The Kiwi Guide to Rigging

Presented by Waikato Rowing Association and Laszlo Boats NZ

Welcome to our rigging education session! These notes will help you remember what Karl takes us through this afternoon. If you have any questions at any time, please just ask!

The main steps to basic rigging we will take you through are:

- 1. Span/spread
- 2. Pitch lateral and stern
- 3. Height of the gate
- 4. Feet angle and height
- 5. Oar length and inboard

We will go through each of these on a single, with Karl demonstrating, and then work though some other boats so you get used to where you are measuring from.

Preparation

As good preparation, make sure all the rigger nuts are fully tight before you begin any kind of rigging or measuring.

You will need to get your boat on level ground. If you don't have level ground, it is possible to use digital spirit levels to reference "level".

Once you have your boat level on dumps, secure it as firmly as possible with ties or upright clamps.





1. Span and Spread

Spread

- Used as a rigging term for sweep boats
- It is the distance from the centre line of the boat to the centre of the pin.

Span

- Used for rigging sculling boats
- It is the distance from the centre of the bow side pin to the centre of the stroke side pin.

Measuring Spread

- a) To measure **spread** on a sweep boat, measure the distance across the boat hull (in line with the gate) from one outside edge to the other and call it **A**.
- b) Divide this number A by 2, which will give you the measurement of the centreline to the outside edge of the hull, call it B.
- c) Find **B** on your tape measure and hold it firmly on the outside edge of the hull, with the **zero** end of the tape measure hovering over the centre of the boat.
- d) Extend the tape measure out to the pin and read off from the centre of the top bolt.



Measuring Span

- a) To measure **span** on a sculling boat, measure the distance from the centre of the top bolt on the bow side gate, across the boat to the centre of the top bolt on the stroke side gate. It is often easier to do this with two people.
- b) The distance between the centre of the two top bolts, is your **span**.
- c) To check your span is correct, you must check that both sides are equal distance from the centre line of the boat.
 - To do this hook the **zero** end of your tape measure on the outside edge of the far slide and measure in a perpendicular line to the top bolt of the opposite gate.
- d) Check that this measurement is exactly the same for both sides.
 - If not, you will need to adjust each pin fractionally until the overall span is correct and both pins are exactly the same distance from the centre line of the boat.



Making adjustments

• If you decrease the span/spread the blades will feel "heavier" as the stroke will be longer, arc will be greater and more power can be applied.

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If you increase the span, the blades will feel "lighter" but the stroke will be less
effective and the arc smaller.

The measurements used for the span/spread must be chosen in relation to the oar overall length and inboard. The relationship between these three (span or spread, and oar length and inboard) determines the length of the arcs either side of the pin. More about this a bit later!

2. Pitch

What is - Stern pitch?

- It is the angle of the face of the blade away from the vertical.
- Correct **stern pitch** helps the blade enter the water cleanly and stay at the correct depth in the water, without wanting to either pop out or dig too deep.
- Too little pitch and the blade will want to pop out of the water.
- Too much pitch and the blade will want to dig deep and be difficult to extract at the finish.

Before you measure Stern Pitch

Before you start measuring pitch, double check that the boat is still level on the outer edge of the hull lengthways and across the boat.



How to check levels

- Karl uses a block in the above photo, with the level held up against it. On older riggers, you may be able to hold the level flush against the pin.
- Assuming the boat is level, the pin should be vertical or with 0° pitch, when the level is both parallel to and perpendicular to the boat. If you do not have 0° loosen the nut and adjust. If the rigger has been knocked with some force, the pin may need to be persuaded back into position using a metal pipe.



Getting your desired pitch

Once your pin is at 0°, you can use pitch inserts to achieve the desired stern pitch. Most rigging experts recommend standard stern pitch as 4° (although the range can is 3° to 7°).

What is - Lateral Pitch?

- More advanced rigging can also involve adjusting **lateral pitch**. This is the angle of the pin away from the centre line of the boat or perpendicular to the boat. Typically, coaches could choose to have up to 1° **lateral pitch**.
- 1° of **lateral pitch** will <u>increase</u> the **stern pitch** at the catch by 1° and <u>decrease</u> the <u>stern pitch</u> at the finish by 1°.

Why? - this is to have the blade enter cleanly without going too deep at the catch and then be slightly easier to extract at the finish. This is also referred to as **diminishing pitch**.

Coaches tip

Most modern oars are made with zero pitch but if you are having a "blade in the water" problem with a rower's stroke and it looks like it could be a pitch issue but the settings on the pin and gate are all fine. It is worth checking that the collar of the blade is in good condition and the collar hasn't come loose etc.

3. Height of the Gate

The height of the gate is the measurement from the lowest point of the front edge of the seat to the bottom, inside corner of the gate, closest to the pin.



What to use:

The height stick that Karl uses is a 1.4m length of square pipe. This stick is used resting across the top edges of the hull, perpendicular to the boat, in line with the pin.

What to do:

- Position the front of the seat under the height stick and measure to the top edge of the stick.
- Then at the gate, measure from the top edge of the height stick up to the bottom, inside corner of the gate, closest to the pin.
- Adding these two numbers together will give you your gate height.
- There should be 1cm greater gate height on the left gate than on the right, to allow for the hands to go left over right on both the recovery and the drive.

Coaches tips:

• Standard rigging would be 16cm height on the right hand/stroke side blade and 17cm on the left hand/bow side blade.

- Wing riggers usually have a 1cm height difference built into them, so in theory, having the same amount of washers below the gate on both sides, would still measure as a 1cm difference.
- Don't use the number of washers as a guide always measure!

What next:

- Once your span/spread, pitch and height are all correct you can load the remaining washers above the gate and secure.
- The gate should have enough washers above the gate so that there is no vertical movement of the gate on the pin.
- If you are using a backstay, loosen the length adjusters on the backstay so that it sits easily on top of the pin, without needing to be forced into position.
- Tighten all nuts and screws when everything is perfect.

4. Feet Angle and Height

Feet angles and heights can be personal to the rower. The position of the feet may need to adjust for longer or shorter shins, flexibility of the rower etc.

Coaches Tip

- You want the rower to be able to get their shins vertical at the catch with their body held in a strong 1 o'clock position.
- If the feet are too low, the rower is likely to over body-swing forwards and/or over compress leading to an ineffective leg drive and back injuries.
- If the feet are too high, the rower will struggle to body swing over into the correct catch position, leading to a very "upright" stroke with a short power phase, reliant on legs only.

The recommended range for feet height is 16-19cm – the bigger the feet, the bigger the feet height measurement.

How to measure

- To measure feet height, position the height stick over the heels.
- Measure from the bottom of the inside of the heel up to the bottom of the stick, call this **D**.
- Then with the seat at front stops, measure from the front lowest point of the seat to the bottom of the stick, call this **E**.
- To get your feet height, subtract **E** from **D**.





Feet angle may also need to be adjusted to suit the body of the rower, and looked at in relation to feet height. The ideal recommended feet angle is 42°- 45°.

5. Oar Length and Inboard

Key terms to know

The most commonly refericed measurements of oars are **overall** and **inboard**.

Measuring overall length

- The **overall** length of the blade is measured by placing the zero end of the tape measure on the end of the oar spoon, usually in the centre of the spoon edge.
- Keeping the tape measure flat and taught, measure to the tip of the handle. This is more easily done as a two-person job.
- The longer the **overall** length, the harder the gearing and the "heavier" the load will feel.

Making adjustments

It is possible to adjust the overall length of most modern oars. Some have screws on the side of the shaft than can be loosened to move the end of the handle in and out. Others such as Concept 2 sculling oars can be adjusted using a specific screw driver at the top of the handle.

Measuring Inboard Length

- The **inboard** length of the blade is measured from the spoon-side edge of the collar to the tip of the handle.
- The smaller the inboard, the harder the gearing and the "heavier" the load will feel.
 - "Harder" gearing means a bigger arc of the blade in the water. This can be achieved by decreasing the span/spread or increasing the overall length of the blade or shortening the inboard.
 - Tip Gearing can be made "heavier" as athletes become older/bigger/stronger/more experienced etc.
- The greater the inboard, the lighter or easier the load will feel to the rower.
 - "Lighter" gearing means a smaller, easier arc of the blade through the water. This can be achieved by increasing the span/spread or shortening the overall length of the blade or increasing the inboard.
 - Tip "Lighter" gearing is appropriate for young rowers, novices, those returning from injury etc.

Did you know?

If your gearing is lighter (your arc is smaller) then you will need to rate higher to be competitive with a boat with harder gearing that is rating lower.

Choosing the right settings

Choosing your gearing and rigging settings is a key part of being a coach. The settings need to have gearing load that is age/ability appropriate to prevent unnecessary injury and enable the development of good technique.

As crews increase in age and improve in strength and technique, the load can be increased for the rowers to achieve their maximum power output possible per stroke and be able to maintain this effectively for the duration of the race, while still avoiding injury.

Knowing rower outputs, the crew's ability to maintain this and their physical size, is key to understanding where to how the boat is geared and rigged to enable the fastest boat speed.

Workshop Notes