Basic measurements:

I build my masts starting at the top so all measurements are taken from the inside of the top mast band:

Pre bend 7075 T-9 Masts

A: 14-15mm
B: 5-6mm
C: 0mm

Pre bend is measured in this case by laying the back of the straight lower mast against the straight edge of a bench or rule and measuring the amount the top curved part of the mast is lifted of the bench at the top band.

Mast pre bend starts about 600mm from the top band. The mast above jib point is straight.

Mast Bands:

Middle band:	Bottom band:
A: 221 mm	1599 mm
B: 161 mm	1179 mm
C: 121 mm	879 mm

Lower Point (Band) to Deck Limit Mark 70 mm

Jib stay attachment point 5mm below bottom of middle band

Side stays attachment point:

A: 450mm
B: 340mm
C: 345mm

Measured down from the bottom of the top band. Stays can be attached to the side of the mast but best practice now is to fit small SS needle syringe tube to the end of the mono wire and make hooks. These are hooked into a hole in the front of the mast with a circle of sail tape over. They can then be removed or easily replaced if broken.

Spreaders:

Below top band:	Spreader Length:
A: 1025mm	52 mm
B: 760 mm	48 mm
C: None	

Spreaders are approx 50% of the distance between the side stay attachment point and the top of the bottom band. I use clip on spreaders so I can easily move them and swap them for longer or shorter spreaders.

Top of Lower band to deck mark on all rigs: 70mm (for 50mm body Bantock G/N)

Tuning Notes: .

Rig setup:

Adjust the side stays so they are the same length. Then adjust tension until they are firm and the mast is straight sideways on either tack with no load. Stay tension does not effect fore and aft mast bend. At any time it is only the windward stay and windward spreader is supporting the mast. When sailing the leeward stay goes slack. I use a plate in my mast step to prevent the mast from rotating. I use clip on spreaders so they move to line up with the sidestays at any time.

Rig tuning:

This is basically about **sail shape** and **fore stay** tension.

Jib shape:

You have little control over jib shape other than foot curve (which effects the bottom third of the sail only) and jib twist (leach line). However the fore stay and leach line tension are provided by the back stay and ram. You need a tight fore stay most of the time but you can reduce tension in light air to add some fore stay sag and add some shape.

The leach line is the most important adjustment on the jib. Set the jib twist with the lower 2/3 of the leech is at least parallel with the mast and slightly open at the top.

Mainsail shape:

The most important adjustments on mainsail shape are mast ram, back stay and vang. These three need to be adjusted together to provide the range of sails shapes needed and also to provide the right amount of fore stay tension. Foot curve effects only the bottom third of the sail.

If your main is back winding, you are either sheeting too close, have insufficient twist in the jib or you main is too full down low. Use more back stay and less mast ram to flatten the main and have a straighter entry.

Set the rig up with a reasonable sail shape forestay tension and jib twist, the jib leech parallel to the mast or just open at the top.

This is your starting point.

Pick the boat up and set the sails wing and wing (main one side jib on the other) and adjust the main vang until the main matches the jib twist. Not tight and not so the mainsail is too open at the top. This can be a bit tricky but it will become obvious on the water.

Sheet in then adjust the mast ram and backstay to attain the correct forestay tension, mainsail shape and mainsail twist.

In medium A rig conditions 5-8 knots set the rig up close hauled with mast ram and backstay tension sufficient to produce an even curve in the mast and medium sail shape with the main twist matching the jib twist.

The main shape should be a dish with the maximum draught slight foreward of middle. Check fore stay tension it should not feel loose. View the boat from behind the leach of the main should be slightly open at the top. I hold the boat on its side standing and view the rig from the direction of the wind. So I can see the shape of both main and jib twist. I swap the boat from tack to tack to make sure that the sail set is the same on both tacks.

In light air use less back stay (only about 5mm) and slightly less mast ram to fill the shape in the mainsail. The fore stay tension will reduce, making the forestay sag more and the sail slightly fuller. The tension will come off the jib swivel, so the sail goes out easier. The side stays should still be firm.. The jib sheet can be eased 5mm in drift conditions to open the slot and maintain balance.

In stronger winds. Pull on more back stay until the top of the main collapses. Add more mast ram and luff tension and repeat, until you can go no further. The mainsail then should be a flat curved smooth shape. The fore stay will be tight.

Main Vang:

You can adjust the vang too! Make fine adjustment with your vang to change the mainsail twist, as long as your basic "off the wind" main and jib twists are not compromised.

The main aim of vang adjustment is to effect the amount of helm you have and how high you can point. More vang: less twist, more weather helm, more pointing. Less vang: more twist, less helm, less tendency to point.

This leads to:

Mast Rake and Balance:

Balance is everything on an IOM. The boat must be set up so there is neutral helm. The boat when correctly set up will sail its self on all points of sailing it will only gain some weather helm when it heels enough for the rig to leverage the boat to windward.

Vary mast rake to find the correct balance.

The B needs more rake than the A and the B sails need a little more twist in main and jib.

The C rig needs more rake than the B rig and the C main needs to have relatively less twist in order to reduce lee helm.

I set my mast rake by floating my boat in a tank, bath or pool. Attach a length cotton with a small sinker to the aft side of the mast at the bottom of the middle mast band with a piece of masking tape. The mast must be straight.

Measure the distance aft at the top of the bottom band to the cotton.

My current rake measurements are: A: 57mm, B: 68mm, C: 60mm

After this I take a measurement from the jib attachment point (hook or screw) to the back of the bumper and put this in my notebook as a reference. I now use bowsies on my jibs and I mark that position as well.

I also mark my maximum backstay tension on the backstay. This tends to go tighter as I tune as using more mast ram can allow more backstay without he top of the main collapsing.

Approx Mast Rake Measurements for Ellipsis 2017 -

Y: From bottom of the middle band to top aft edge of the foredeck. Z: From bottom of the middle band to the back of the bumper. (hull edge at bow)

A Rig: Y= 1381mm Z= 1478mm, B Rig: Y= 1022mm Z= 1155mm C Rig: Y= 762mm Z= 932mm

Top of bottom band to deck mark on all rigs: 70mm (for 50mm body Bantock G/N)

Typical Rig Weights:

A: Rig Weight 267g, Jib Balance: 33g, Trim 0g, Total: 290g
B: Rig Weight 230g, Jib Balance: 30g, Trim 30g, Total: 290g (75 micron Sails)
C: Rig Weight 215g, Jib Balance: 25g, Trim 50g, Total: 290g

Foot Curves:

These don't vary much from boat to boat. I set my foot curves by eye and by trial and error.

These measurements might prove useful:

Measure the natural curve of the sail.

A Rig: Main 25mm light air or waves 30 mm	Jib + 5mm
B Rig: Main 25mm waves 30mm	Jib + 5mm
C Rig Main 20mm	Jib + 5mm

Sheeting Angles:

Mainsail 10mm off the centreline at the main sheet point. Aim the jib boom center at the side stay. This is your starting position.

The best way to set the main jib angle is to sail the boat to windward and to luff slowly. The luff of both sails should "break" at the same time.

In light conditions open the jib sheet slightly say 5mm to open the slot so the jib "breaks" just before the main.

If your main is back winding, you are either sheeting too close, have insufficient twist in the jib or you main is too full down low.

Main luff wire or tape?

I prefer to use luff tape. The only advantage in a wire is you can get away with less luff ties as the luff is a bit firmer. **The luff wire should never be tight.** The idea of using luff ties or rings is to allow the mainsail to rotate around the mast. It is in effect a rotating mast where the sail rotates but the mast doesn't rotate. Rotating masts are very hard to control in any case and are not allowed on the IOM. The luff wire should be set when the sails are all the way out and set to limit the luff sag.

Luff tension should be set up so that it automatically eases when the mainsail goes out. This allows the main to rotate around the mast on a reach or run. The reduced luff tension increases fullness and power.

Luff Tension:

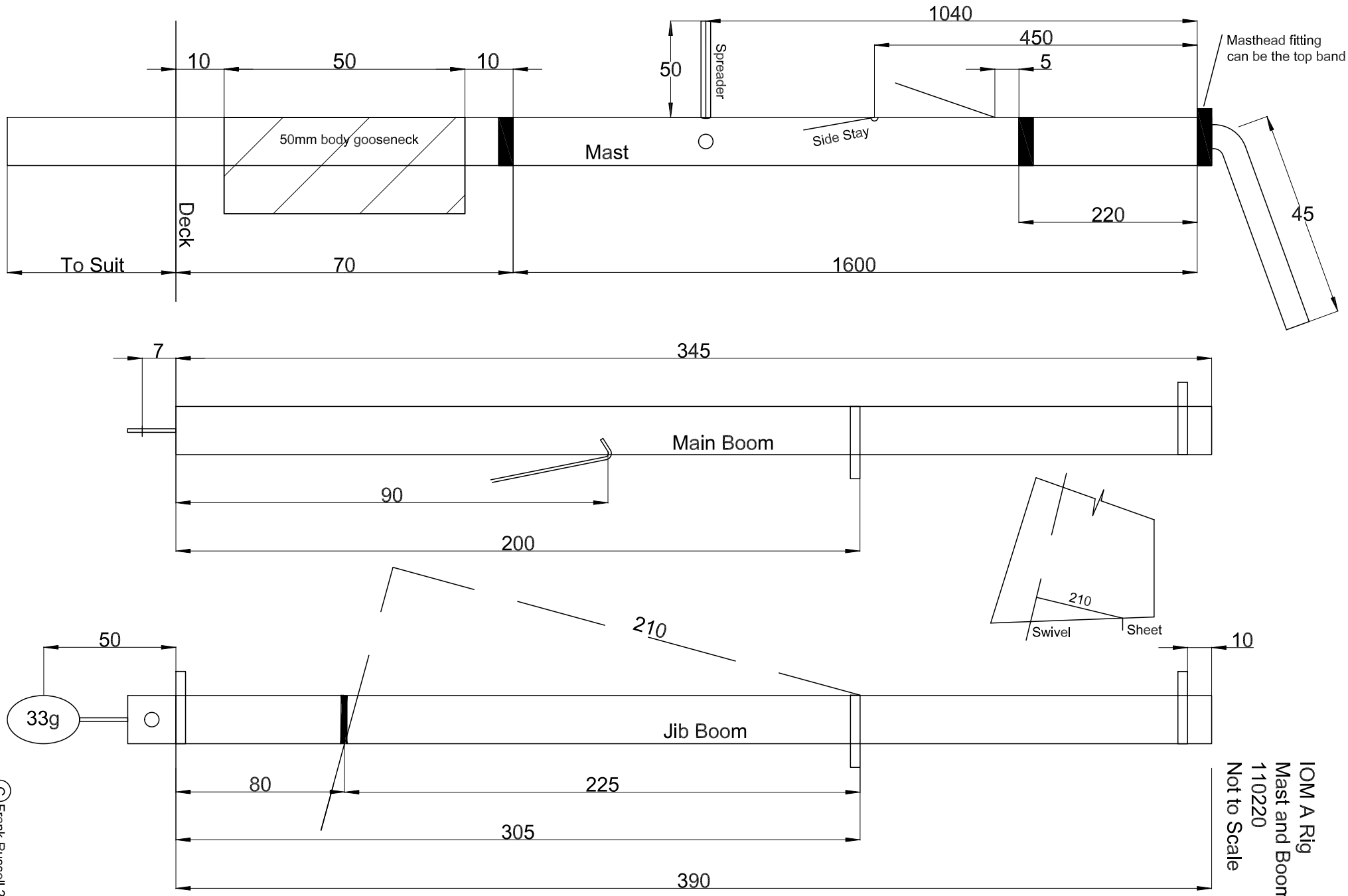
Always only use enough to remove wrinkles in the luff. A slight sag in the bottom of the main luff is okay as the luff tension increases as you go up the mast. You need the middle part of the sail to be right. This sometimes means the bottom of the main luff is a bit low in tension. Jib luff tension the same, just enough to remove wrinkles. Most sailors use far too much luff tension.

Jib Balance weight:

Balance the jib with the CG of the jib and boom on the swivel. You do not want to be steering the boat around trying to get the jib out. The jib should go out on it's own. If the jib won't go out on a run you either need to come up a few degrees to a reach or you need to gybe. Always keep the jib full and drawing.

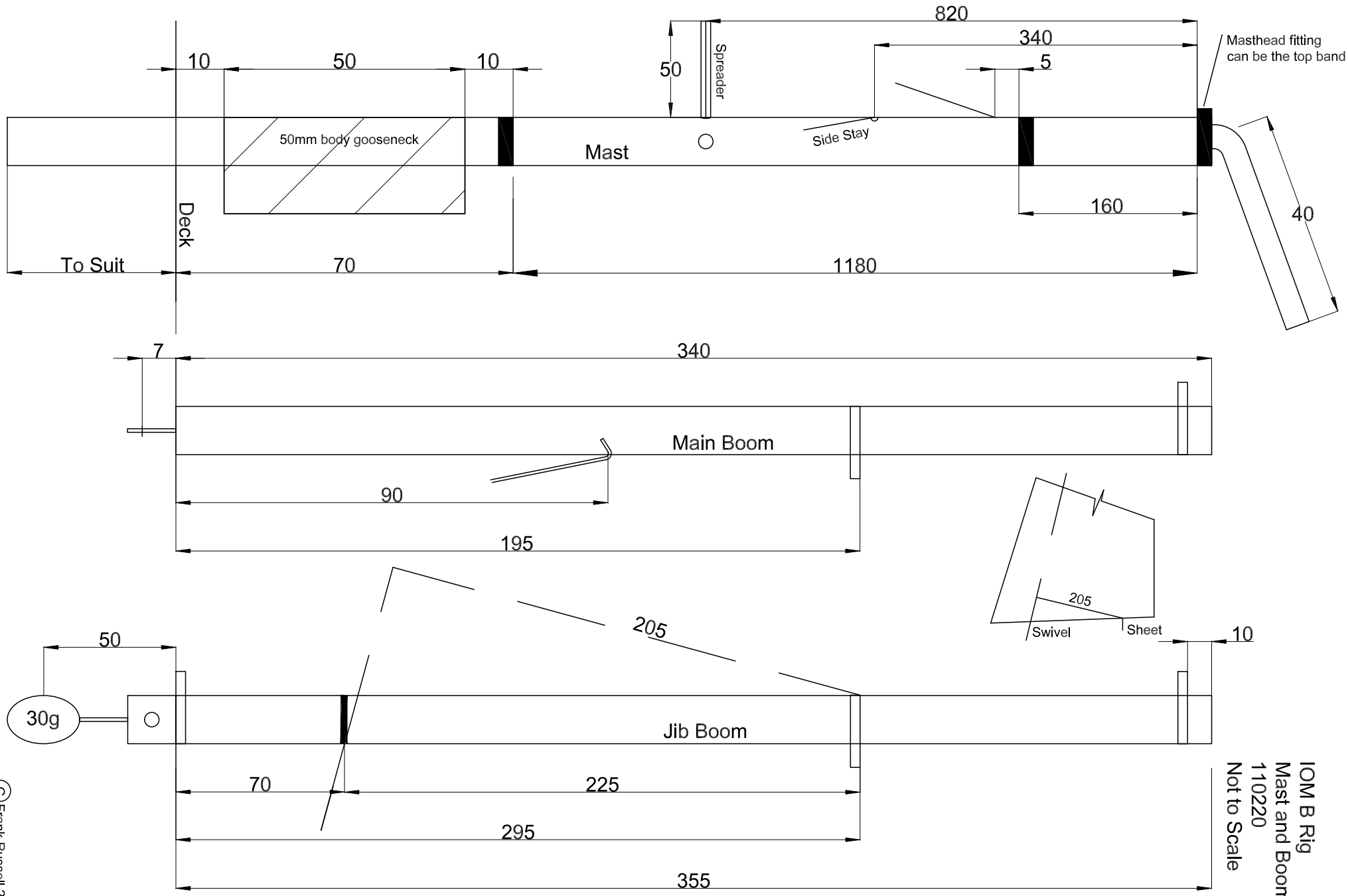
Currently I use A: 33g, B:30g, C:25g. My jib balance arms are short about 50mm.

FRD 12 Feb 2020



IOM A Rig
Mast and Booms
110220
Not to Scale

Dwg 1 of 4



IOM B Rig
Mast and Booms
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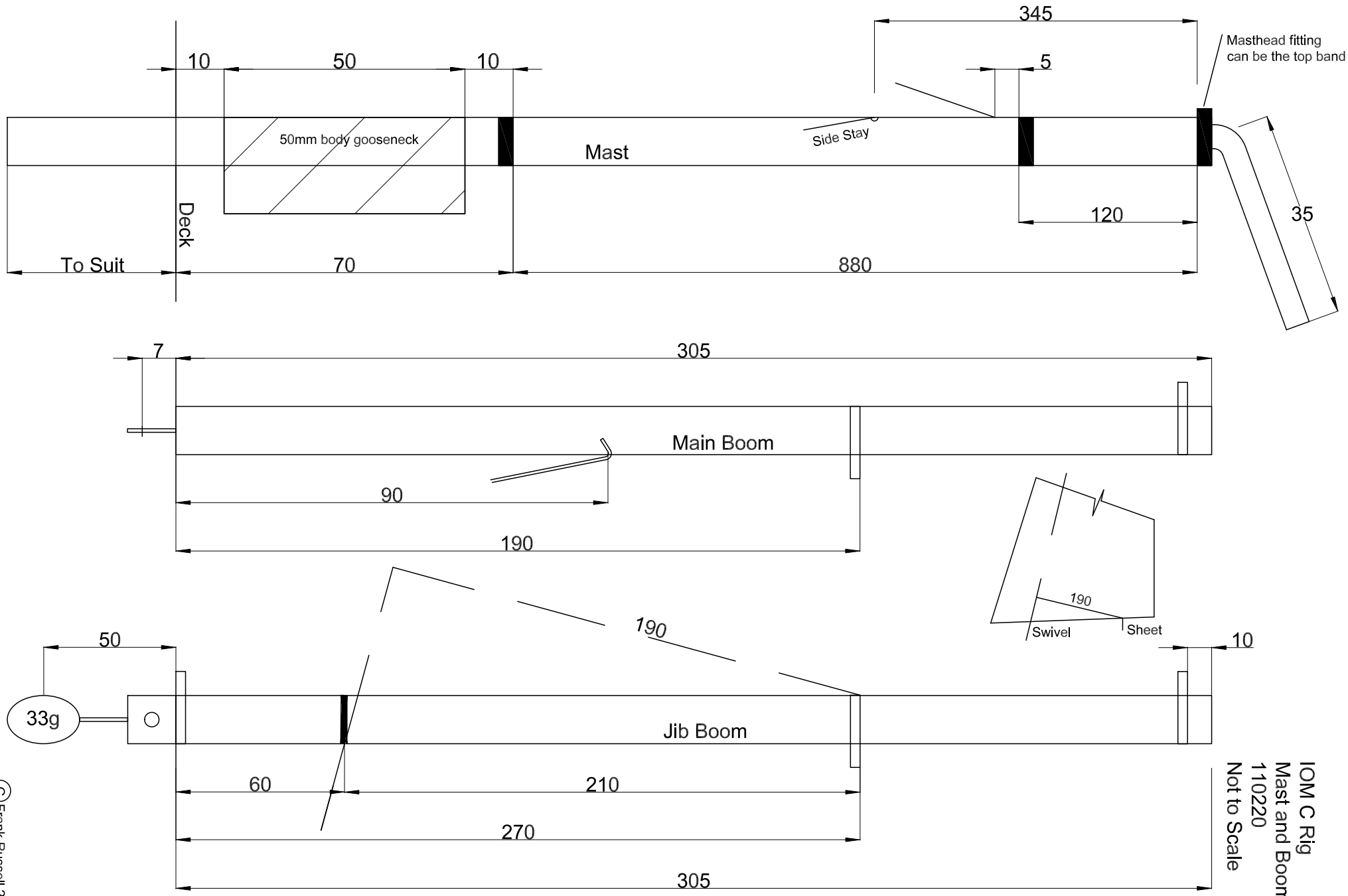
Not to Scale



IOM C Rig
Mast and Booms
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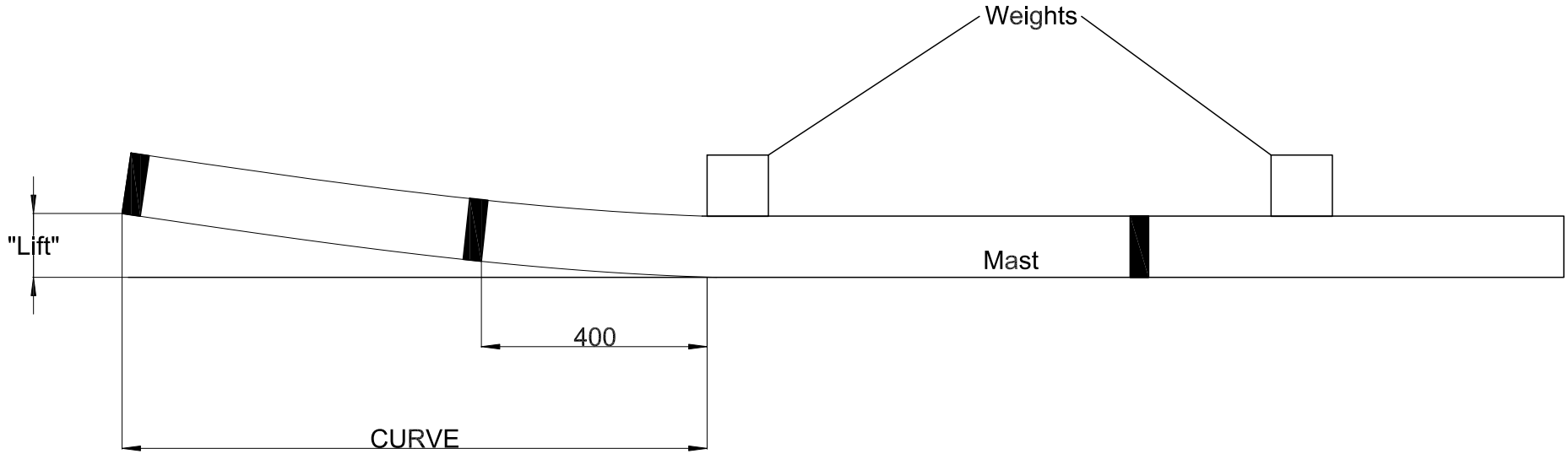

Bend the mast over 700mm radius curve from the jib attachment point (Middle Band) to approximately 400mm below the middle band.

"Lift" should be from a flat table with the mast held with two weight or a straight edge.

A= 14-15mm B = 5-6mm C= 0

IOM Pe-bend

120220

Not to Scale