

Replacing the Crosstube Seals

Note: You must have the assistance of a qualified Aircraft Mechanic to perform this procedure. Make a logbook entry signed by the A&P (AMT) when completed.

Description:

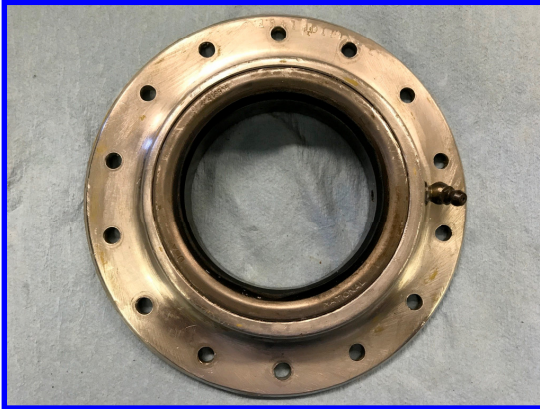
The crosstube seals are the large seals on the side of the fuselage that prevent water and dirt from entering the landing gear crosstubes and into the hull. Water can enter the seals if they are cracked or deformed causing corrosion of the main bearings just inside these seals. Water can also make its way into the fuselage if the seals and bearings are compromised. I would dare say that most Seabees flying today have never had the seals changed unless a major restoration has been done. This job is a major undertaking as the removal of the landing gear and crosstubes is required. The good news is that the left and right crosstubes are identical so if you get them mixed up it's no big deal. The Republic Part Number for the crosstubes is 1102 and the coupling is 1110. I know of no other way to get the seals out without removing the crosstubes so, if you have a better way, please let me know.



Crosstube Seal Location



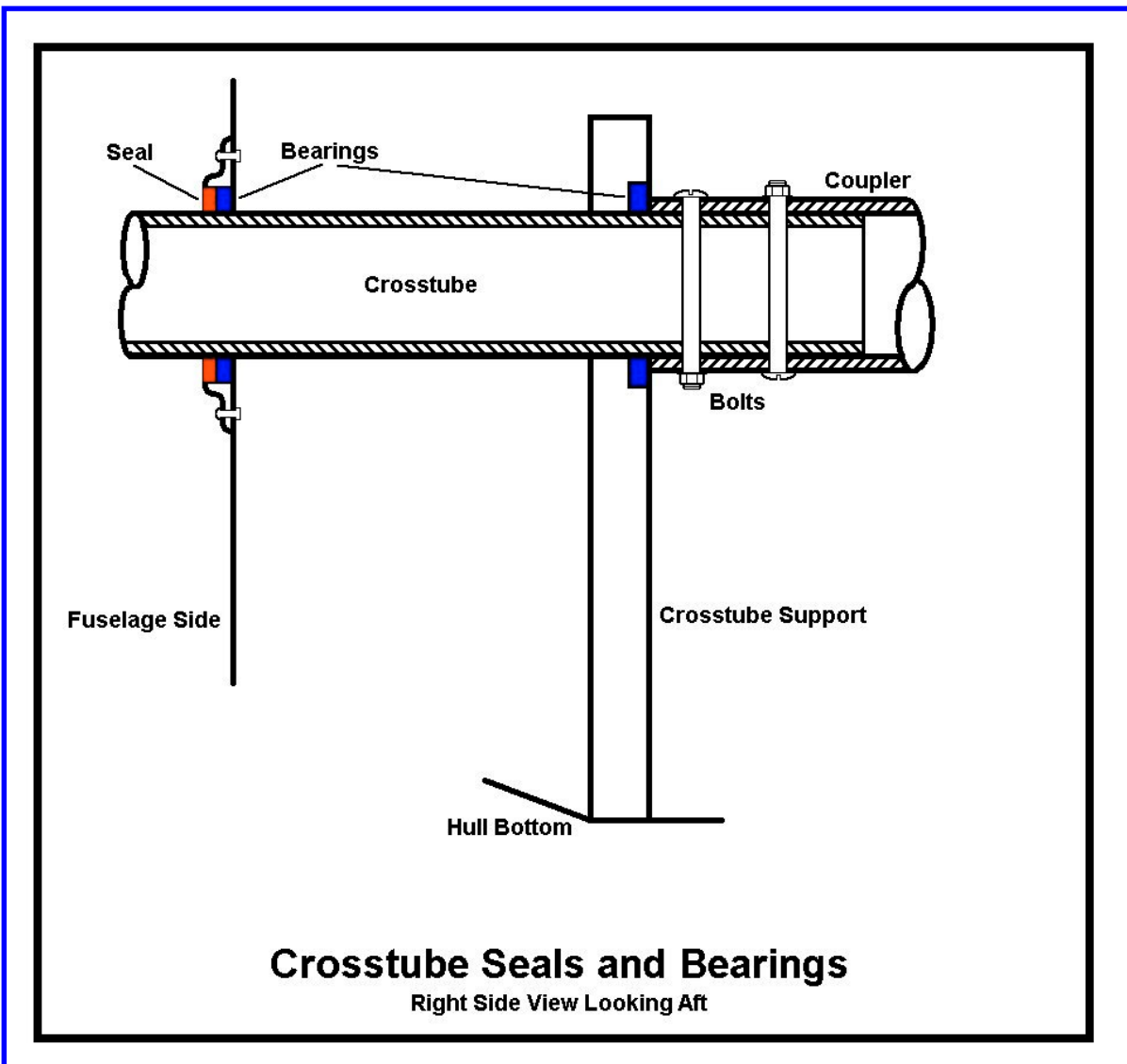
Crosstube Seals. You need two. \$10 to \$25 depending on supplier. Shop around.



Bearing and Seal flange on fuselage side



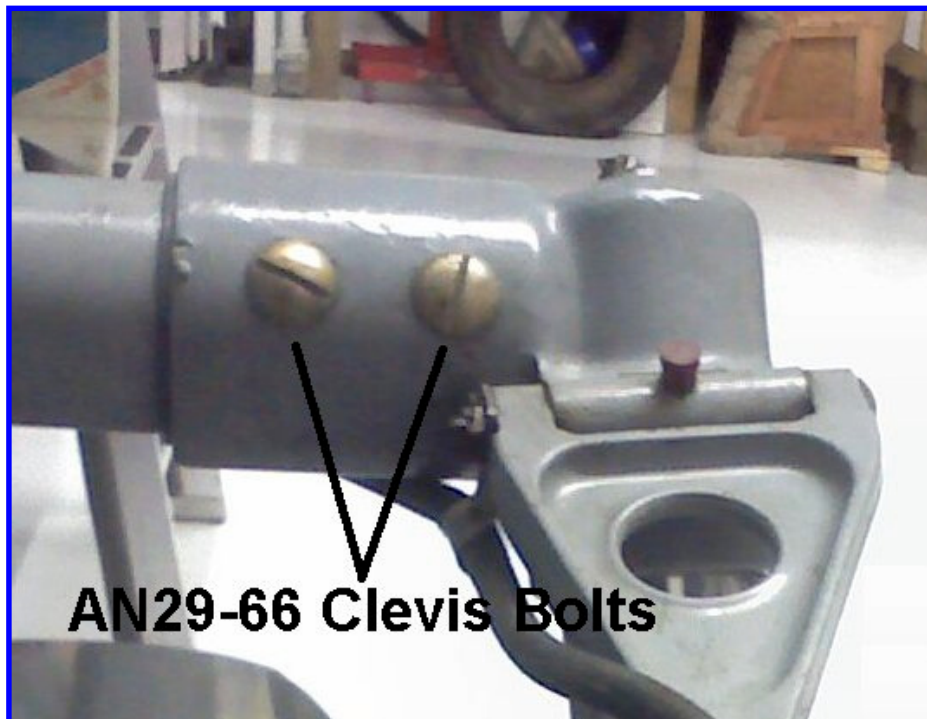
Bearing shown with grease hole.
Seal is above the bearing



Cross section of Bearings, Seals and Crosstubes

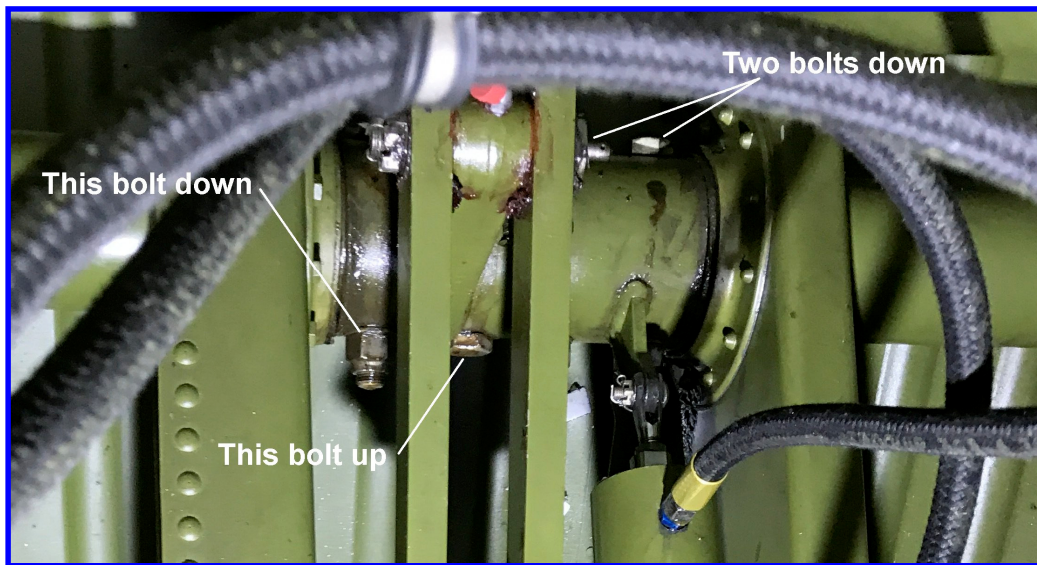
Procedure:

- Step 1:** Jack up the Seabee and place it on the hull stands like you were doing a retraction test because you will later.
- Step 2:** Disconnect the brake lines and cap off the fittings at the fuselage to prevent hydraulic fluid from leaking onto your pretty floor.
- Step 3:** Remove the landing gear struts from the cross tubes by removing the four AN29-66 clevis bolts (two on each side). Hint: Removing the wheels from the struts make it a little easier to remove the struts.



NOTE: If the struts are corroded in place or difficult to remove, DO NOT START POUNDING ON THE KNUCKLE! These things are very expensive, IF you can find them, so use a combination of heat with a propane torch and your favorite "rust" remover (Blaster, WD40, LPS-2, etc.). Propane will not get hot enough to affect the aluminum knuckle casting. Do not use an acetylene torch for you will surely melt or degrade the knuckle. If all else fails you can remove the cross tubes with the struts still attached.

- Step 4:** Take the rear seat out and remove the floor panels to gain access to the crosstubes and crosstube coupling located under the back seat.
- Step 5:** Remove the four 9/16" bolts from the crosstube coupling. Make a note of which way the bolts go in as the micro switch for the gear up light is very close to the second bolt from the starboard side and is attached to the vertical bulkhead behind the coupling. Yours may differ however. See photo below:



Coupling bolt location and orientation: Looking aft, gear down.
Note: Second bolt from the left is UP! Micro switch is right behind the coupling so the bolt head must clear the switch..

Note: You will need to rotate the gear up and down in a few intermediate positions to get a wrench on the bolts and to remove them. I found that about half way up gives the best access to both the bolt head and nut (You may have clevis bolts or regular AN bolts). Clevis bolts have cotter pins and castle nuts. AN bolts have metal lock nuts. Use a brass drift to knock the bolts out if required.

- Step 6:** Have a helper pull the crosstubes out one at a time while you hold the coupling in place as it will tend to fall back toward the bulkhead. Rest the coupling on something soft. You may need a 1/2" steel rod or large round screwdriver on the knuckle end of the crosstube to twist and pull the cross tubes out.
- Step 7:** With the crosstubes out, pry the old seals out using a seal removal tool. See photo below:



Seal removal tool. About \$10 at your local auto parts store.

Note: The seals are very large; about 3" inside diameter so you may need to put a piece of wood across the seal flange to remove it with this tool. You may get it out with a slide hammer but be careful not to touch the bearing inside the seal.

Step 8: Clean out the old grease from the outer and inner crosstube bearings. There are four of these. They are large bearings just outside the coupling and just inside where the seals go into the fuselage seal fitting.

Step 9: The new seals (National Part Number 416956) can now be installed using a wooden block and hammer or a seal installation tool. The seal part number on the outer edge of the seal goes to the outside. Make sure the seals go in straight, as they will be deformed if allowed to wander one way or another. The seal outer edge should be flush with the outer seal flange on the side of the fuselage.

Step 10: With your finger, liberally grease the seals and four crosstube bearings. Use good waterproof grease. Also clean and grease the inside of the crosstube coupling.

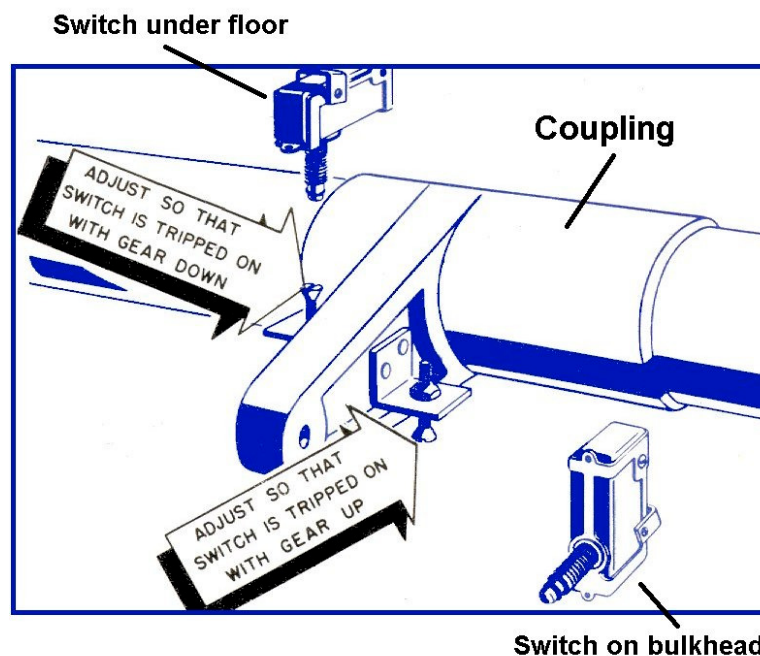
Caution: Check the main landing gear actuator rod control horn on the coupling for cracks and corrosion around the weld. There have been control horns in the past that have "let loose" at the most inopportune time due to corrosion or bad welding job. If the coupling looks like it needs attention, remove it now while you have everything apart. If the control horn is allowed to disconnect from the coupling the actuator rod may go through the aft bulkhead and then into the fuel tank and then, boom!

Note: Now is a good time to check inside the crosstubes and coupling. Check for rust and debris inside the tubes. I have found a long honing stone works great to smooth out the junk inside the tubes. Treat the tubes with your favorite corrosion preventative (LPS-3, Corrosion X, ACF-50, etc.)



Crosstube: Left and right are identical.

- Step 11:** Install the crosstubes taking care not to deform the seals as the crosstubes are inserted. Have your helper push the crosstubes in slowly as you line up the coupling under the back seat. Once one side is installed the other side goes in very easily.
- Step 12:** Inspect the coupling bolts for wear. If you can run your fingernail down the grip of the bolt it needs to be replaced. These bolts are either AN29-66 clevis bolts or AN9-37A Cadmium plated bolts available at most aircraft supply stores. If your crosstube nuts are metal stop nuts you need to replace them. Never reuse a stop nut! Do not use nylon lock nuts.
- Step 13:** Install the coupling bolts. Again, be sure the second bolt is pointed UP when the gear is down. Tighten the nuts just enough to make a good secure fit. No need to torque them down! These are shear bolts and are not under tension. Use a plastic or rubber hammer or equivalent to drive the bolts in. They should be a tight fit.
- Step 14:** Install the landing gear struts and wheels. Grease the ends of the crosstubes where the knuckles fit to prevent corrosion and to make it easier to install the knuckles. Inspect and repack the wheel bearings while the wheels are off.
- Step 15:** Install the AN29-66 clevis bolts through the knuckles. Again, don't over torque these bolts. They are shear bolts and don't need to be too tight. Just enough to make contact with the knuckle. Safety the clevis bolts with cotter pins.
- Step 16:** Do a retraction test. Go slowly up with the gear and listen for any unusual sounds by the coupling. If you notice some funny noises as the gear goes up, STOP! Check the bolt on the coupling closest to the "up" micro switch. It may be hitting it and damage will occur to the switch if you go any further. If all is well, cycle the gear a few times and check that the red and green gear lights work correctly. If not, the switches may need to be adjusted. See diagram below:





Step 17: Remove hull stands and rest assured that your Seabee crosstubes are watertight! Have your mechanic sign the logbook and you are done!

List of materials:

Qty	Description
2	Seals, P/N National 416956
AR	Good waterproof grease
4	AN29-66 Clevis bolts or AN9-66 hex head bolts (if required)
4 or 8	1/8" x 1" cotter pins for knuckle and coupling bolts
1*	Microswitch, P/N YZ-7R-A6 or BZ2RQ1-AZ (if you break yours)
1	Seal puller, Lisle P/N 56750

* Available from HS Electrical, 1665 W. 33rd Pl., Hialeah, FL 33012-4513
Type Z (from Micro Switch Corp.) HS Elec.: (305) 821-5802