Brief rigging guide

This is a simple brief rigging guide, which may help to establish a systematic approach and understand better biomechanical implications of rigging variables. The most important adjustable rigging variables are defined below: 12 in sculling and 11 in rowing. Typical numbers are given for a common equipment, but could be very different, e.g. for Fat2 blade type.

Oar settings

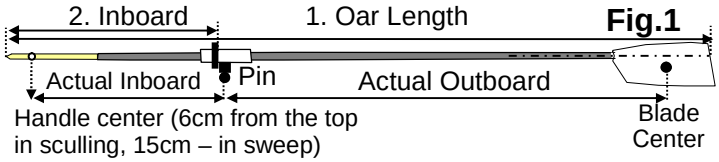

Fig.1

Oar length (1) is measured from the handle top to the outer edge of the blade at the axis of the shaft; inboard (2) - from the handle top to the outer face of the button. Oar gearing is defined as a ratio of actual outboard to actual inboard both measured from the pin to the centres of the blade and handle, where the resultant forces are applied. The typical oar rigging numbers:

Variable (cm)	1x	2x	4x	2-	4-	8+
1. Oar Length	287	288	289	372	374	375
2. Inboard	88	88	88	116	115	114

Biomechanical implications

	Shorter	Longer
1. Oar Length	Lighter gearing: higher handle speed at lower force	Heavier gearing: lower handle speed at higher force
2. Inboard	Heavier gearing, longer oar angles	Lighter gearing, shorter oar angles

Boat settings

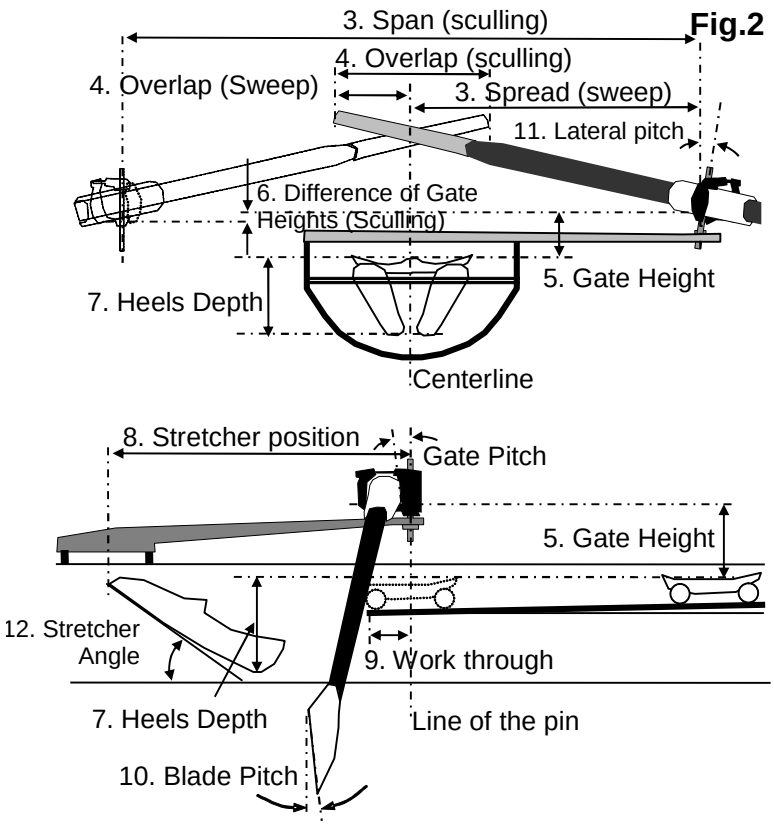

Fig.2

Span (3) in sculling is measured between pin centres at the bottom (because lateral pitch could affect it at the pin top); and spread (3) in rowing is measured from the centreline of the boat to the pin centre. Overlaps (4) could be measured directly, or calculated:

Overlap (Sculling) = Inboard * 2 - Span + 4

Overlap (Sweep) = Inboard – Spread + 2

The gate height (5) is measured from the bottom of its working face to the seat. Usually it is taken to the gunnel first, then the height from the seat to the gunnel is added or subtracted. In sculling, the difference between star and port gate heights (6) is recorded separately. The heels depth (7) is measured from the seat to the bottom corner inside the shoe. Line of pins inside the boat should be marked and used as a reference to measure the stretcher position (8), to the shoes toes, and work through (9), to the stern end of the seat.

Blade pitch (10) can be measured either directly with the oar sleeve fixed at the gate and blade shaft in horizontal position; or the pitch can be measured between the sleeve and blade, then it is summed up with the gate pitch. The pitch is easier to measure with a special electronic pitch-meter applied to the blade or working face of the gate, when the boat is levelled. Lateral pitch (11) outwards is measured at the pin or at the back of the gate, when it is perpendicular to the levelled boat. The stretcher angle (12) is measured from the horizontal axis of the boat.

Biomechanical implications of boat settings:

Variable	Range	At lower values	At higher values
3. Span Sculling	158-160	Longer angles, heavier gearing	Shorter angles, lighter gearing
Spread Sweep	84-86	Same	Same
4. Overlap Sculling	19-21 cm	Longer catch, longer stretcher position	Longer finish, requires shorter stretcher position
-- Sweep	30-32	Same	Same
5. Gate Height	14-18 cm	Shorter length, higher force	Longer length, less force
6. Difference of Gate Heights in sculling	1-2 cm	Even handles heights, more boat roll	Uneven handles height, less boat roll
7. Heels Depth	15-19 cm	Same as 5	Same as 5
8.Stretcher position	55-65 cm	Shorter catch – lighter gearing	Longer catch – heavier gearing
9. Work through	14-20 cm	Same	Same
10. Blade Pitch	4-8 deg	Deeper blade, requires higher gate height	Shallower blade, lower gate height
11. Lateral Pitch	0-2 deg out	Less blade pitch at catch, more – at finish	More blade pitch at catch, less – at finish
12. Stretcher Angle	40-44 deg	Same as 5	Same as 5

Appendix 1 to Rowing Biomechanics Newsletter No 162 2014 September

Template for rigging records

	Rower/Date **Variable**								
1	Oar Length (cm)								
2	Inboard (cm)								
3	Span (Sculling), or Spread (Sweep) (cm)								
4	Overlap (cm)								
5	Gate Height Port board (cm) Star board (cm)								
6	Difference of Gate Heights (sculling) (cm)								
7	Heels Depth (cm)								
8	Stretcher position (cm)								
9	Work through (cm)								
10	Blade Pitch (deg)								
11	Lateral Pitch (deg)								
12	Stretcher Angle (deg)								