Practical boat rigging

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to be continued Part 2

Rigging: Oars – Setting up the Arc length with Catch/ Finish angles

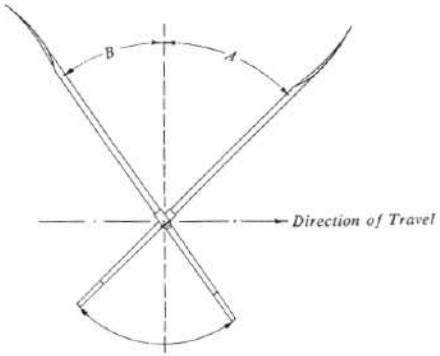


Figure 6. Arc of Angular Movement

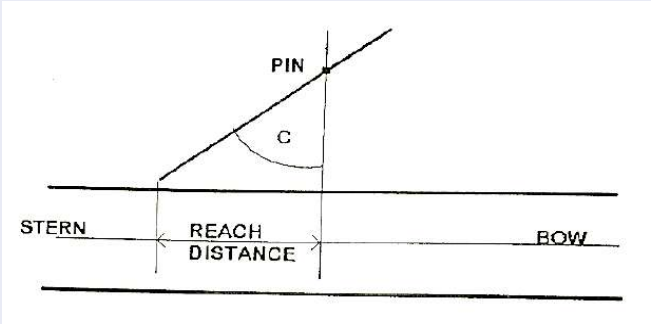
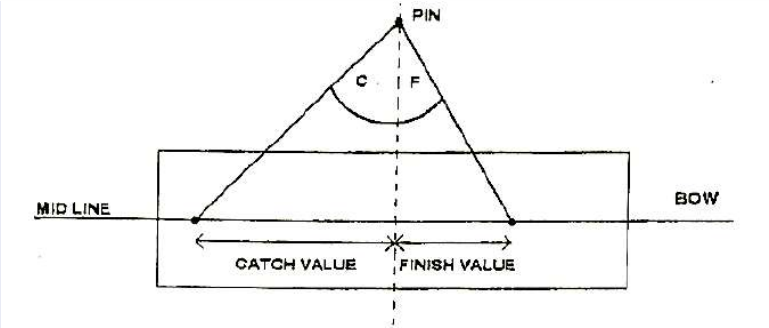
	NOVICE			EXPERIENCED		
	Stroke length	Catch angle	Finish angle	Stroke length	Catch angle	Finish angle
SWEEP (deg)	77-85+	45-55+	30-35	82-90+	50-62+	30-35
SCULLING (deg)	85-100+	50-60+	35-42	98-110+	55-72+	40-45

- The recommended arc of angular movement in degrees (see table)
- generally faster boats have longer catches/ shorter finishes;
  slower boats have shorter catches, longer finishes

- Oar setup: important for aiming at a targeted stroke length incl. the absolute points for the entry (Catch) & exit (Release/ Finish) of the blade
- Oar setup differs between boat categories, rowing classes, levels & genders
- 'Arc & Angle Setup' Method suitable for aligning crew members (by angles & in time)
- If angles still require adjustment to match the angles & the timing of the oars with the crew, further changes can be done by adjusting:
  - Footstretcher position adjustment (sometimes requires slide adjustment)
  - Inboard/ oar length/ span/ spread

Rigging: Oars – Setting up the Arc length with Catch/ Finish angles

2 Examples for calculating the catch and finish angles

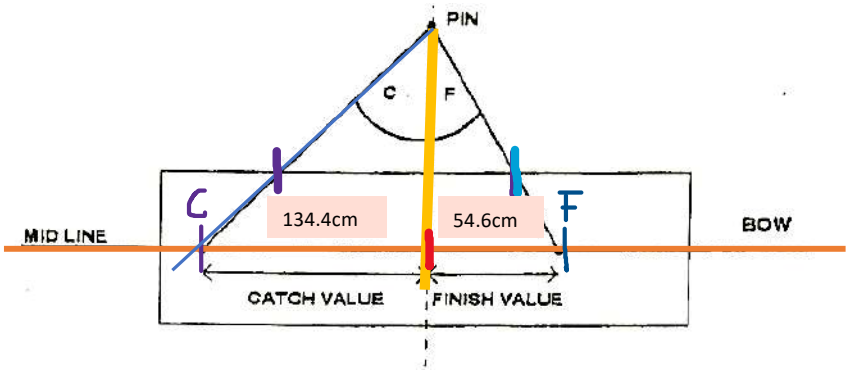
'Reach Distance' Method	'Spread Distance' Method
Reach Distance = Inboard x sin 'C'	Catch value = Spread x tan 'C' Finish value = Spread x tan 'F'
	
The 'Reach distance value' is the distance from the point where the pin(s) is perpendicular to the boat = length of the inboard x sin 'C' (required catch/ or finish angle). Measurements are in cm and made along the midline of the boat.	The 'Catch/ finish values' are the distances from the point, where the pin is perpendicular to the boat. Measurements are in cm and made along the midline of the boat. For sculling: Catch/ Finish value = Span/2 x tan 'C'/ 'F'.

Rigging: Angle Setup – ‘Spread Distance’ Method

Catch (or Finish) value = Spread x tan ‘C’(or ‘F’)

How to mark the entry and release point with straws to bring everyone to the same angle.

- Set up centre line of boat with a string line
- Determine the required stroke length with the targeted ‘Catch position’ (C)/ ‘Finish position’ (F) and Spread: Sweep example: SL=90+deg/ ‘C’= -58deg/ ‘F’= 33deg) & Spread/ Span = 84cm (see table)
- Select measuring device & mark the distances ‘C’ & ‘F’ on the midline; then rotate around the pin until those distances intersect with the boat centre line; mark position on saxboards where the line crosses the saxboard.



'Spread Distance Method': CATCH/ FINISH VALUES											
SPREAD (cm)	82	82.5	83	83.5	84	84.5	85	85.5	86	86.5	87
Catch angle 'C' (deg)											
-60	142.0	142.9	143.8	144.6	145.5	146.4	147.2	148.1	149.0	149.8	150.7
-59	136.5	137.3	138.1	139.0	139.8	140.6	141.5	142.3	143.1	144.0	144.8
-58	131.2	132.0	132.8	133.6	134.4	135.2	136.0	136.8	137.6	138.4	139.2
-57	126.3	127.0	127.8	128.6	129.3	130.1	130.9	131.7	132.4	133.2	134.0
-56	121.6	122.3	123.1	123.8	124.5	125.3	126.0	126.8	127.5	128.2	129.0
-55	117.1	117.8	118.5	119.3	120.0	120.7	121.4	122.1	122.8	123.5	124.2
-54	112.9	113.6	114.2	114.9	115.6	116.3	117.0	117.7	118.4	119.1	119.7
-53	108.8	109.5	110.1	110.8	111.5	112.1	112.8	113.5	114.1	114.8	115.5
Finish angle 'F' (deg)											
36	59.6	59.9	60.3	60.7	61.0	61.4	61.8	62.1	62.5	62.8	63.2
35	57.4	57.8	58.1	58.5	58.8	59.2	59.5	59.9	60.2	60.6	60.9
34	55.3	55.6	56.0	56.3	56.7	57.0	57.3	57.7	58.0	58.3	58.7
33	53.3	53.6	53.9	54.2	54.6	54.9	55.2	55.5	55.8	56.2	56.5
32	51.2	51.6	51.9	52.2	52.5	52.8	53.1	53.4	53.7	54.1	54.4
31	49.3	49.6	49.9	50.2	50.5	50.8	51.1	51.4	51.7	52.0	52.3
30	47.3	47.6	47.9	48.2	48.5	48.8	49.1	49.4	49.7	49.9	50.2

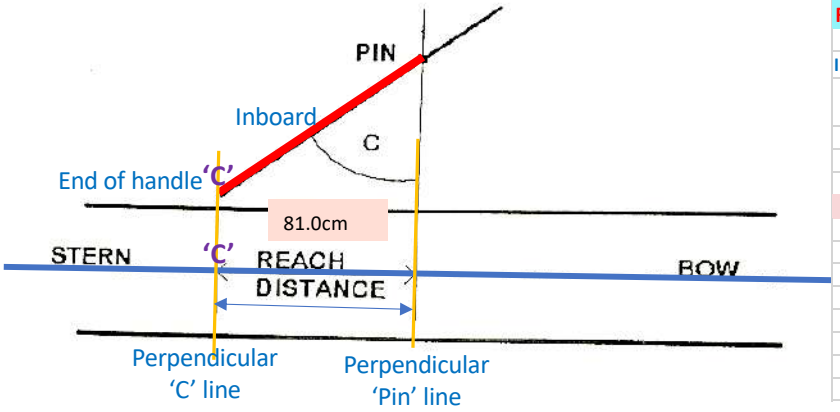
Rigging: Angle Setup – ‘Reach Distance’ Method

Reach Distance = Inboard x sin ‘C’

How to mark the entry and release point with straws to bring everyone to the same angle.

- Set up centre line of boat with a string line
- Determine the required stroke length with the targeted ‘Catch position’ (C)/ ‘Finish position’ (F) and Spread:
  Sculling example: SL=110deg/ ‘C’= -67deg/ ‘F’= 43deg) & Inboard = 88cm (see table)

- Select measuring devices & mark the distance between the ‘C’ - ’Pin line’ on the midline;
  then rotate the inboard around the pin until the end of the handle intersect with the perpendicular ‘C’ line (of the boat centre line); mark position on saxboards where the line crosses the saxboard.



REACH DISTANCE VALUES': CATCH/ FINISH VALUES													
INBOARD (cm)	84	84.5	85	85.5	86	86.5	87	87.5	88	88.5	89	89.5	90
ANGLE 'CATCH' (deg)													
70	78.9	79.4	79.9	80.3	80.8	81.3	81.8	82.2	82.7	83.2	83.6	84.1	84.6
69	78.4	78.9	79.4	79.8	80.3	80.8	81.2	81.7	82.2	82.6	83.1	83.6	84.0
68	77.9	78.3	78.8	79.3	79.7	80.2	80.7	81.1	81.6	82.1	82.5	83.0	83.4
67	77.3	77.8	78.2	78.7	79.2	79.6	80.1	80.5	81.0	81.5	81.9	82.4	82.8
66	76.7	77.2	77.7	78.1	78.6	79.0	79.5	79.9	80.4	80.8	81.3	81.8	82.2
65	76.1	76.6	77.0	77.5	77.9	78.4	78.8	79.3	79.8	80.2	80.7	81.1	81.6
64	75.5	75.9	76.4	76.8	77.3	77.7	78.2	78.6	79.1	79.5	80.0	80.4	80.9
63	74.8	75.3	75.7	76.2	76.6	77.1	77.5	78.0	78.4	78.9	79.3	79.7	80.2
62	74.2	74.6	75.1	75.5	75.9	76.4	76.8	77.3	77.7	78.1	78.6	79.0	79.5
61	73.5	73.9	74.3	74.8	75.2	75.7	76.1	76.5	77.0	77.4	77.8	78.3	78.7
60	72.7	73.2	73.6	74.0	74.5	74.9	75.3	75.8	76.2	76.6	77.1	77.5	77.9
59	72.0	72.4	72.9	73.3	73.7	74.1	74.6	75.0	75.4	75.9	76.3	76.7	77.1

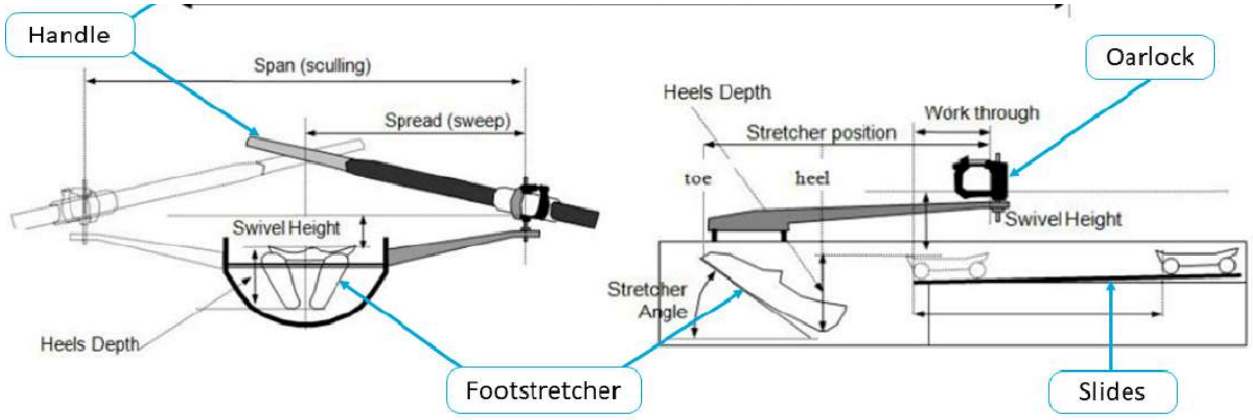
Rigging: Footstretcher - Angle - Height – Placement of stretcher & shoes Stretcher system

Stretcher setup: important for required posture of the athlete (free, effective and comfortable movement) to be able:

- to reach a long catch angle
- to place the blade effectively (aimed to coordinate in tune with the beginning of the leg drive)
- to initiate and execute a strong effective leg drive

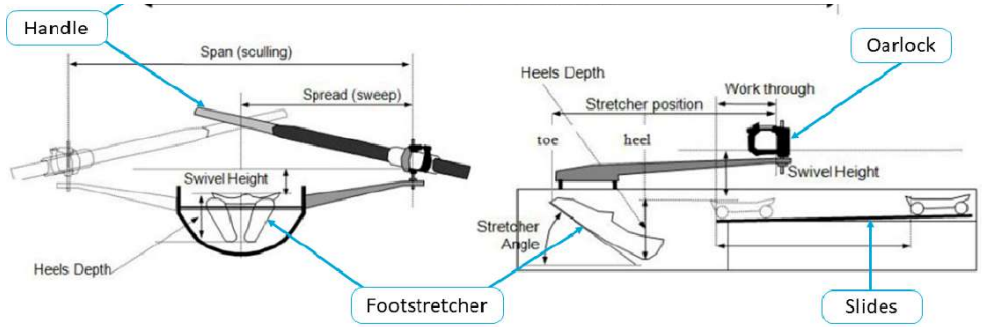
These are the pre-requisites to minimize the time of boat deceleration (also called 'check time') of the boat at the catch

Stretcher & the shoes/ shoe plate can/ should be adjusted for the individual needs of the athletes:
- Anthropometry, Mobility (ankle &; hip flexibility), Strength, Shoe size, Technique



Voordouw, J., 2018

Rigging: Footstretcher - Angle - Height – Placement of stretcher & shoes



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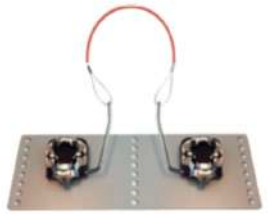
CATCH
- Heels slightly off
- Shins vertical
- Pelvis forward
- Pressure on front of sit bones
- Hip slightly externally rotated
- Spine neutral
- Shoulders mid socket
- Upper arms slightly ER

Adjustment	Recommendation	Adjustment requirement?	Example
Stretcher angle	40-45deg (42-45deg ideal)	Mobility Boat type	Ankle/ hip mobility
Stretcher height (Heel depth)	12-19cm	Anthropometry; shoe size Body type Mobility	Lower/ upper leg ratio lightweight/heavyweight Ankle/ hip mobility
Stretcher position	56-60cm (from pin – centre of seat in the finish position)	Catch/ finish angle Leg length	
Shoe width	12-20cm	Depending on boat category/ boat width	1x: (13cm)/ 2-/2x: 14-16cm/ 4-/+: 16cm/ 8+: 18-20cm….
Splay	Depend on width of boat	Boat type Mobility, Shoes	(gluteal muscle/ tight hips)

Rigging: Footstretcher: Stretcher/ Shoe systems

Standard	BAT(Logic)/ Bont system	Shimano system
 	 	   
Shoe fixed to shoe plate with splay (angle) & shoe displacement width (depend on boat width/ athlete's requirement) Shoe is fixed or able to rotate slightly	Aim: the shim system allows to have an improved foot support, greater engagement and enhanced heel load through the whole stroke Hygienic (keep your own shoes)	Aim: pivot helps you get more reach at the catch Hygienic (keep your own shoes)

Rigging: Blades - Effect of the Vortex on the tip of the blade

Standard	Vortex
	
Good connection at the catch More surface of the blade Keep good connection throughout the finish	Aim: Decreasing slip in first half of drive, which in turn increases resistance and efficiency Increasing slip in last quarter of the drive

Rigging: Challenges & Opportunities

Challenges 'One size fits all' - Setup	Opportunities (individual rigging)
In big clubs/ Universities/ Schools – boats have mostly a standard setup & are shared – hard to change/ time issue/ big squad Difficult to change: • oar gearing, • span/ spread • Stretcher setup • Shoe size (often a big problem for smaller athletes) • Width of shoe displacement • Seats (height/ size/ type) • grip/s	individual setup improves technique & training quality • Oar load gearing depending on athlete's individual needs (anthropometry, fitness/ strength level; skill level; boat class) • Grips (hand size; hand condition) • Seats (gender; boat class; hip structure) • Individual shoe size (very important) • Stretcher (angle, height, position, splay, width of shoe displacement)

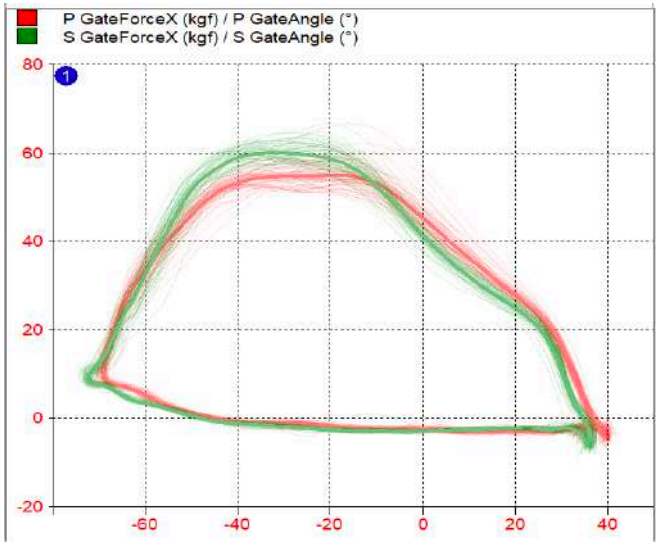
Ideal Technique vs. Common technical Breakdowns: CATCH

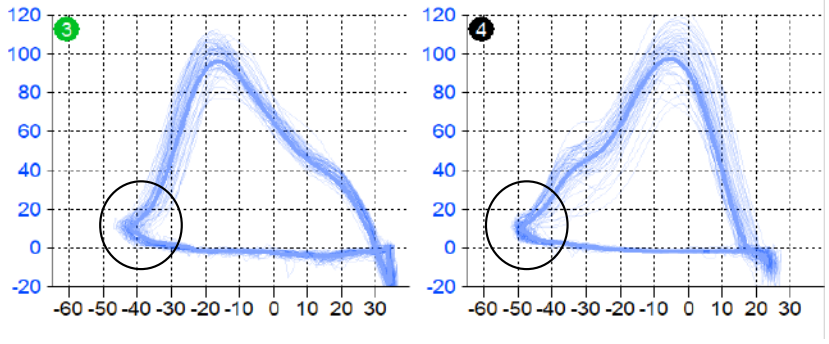
IDEAL TECHNIQUE: CATCH

CATCH

- Heels slightly off
- Shins vertical
- Pelvis forward
- Pressure on front of sit bones
- Hip slightly externally rotated
- Spine neutral
- Shoulders mid socket
- Upper arms slightly ER

BIOMECHANICAL ON-WATER DISPLAY





Common technical BREAK DOWNS CATCH

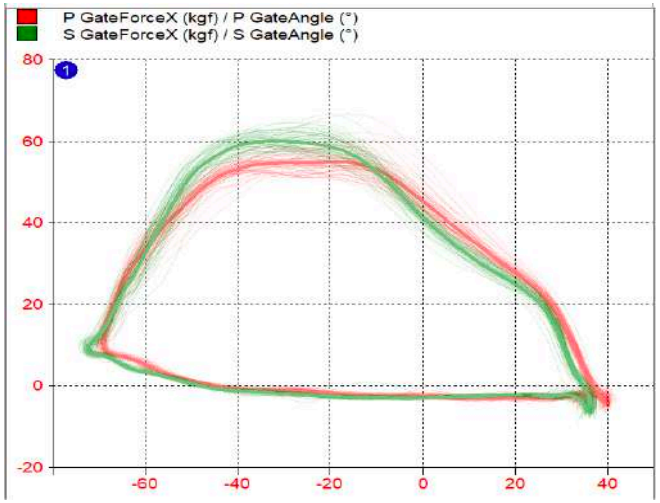
CATCH

- Poor ankle compression
- Poor Hip compression
- Poor pelvic/rock over
- Lower spine flexion
- Upper spine flexion
- Forward Head Posture
- Shoulder forward (sublux)

Ideal Technique vs. Common technical Breakdowns: FINISH

IDEAL TECHNIQUE: FINISH

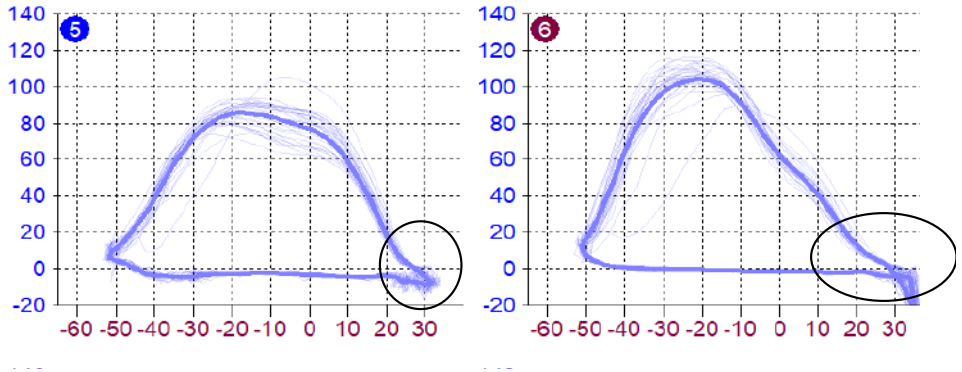
BIOMECHANICAL ON-WATER DISPLAY



Common BREAKDOWNS FINISH

FINISH

- Pelvis just past neutral
- Pressure on back of sit bones
- Neutral spine
- Glutes engaged
- Shoulders set



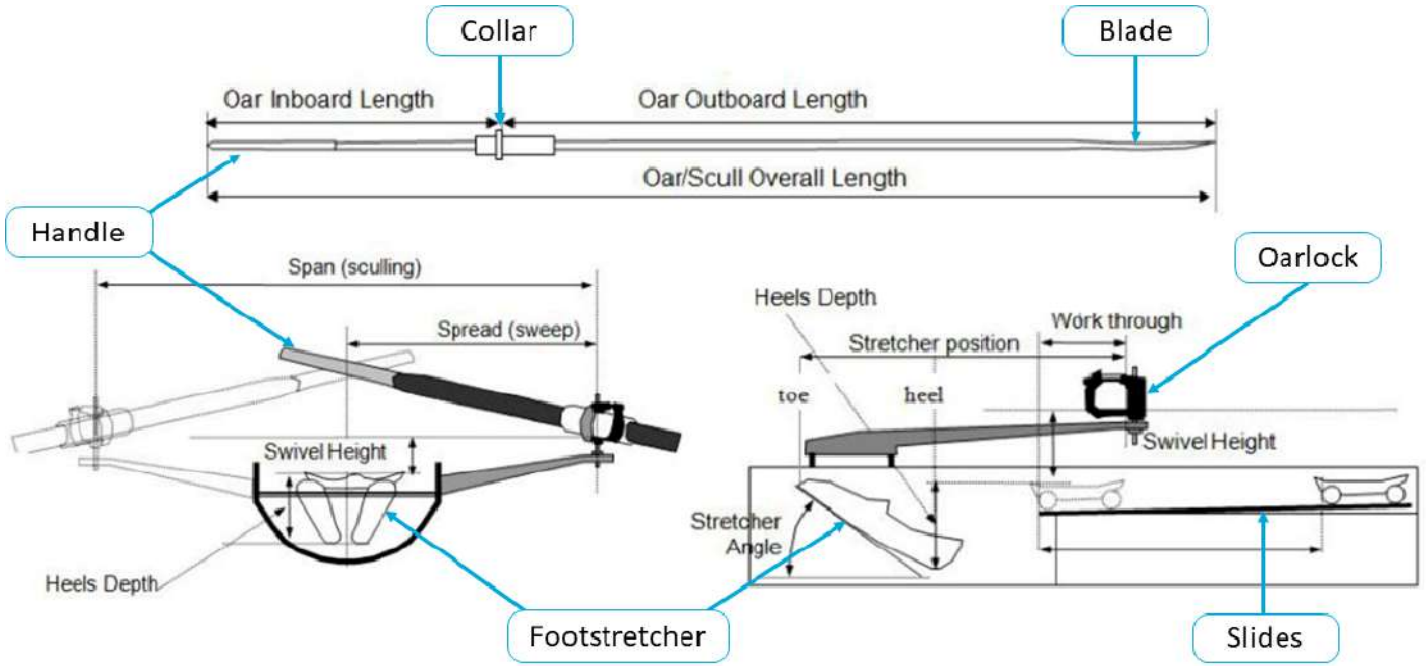
FINISH

- Glutes off too early/over reliance on hip flexors
- Collapse at back end
- Over extension of upper Tx
- Forward head posture

Rigging: HOW ideal is your current Rigging Setup?

2 Types of assessment for the boat and the athletes

- Technique
- Competition



Voordouw, J., 2018 The set-up (adjustable parameters in the rigging) of the oar and the boat. (Figure adjusted from Gianchandani).