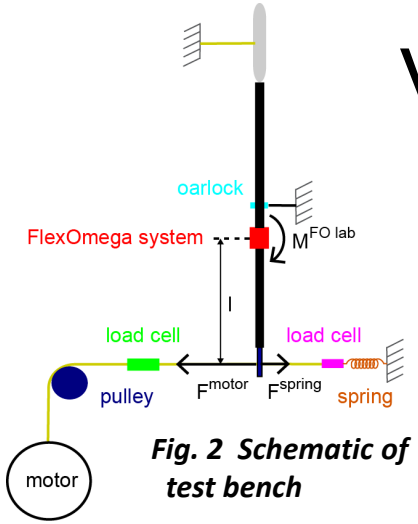

Fig. 2 Schematic of test bench

Background Quantifying rowing perfomance facilitates control of training load or assessement of skill level. Accordingly, Flexomega system was developed (see Fig. 1).

Goal Validation during dynamic load case.

Method Rowing profiles recorded during on-water rowing were used to repeatedly load instrumented oar on newly developed test bench (see Fig. 2).

Results On the test bench (featuring a mean precision of 99% and mean accuracy of 95%) a mean error of 3Nm for the FlexOmaga system was determined for rowing profile A representing race pace of a former world class athlete (see Fig. 3).

Measurement variability observed on test bench was on average 30% of the measurement variability occurred during on-water rowing at race pace but considerably less in faulty rowing (see Fig. 4).

Conclusion Improving characteristics of FlexOmega would hardly result in practical benefit as on-water measurements are mainly influenced by skill level and environmental conditions. FlexOmega can be used to control training intensity or assess performance.

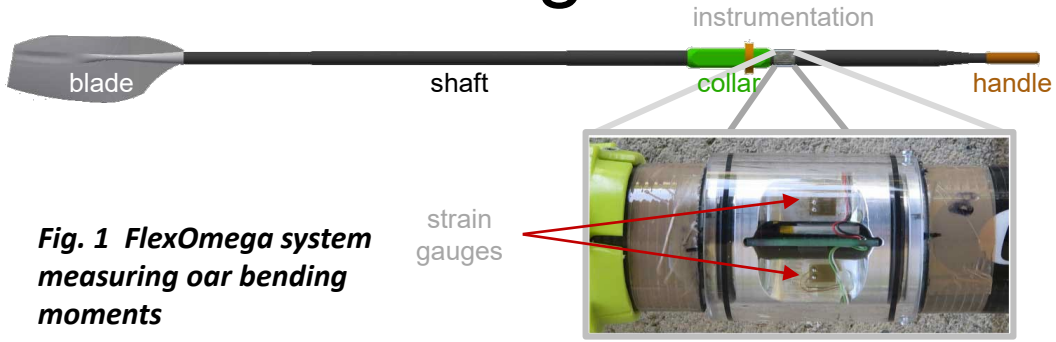

Fig. 1 FlexOmega system measuring oar bending moments

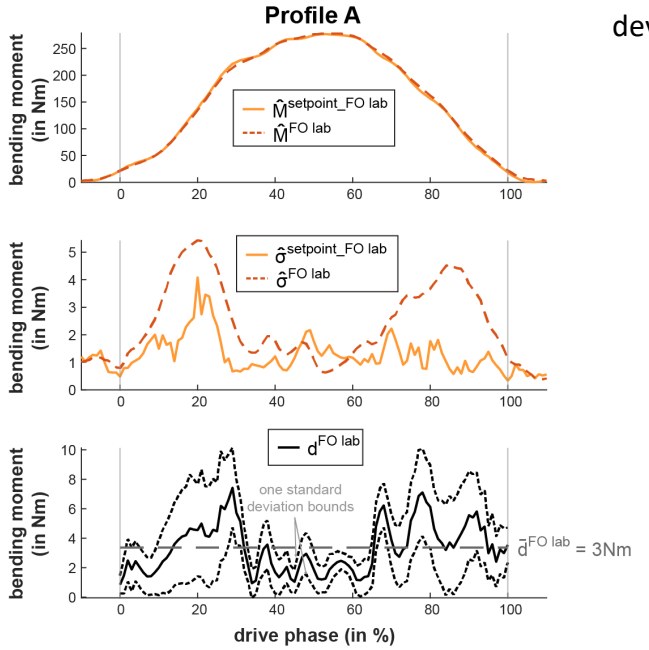

Fig. 3 Setpoint bending moments applied on test bench and FlexOmega moments measured simultaneously (65 strokes)

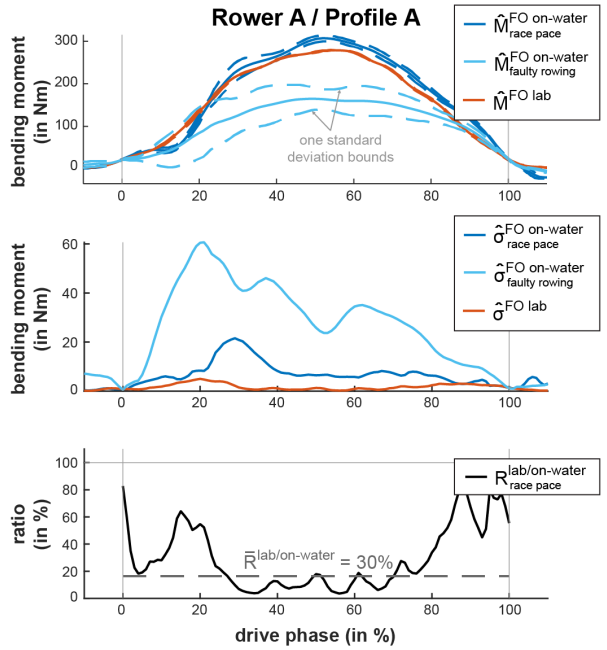

Fig. 4 Variability of eight trials measured either on-water (blue) or in the laboratory (orange). Lowest graph shows ratio between standard deviations.

Ungericht, C., Graf, C., Mandanis, G., Wernas, T., Schmid, M. J., & Wolf, P. (2023). Validation of a novel instrumentation (FlexOmega system) measuring oar bending moments on-water in rowing. *Current Issues in Sport Science*, *8*(1), Article 009. https://doi.org/10.36950/2023.1ciss009