1. Safety
When handling cured Carbon fibre, there is a risk of damage to skin from sharp slivers.
Wear long sleeves and heavy duty gloves.
Use barrier cream to reduce irritation from carbon dust.
Safety goggles and a face mask should be worn when cutting, sanding or drilling the tube.
Latex gloves should be worn when handling the mixed adhesive during join assembly.
A vacuum cleaner is highly recommended for frequent removal of dust.

2. Tools & Materials
2.1 Normal hand & power tools used in spar making will be sufficient. Standard HSS drill bits etc. will damage the laminate. Dagger drill bits, jigsaw and holesaws with abrasive blades are essential. For cutting the tubes, a special diamond edged hacksaw blade will be required. These can be purchased from Seldén Mast (item number 592-102).

3. Drilling instructions for all Carbon Spurs

<table>
<thead>
<tr>
<th>“Dagger” Drill Bit</th>
<th>Drilling Speed rpm</th>
<th>Item No:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter (mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1</td>
<td>2330</td>
<td>592-079</td>
</tr>
<tr>
<td>4.8</td>
<td>2000</td>
<td>592-080</td>
</tr>
<tr>
<td>6.4</td>
<td>1500</td>
<td>592-081</td>
</tr>
</tbody>
</table>

3.4 Support the weight of the drill, position the drill bit, and start carefully drilling. Continue supporting the weight of the drill, and allow the drill bit to cut through the material. Do not apply any pressure. Just before the drill bit breaks through the inner carbon surface, give even more support to the drill. This reduces the chance of breaking fibres, and produces a cleanly cut hole.

4. Tube Preparation
To achieve the correct finished pole overall length (POA), use the table offsets listed in the relevant page PS649, PS651-1 or PS651-2 (below)

4.1 Mark the cut position with a grease pencil or white typist’s correction fluid. To ensure a correct pole structure, the ends of the tube must be precisely cut and square.

4.2 Using the special blade fitted into a hacksaw, cut the tube. To avoid a ragged edge, it is essential that the cutting action is only towards the inside of the tube. Rotate the tube frequently during the cutting process, and cut on the down stroke at the same end of the cut slot. Smooth even strokes are more effective than short strokes.
5.1 Pole Assembly, End-for-End (Type A) SC047, SC059, SC077, SC088, SC090

Mark and drill rivet holes for ends as shown in PS659 (page 3).
Fit TWARON® reinforcement if required. See 595-411-E (pages 8 & 9).
If the pole is Ø39, attach self adhesive spacer shims to the pole ends curved sides & lower c/line Fig A below.
If the pole is Ø47, attach self adhesive spacer shims to the pole ends curved sides as Fig B below.
If the pole is Ø59 or Ø61, attach 4 self adhesive spacer shims to the pole adapter curved sides as Fig C below.
If using 4 shims makes the fit too tight, use 3 only. These must be on the curved surfaces.

Clear dust, push ends into place.
Drill through existing holes, then rivet ends in place.
Complete as diagram PS649
Fit briddles if required. Instructions are 595-412-E (pages 6 & 7).

Included Diagrams
PS649 Diagram End-For-End Pole (Type A)
PS650-1 Diagram Dip Gybe Pole, (Type B) with 534-854 outboard end
PS650-2 Diagram Dip Gybe Pole, (Type B) with 534-777 outboard end
595-412-E Instructions for Bridles.
595-411-E Instructions for TWARON® reinforcement.

5.1 Pole Assembly, Dip Gybe (Type B) SC077, SC088, SC090

Drill rivet holes for ends as shown in PS650-1 or PS650-2 as appropriate (pages 4 & 5).
If 534-777 outboard ends are to be fitted, take care not to allow carbon dust or aluminium debris to contaminate the plunger mechanism. Before drilling rivet holes, wipe grease from plunger.
After drilling, move end fitting away from pole, remove any contamination and re-grease plunger.
Fit TWARON® reinforcement if required.
Drill holes for lift eye. Fit eye & backing plates.
Fit extra exit boxes if required. Cut the oval hole with a router or small hand power tool (Dremel).
Rig internal operating lines & topping lift retract cord (if required).
Clear dust, rivet ends in place.
Complete as diagram PS650-1 or PS650-2.
Total Pole End Deductions (POA – XL)

<table>
<thead>
<tr>
<th>Pole</th>
<th>Selden Pole End Type</th>
<th>Total Ends Deduction (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC039</td>
<td>534-900</td>
<td>120</td>
</tr>
<tr>
<td>SC047</td>
<td>534-865</td>
<td>180</td>
</tr>
<tr>
<td>SC059</td>
<td>534-865</td>
<td>220</td>
</tr>
<tr>
<td>SC061</td>
<td>534-865</td>
<td>220</td>
</tr>
<tr>
<td>SC077</td>
<td>534-854</td>
<td>190</td>
</tr>
<tr>
<td>SC088</td>
<td>534-854</td>
<td>230</td>
</tr>
<tr>
<td>SC090</td>
<td>534-854</td>
<td>230</td>
</tr>
</tbody>
</table>

Pole End Rivet Positions

<table>
<thead>
<tr>
<th>Pole</th>
<th>Selden Pole End Type</th>
<th>Dimn A (mm)</th>
<th>Dimn B (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC039</td>
<td>534-900</td>
<td>20</td>
<td>61 (single)</td>
</tr>
<tr>
<td>SC047</td>
<td>534-865</td>
<td>18</td>
<td>55</td>
</tr>
<tr>
<td>SC059</td>
<td>534-865</td>
<td>23</td>
<td>70</td>
</tr>
<tr>
<td>SC061</td>
<td>534-865</td>
<td>23</td>
<td>70</td>
</tr>
<tr>
<td>SC077</td>
<td>534-854</td>
<td>30</td>
<td>90</td>
</tr>
<tr>
<td>SC088</td>
<td>534-854</td>
<td>35</td>
<td>104</td>
</tr>
<tr>
<td>SC099</td>
<td>534-854</td>
<td>35</td>
<td>104</td>
</tr>
</tbody>
</table>

All rivets 20mm from edge of tube

Optional extra trip line and exit box 505-069-11 if trip trigger end used

591-552 Label over white tape (if whisker pole)

If trip trigger outboard end to be used, fit trip line and exit box 505-069-11

Rivet Sizes
SC039 to SC077 ø4.8
SC088 to SC090 ø6.4

References
Rivet positions PS410
Logo position 595-938-E

Standard Layout, Cbn SC039 to Cbn. SC090
### Pole End Rivet Positions

<table>
<thead>
<tr>
<th>Pole</th>
<th>End</th>
<th>A (mm)</th>
<th>B (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC077</td>
<td>Outboard</td>
<td>30</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Inboard</td>
<td>40</td>
<td>85</td>
</tr>
<tr>
<td>SC088</td>
<td>Outboard</td>
<td>35</td>
<td>104</td>
</tr>
<tr>
<td>SC090</td>
<td>Inboard</td>
<td>45</td>
<td>90</td>
</tr>
</tbody>
</table>

All rivets 20mm from edge of tube

### Rivet Sizes

- SC077: ø4.8
- SC088 & SC090: ø6.4

### Standard Layout, Cbn SC077, SC088 & SC090 Dip Pole

*with 534-854 Outboard End*

#### Pole End Rivet Positions

<table>
<thead>
<tr>
<th>Pole</th>
<th>End</th>
<th>A (mm)</th>
<th>B (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC077</td>
<td>Outboard</td>
<td>30</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Inboard</td>
<td>40</td>
<td>85</td>
</tr>
<tr>
<td>SC088</td>
<td>Outboard</td>
<td>35</td>
<td>104</td>
</tr>
<tr>
<td>SC090</td>
<td>Inboard</td>
<td>45</td>
<td>90</td>
</tr>
</tbody>
</table>

All rivets 20mm from edge of tube

### Rivet Sizes

- SC077: ø4.8
- SC088 & SC090: ø6.4

### References

- Rivet positions: PS410
- Logo position: 595-938-E

### Standard Layout

- Cbn SC077, SC088 & SC090 Dip Pole
- with 534-854 Outboard End

#### Hole Layout

- Section Length = XL
- Outboard edge
- Logo Fwd edge
- (XL - 50% Label length)
- Outboard lift eye = Fwd fix
- (XL - 250)
- Alt. extra release line box
- (XL - 700)
- Internal reinf. plates
- 591-552 Label for whisker pole.
  (over white tape if unpainted)
- Alt. release line box
- 1500
- Lock & washer fitted

### Lockscrew & washer fitted

#### Running knot

- Alt. extra release line exiting via box
  L = POA - 1000
  (for manuf.)

### Release line

- L = POA (for manuf.)

#### Topping lift retract

- (Optional)
  L = (2xPOA) - 400

#### Downhaul loop

- 330mm x ø5mm HMPE
  (see 595-267-E)

#### Clip 301-039

### Topping lift retract to be used, add extra small block & lashing

(see MB 3040-3)

### WB

#### Locking system

- T/WARON ® reinf. used, standard position is 40 from outboard end.

### Outboard End Type 534-854

- Section Length = XL
- Outboard edge
- Logo Fwd edge
- (XL - 50% Label length)
- Outboard lift eye = Fwd fix
- (XL - 250)
- Alt. extra release line box
- (XL - 700)
- Internal reinf. plates
- 591-552 Label for whisker pole.
  (over white tape if unpainted)
- Alt. release line box
- 1500
- Lock & washer fitted

### Inboard End Type 534-778

- 150
  (when finished)

### Notes

- It T/lift retract to be used, add extra small block & lashing
  (see MB 3040-3)

### Rivet Positions

- SC077: ø4.8
- SC088 & SC090: ø6.4

### References

- Rivet positions: PS410
- Logo position: 595-938-E

### Standard Layout

- Cbn SC077, SC088 & SC090 Dip Pole
- with 534-854 Outboard End

#### File:

- 3000

### Drawn:

- JP
  - Date: 060913
  - Scale: n/a

### Replacing / Replaced by:

- Approved:
  - Dwg. No.: PS650-1
Standard Layout, Cbn SC077, SC088 & SC090 Dip Pole with 534-777 Outboard end

References
Rivet positions PS410
Logo position 595-938-E

All rivets 20mm from edge of tube

Pole End Rivet Positions

<table>
<thead>
<tr>
<th>Pole</th>
<th>End</th>
<th>A mm</th>
<th>B mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC077</td>
<td>Outboard 534-777</td>
<td>40</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Inboard 534-778</td>
<td>40</td>
<td>85</td>
</tr>
<tr>
<td>SC088</td>
<td>Outboard 534-777</td>
<td>45</td>
<td>90</td>
</tr>
<tr>
<td>SC090</td>
<td>Inboard 534-778</td>
<td>45</td>
<td>90</td>
</tr>
</tbody>
</table>

Rivet sizes
SC077 ø4.8
SC088 & SC090 ø6.4

Outboard End
Type 534-777

If TWARON® reinforcement used, standard position is 40 from outboard end.

Section Length
Outboard edge = POA

Logo Fwd edge

(XL-50% Label length)

Outboard lift eye = Fwd fix

(XL-250)

Internal reinf. plates

591-552 Label for whisker pole. (over white tape if unpainted)

(XL-700)

Alt. extra release line box

Alt. release line exits via box

Release line L = POA (for manuf.)

Section Length XL = POA-340 (SC088, SC090) or XL = POA-380 (SC077), or XL = POA-340 (SC077)

Clip 301-039

Running knot

Inboard End
Type 534-778

Topping lift retract (Optional)
L = (2xPOA) - 400

Dimension Datum = Section inboard edge

150 (when finished)

1500

591-552 Label

Lock screw & washer fitted

Inboard End
Type 534-778

Clip 301-039

Running knot

Topping lift retract (Optional)
L = (2xPOA) - 400
Bridles for carbon poles are made from 100% HMPE rope. This has minimal stretch, and does not damage the pole’s surface when stowed on deck.

**Method**

**Pre Assembly**
1. Cut the rope into equal lengths.
2. Feed one end of each through the pole end fitting.
3. Make marks A and B as shown.

4. Feed the short end through the long part at A.

5. Feed the long part through the short end at B.

6. Pull the two loops together. Make a mark at C.

7. Feed the short end through the middle of the long part, to exit at C.

8. Taper the short end by cutting 6 strands as shown.

9. Smooth the long part away from the splice to swallow the short end.
Final Assembly

4. Lay each bridle line along the pole section.

5. Mark each line at E, 55% of section length from end.

6. Tie each bridle part to the central ring using a Running Knot. Ensure that the marks are as shown.

7. Using a splicing needle, feed each free end into the centre of it's standing part close to the knot, and out again 50mm from the knot.

8. Pull the free end and cut at 10mm closer to the knot than the exit. Taper the cut end.

9. Smooth the outer to swallow the cut end.
The external TWARON® protective wrap for carbon poles is intended to improve chafe resistance. Type A poles (End-for-End Gybe) have two wrapped areas, Type B poles (Dip Gybe) have one wrapped area.

The wrap can be positioned to suit the intended operating or stowage method:-
1. Chafe protection when stowed on the toe rail. This is the standard position. The wrap starts 40mm from the tube outer edge.

2. Chafe protection when the pole comes into accidental contact with the forestay.

**SAFETY**

When handling cured Carbon fibre, there is a risk of damage to skin from sharp slivers. Wear long sleeves and heavy duty gloves. Use barrier cream to reduce irritation from carbon dust. Safety goggles and a face mask should be worn when cutting, sanding or drilling the tube. Latex gloves should be worn when handling the mixed adhesive during join assembly. A vacuum cleaner is highly recommended for frequent removal of dust.

**Preparation.**

Ensure that the work area is clean and well ventilated. Select a stable work surface. If the pole already had it’s ends fitted, remove these. Wipe the tubes clean with a soft rag. Rest the carbon tube on chocks with soft padding.

**Wrap position**

Using the suggestions above, select the optimum location for the wrap. This will usually be the standard position. Apply a protective layer of masking tape around the pole tube and wraps as shown above.
Fitting method

1. Apply a layer of masking tape around both ends of the wrap. Finish with a “pull off” tab of tape.

2. Apply a series of lines (5~6) of marine grade silicone sealant to the pole tube.

3. Spread the sealant into an approximately even layer over the tube.

4. Slide the wrap onto the tube, using a twisting motion. This helps to spread the silicone.

5. As the wrap moves, a large excess bead of silicone will develop.

6. Spread this ahead of the wrap using a wooden spatula or similar soft tool.

7. When the wrap reaches the inner tape, remove excess silicone. Remove the tube’s tape, pulling slightly towards the wrap. This will produce a neat edge of silicone. Remove the wrap’s tape.

8. Apply black self adhesive tape (supplied with the kit) to cover the wrap end. Pull it tightly to avoid creases.

9. Smooth the tape firmly in place.

10. Refit the pole ends.