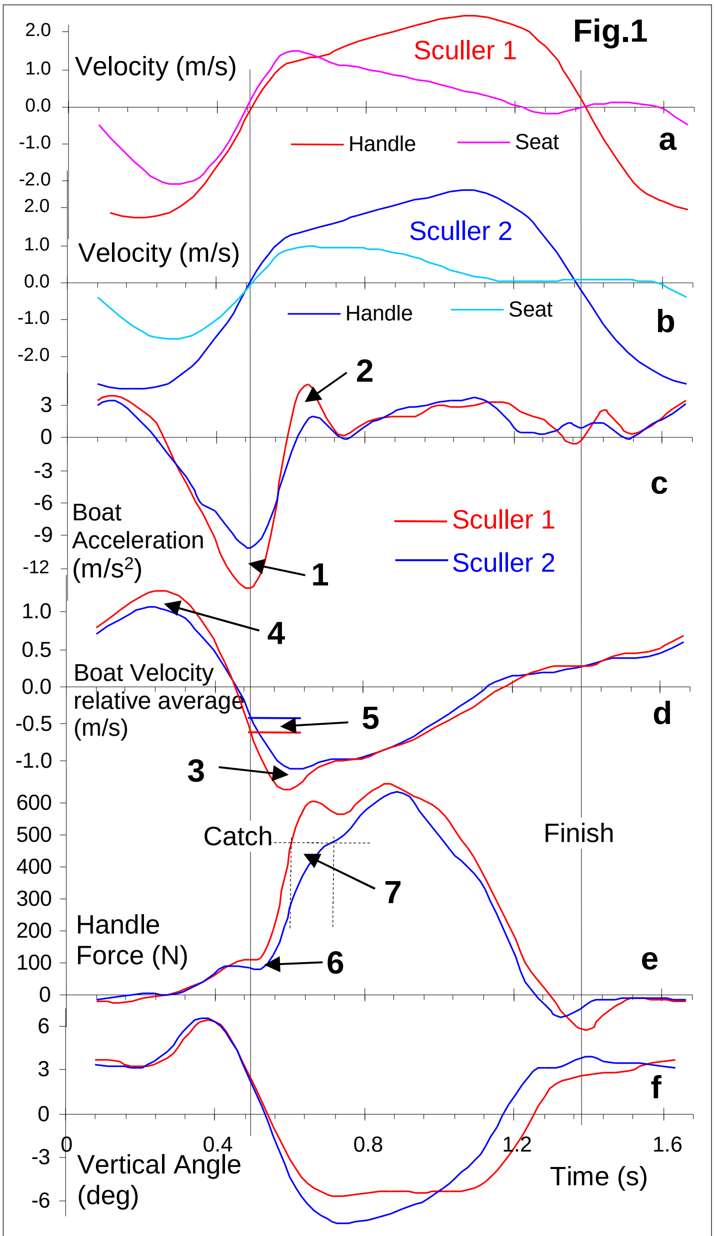
Again about "boat check"

The "check" on a boat at catch is still mentioned as an indicator of rowing technique (e.g., Rowing&Regatta #93 p.60), though advantages of the deeper negative peak of the boat acceleration were proved a number of times (RBN 2012/11, 2016/01). Again, this case study illustrates the positive effect of a more significant "boat check". Two single scullers performed a step-test with the BioRow system, the fastest samples were analysed, both at the stroke rate 37.9 min^{-1}.



Sculler 1 (1.83m height, 80kg weight) performed the "catch through the stretcher" (Fig.1, a) with a negative Catch Factor ***CF***=-14ms (RBN 2015/09), but had a "slide shooting" problem with the Rowing Style Factor ***RSF***=108%. Sculler 2 (1.93m, 86kg) used a "catch through the handle" approach (Fig.1, b) with positive ***CF***=+8ms and ***RSF***=68% - indicating an early "opening of the trunk".

As a result (Fig.1, c), sculler 1 had a much deeper negative peak of the boat acceleration at the catch (1): the evaluation of its value from the trend (RBN 2016/01) was -1.9SD, whereas it was +0.5 SD for sculler 2. The first peak (2) was significantly higher in sculler 1 (+2.2 SD) than in sculler 2 (-0.4 SD).

Sculler 1 had a lower boat velocity after the catch (3), however it was higher before the catch (4), which means he had a higher variation of boat velocity (13.5%) compared to sculler 2 (12.4%). This created a 0.26% higher loss of boat speed for sculler 1 (0.95s slower over a 2km race). **The elimination of the extra speed losses due to "the boat check" at the catch was traditionally considered as the most important target of efficient rowing technique, but in fact the losses are very small, less than 1 s over a 2 km race.**

What are the advantages of a higher "boat check" technique? At the catch, the rower has to change the direction of the oar movement, and accelerate the blade to pick up the speed of the water relative to the boat; if otherwise, it would produce a negative braking force instead of propulsion. The sharp negative acceleration peak quickly decreases the boat speed, so at the catch it was 0.2m/s slower in sculler 1 (5), and at the blade entry it was 0.5 m/s slower (3). Together with using longer outboard lever (RBN 2006/09), **a lower boat velocity at sharper "check" at catch makes it easier for the blade to pick up the water speed and start propulsion.**

Sculler 1 changes direction of the seat movement earlier and accelerates it quicker after catch, so at the blade entry the velocity of his seat was two times faster than in sculler 2 (1.2m/s compare to 0.6m/s). The rower's centre of mass CM at catch is located between the thigh and torso, approximately at the level of the belly button, so the movement of the rower's CM is closely related to the seat movement. Therefore, at the blade entry, sculler 1 used his faster moving mass to take the load. **It was called rowing "using the rower's weight", which we named the "hammer and nail" principle: a hammer must be accelerated first, before hitting a nail (taking the load)**, otherwise it would require much more efforts to insert the nail into the wall.

A combination of a lower boat speed relative to the water and a faster moving CM allows sculler 1 to increase the handle force immediately after the blade entry, whereas it slightly decreases in sculler 2 (6). Sculler 1 has a much steeper force gradient: it takes him only 6deg of the oar movement to increase his force up to 70% of its peak value - two times shorter than in sculler 2 (7). The rapidly increasing force is transferred through the oar, gate and rigger to the boat to create its high positive acceleration (the first peak), which works as a "trampoline" and helps the further acceleration of the rower's mass. As a result, the technique of sculler's 1 was much more effective, so his speed was 15s faster over 2km.

Concluding, **reducing the "boat check" at catch and effective rower's weight utilisation are two opposite principles**, so you can choose one or another.