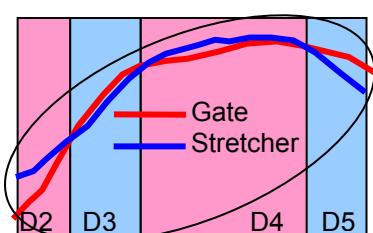
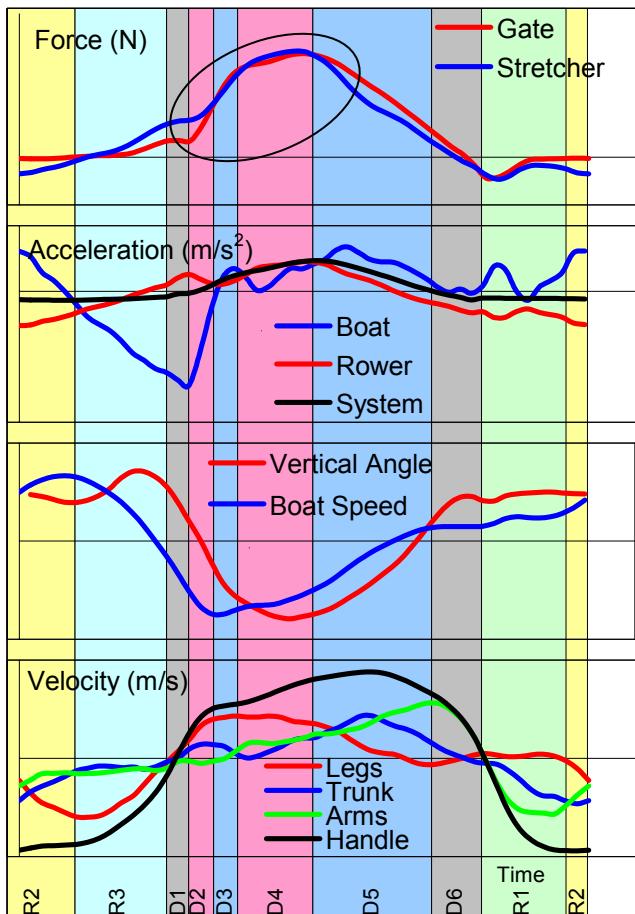


Facts. Did you know that...

✓ ...coordination of the handle/gate and foot-stretcher forces during the drive phase is not as simple as it appeared to be from the first glance? Below are typical graphs of biomechanical parameters in M1x together with micro-phases of the stroke cycle (D1-D6 drive, R1-R3 recovery):



There are six micro-phases in the drive phase: D1 blade insertion, D2 initial rower's acceleration, D3 initial boat acceleration, D4 the main rower's acceleration, D5 the main boat acceleration, D6 blade extraction.

The main rules of interaction between the rower and boat masses are: more push (higher foot-stretcher force, legs work) means greater acceleration of the rower's mass; more pull (higher handle/gate force, upper body work) means greater boat acceleration. In previous publications (RBN 6,11/2002) we have emphasized the importance of the rower's mass acceleration, which determines amount of kinetic energy accumulated during the drive and, hence, average speed of the rowers-boat system. This remains

true with one important addition: rowers need a good support to push their bodies forward. Emphasis on push or pull (rower's or boat acceleration) changes four times during the drive phase:

- First, rowers have to push to accelerate their body mass and decelerate the boat, because they have to change direction of their movement from the stern to bow at catch (D1 – D2). The quicker these micro-phases, the better.

- Then, during the first pull phase rowers accelerate the boat to create faster moving support on the foot-stretcher to further accelerate their bodies. This micro-phase D3 **initial boat acceleration is extremely important for performing effective drive phase**. In some crews this phase can absent. Fast increasing of the handle force is the main condition of its presence.

- During D4 rowers push the stretcher again to accelerate themselves and accumulate the main part of kinetic energy. Effectiveness of this phase depends on amount of gained boat speed during the previous D2 and fast powerful legs drive.

- The final boat acceleration micro-phases D5 and D6 utilize more pull by means of trunk and arms work. Forces and total system acceleration decrease during this phase and rower's acceleration become negative transferring kinetic energy to the boat.

This push-pull-push-pull coordination during the drive requires significant coordination and "boat feel" from rowers.

Ideas. What if...

? ...we correlate above facts with specifics of rowing technique, which can be found in some top rowers? Famous coach Marty Aitken expressed a guess that "grabbing the arms" at the beginning of the drive can help more effective initial boat acceleration during D3. This "arms grabbing" generally considered as a technical mistake by majority of rowing coaches, but it can be found in technique of such a great rowers as Steven Redgrave, Kathrin Boron and other Olympic and World champions. I think that this guess is correct and "arms grabbing" helps them to increase the handle force quicker and create faster moving support on the stretcher. However, some other great rowers manage to do initial boat acceleration without "arms grabbing".

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