Re-Spar Method Synopsis

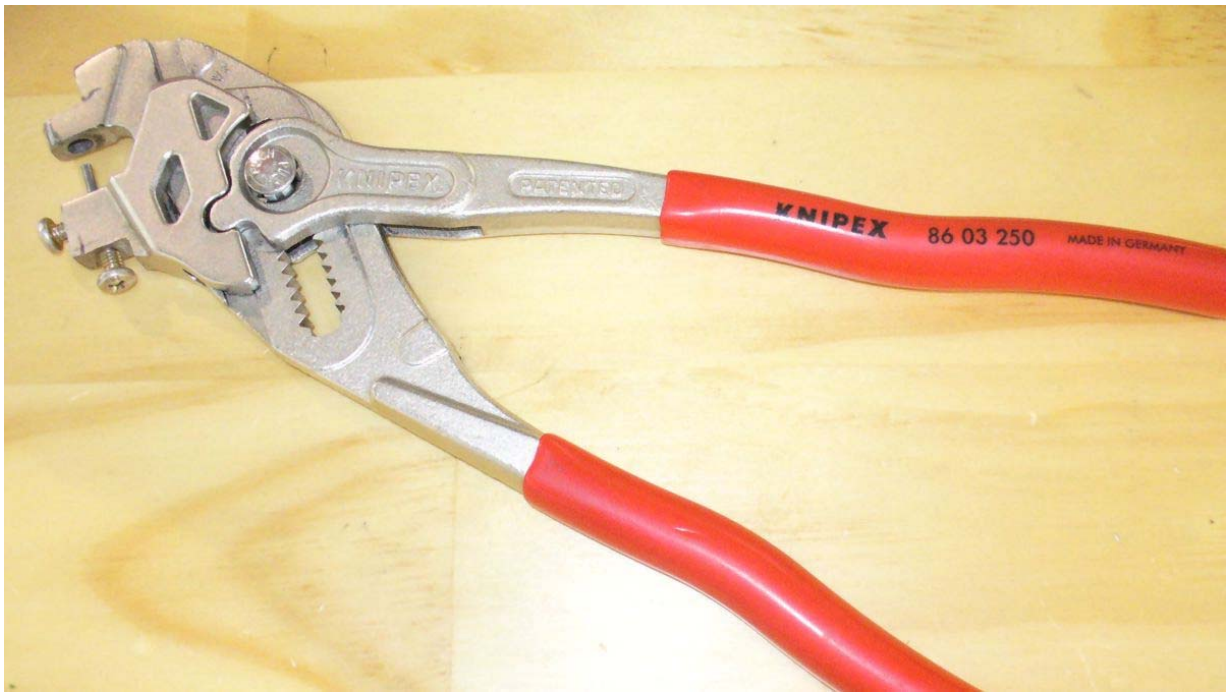
We remove only three rivet rows: the upper flange, the lower flange, and the forward skin closure, all rib upper and lower flange rivets remain intact except for the outboard aft rib.

We use a needle nose sander to remove the heads from the rivets attaching the existing spar to the third, fourth and tip forward inboard ribs, a total of 7 places. The spar attachment at the root and second ribs can be removed conventionally, and the attachment at the outboard forward to aft ribs can be removed by careful use of a long drill bit. At this point, the spar can be coaxed out. It helps to shift the spar aftward at the tip as you begin to slide it inboard. We also use some wood spreader blocks to open the forward skin closure about ½".

We stack the old and new spars at the drill press (using a spacer) and correspondence drill the 7 holes for the rib rivets, to number 30 only while at the drill press.

We then correspondence drill the trim rod cutout doubler and mid hinge fitting inboard bracket onto the new spar but install only the four rivets common to only the doubler and the spar web at this time. Good luck with the mid hinge outboard bracket but, whatever you do, act in accordance with achieving perfect alignment (at a later step) after number 27 clean-up drilling the spar flanges and mid hinge fitting brackets through the skins on your fixture. If there will be any error, we prefer to take it in the skin.

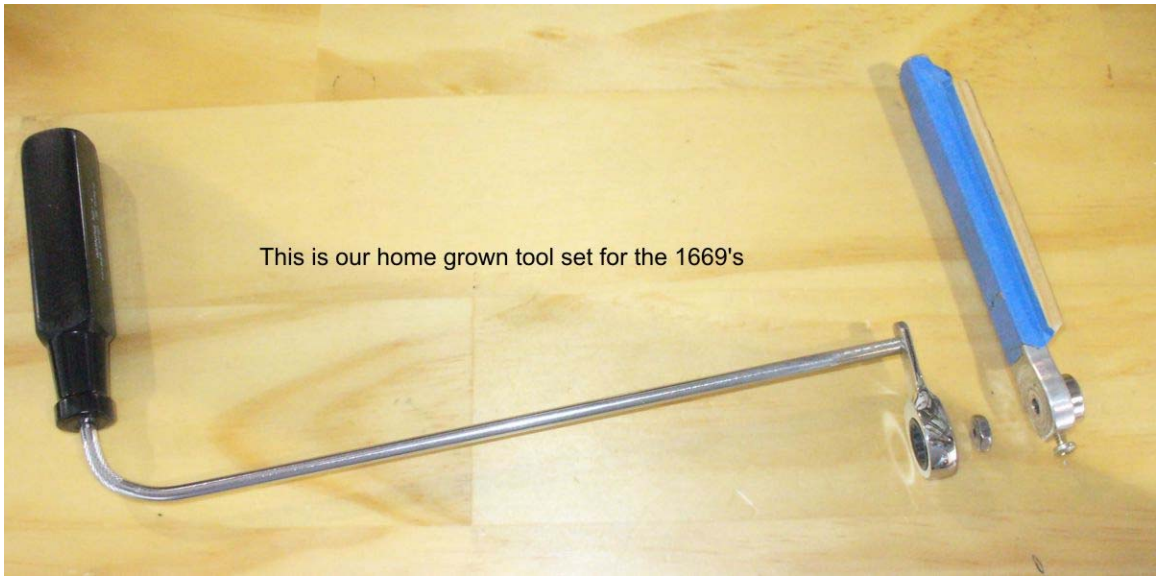
Next, we insert the new spar and cleco to the ribs using short-body clecos, then clean-up drill to number 19 (0.166) through the spar and ribs, installing #5 stubbies as we go. Then, we pull the spar to clean and deburr for the first time. While the spar is out, we eject the rivet bodies from the rib flanges using a custom ejector we made from a pair of Knipex pliers.

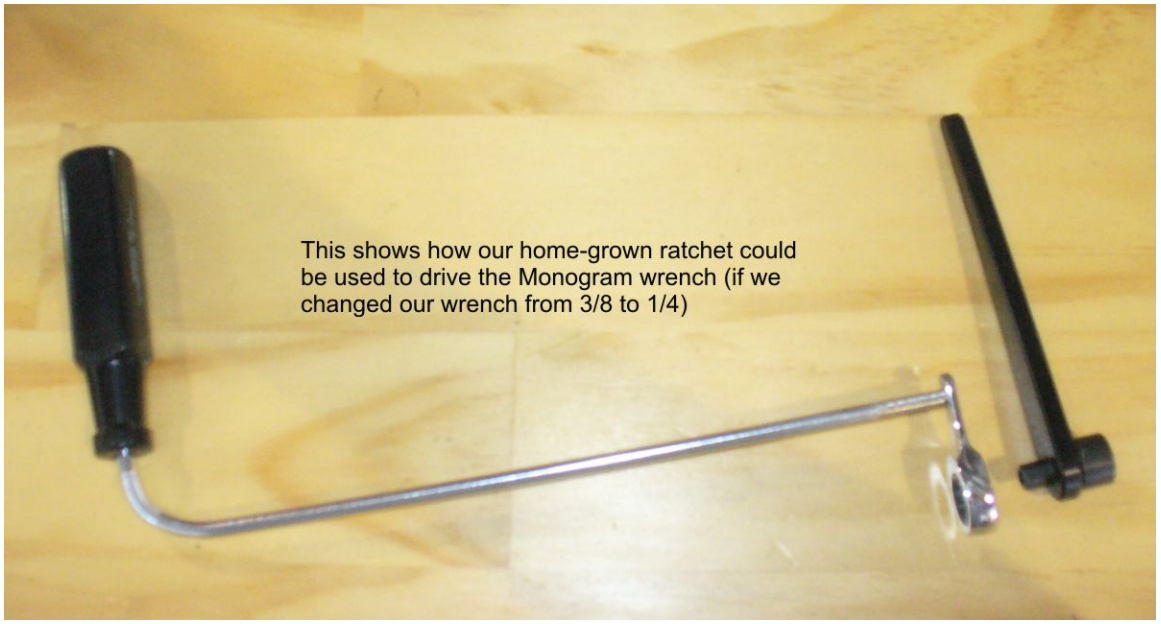


Back in goes the spar for stubby cleco back to the ribs again, taking every precaution because getting a good, clean, and tight seating of the spar to the rib flanges is an absolute requirement.

At this point we constrain the elevator in our fixture to control twist, and correspondence drill the spar flange rows to number 27. Then it's out for cleaning and deburring for the second time. Remember to dimple the outermost flange rivet positions in the spar while out this time.

Back in again, and attach the spar to the ribs using NAS1669-08DL1 blind bolts. Our home-grown tooling, and a possible hybrid scenario using the Monogram wrench are pictured here.





We re-assemble using NAS1242AD4's at the spar flanges (except for the four most outboard positions, and standard 3's or NAS1242AD3's as required for the forward closure. We use cherries for the 4th, 3rd, and 2nd most outboard positions, and NAS121AD4's for the most outboard position.

We use NAS1241AD4's for the outboard rib flanges when the rib is still reasonable for those, and NAS1097AD5's when the rib requires those AND edge-distances are met.

Please excuse any errors or omissions in this synopsis and proceed at your own risk. We do not have fully developed and vetted instructions for the re-spar process, and there are various conditions that will preclude this method for some elevators.

Notes and Supporting Data

When procuring NAS1669-08DL1, you will receive Monogram PLT5210-5-1. I have attached the Monogram specification for reference.

We consider the use of the blind bolts a minor alteration based on review of the specifications, and consultation with our DER and IA. You must make your own decision about basis.

You should file a Form 337 to put the ICA's on file.