

## Change Your Tail Wheel Bearings (and Races)

**Note:** You must have the approval of a certified aircraft mechanic (A&P) to perform this procedure. This procedure worked with my tail wheel but yours may differ. Get the advice of someone who has performed this procedure on your model tail wheel before starting this.

One must keep in mind that there are almost as many different tail wheels as there are Seabees! Your part numbers and tail wheel system may be different so always consult your mechanic for the best advice. I hope this procedure is useful regardless of the tail wheel installed on your Seabee.

The tail wheel, unlike the main gear on our Seabees, is constantly exposed to potential bearing corrosion every time we land on water. The main gear is usually UP out of the water for the most part but the tail wheel is always in the water so its exposure is usually much more than the main wheels. The original tail wheel design was a very poor one as far as waterproofing goes but later modifications and material improvements have improved the sealing capability but still water seems to find its way in no matter what we do. This procedure will explain how to change the tail wheel bearings and seals (if you have them).

The following procedure is for the Bendix tail wheel. The word "Bendix" and the part number should be in raised letters inside the hub. Mine is a Bendix P/N 146419. But even Bendix had different tail wheels on the Seabee so make sure you get the right bearings and seals for your system, as they will surely be different. There were also Firestone tail wheels that are a little different than the Bendix but the bearing/race procedure will probably work for those as well. Don't have a Bendix or Firestone? You are on your own.

### History:

Recently I noticed brown grease (normally red in color) spewing out as I greased the tail wheel bearings indicating some sort of corrosion was definitely taking place. I grease my tail wheel bearings after almost every encounter with water and they still corroded, albeit after ten years of service so I really shouldn't complain. Republic says to lubricate everything every 25 hours. If you spend any time at all on the water, I think this is too long a period especially for the tail wheel bearings (even for the main gear bearings).

**Terminology:** The term "cone" has been used to indicate the tapered roller bearing part of the system. The term "cup" is the race part of the assembly. The terms are used interchangeably.



Tapered Roller Bearing or Cone



Race or Cup

## Removal

- Chock the main wheels and jack the tail wheel up off the ground and support it with a hull stand or substantial blocks.
- Remove the axle cotter pin and throw it away.
- Loosen the axle nut and slide the axle out allowing the tail wheel to come off.
- If you have spacers and washers on each side of the tail wheel, label them for left and right as they may be different and keep them together.
- Take the wheel to the workbench and let most of the air out of the tire by depressing the Schrader valve.
- Remove the Schrader valve from the tube with a valve stem tool to let the rest of the air out.
- Depress the collar side of the tire so that the snap ring is exposed and remove it.
- Remove the collar on the side that the snap ring was located.
- Remove the larger hub from the tail wheel tire/tube. This hub is a tight fit in most cases and requires care in removing it.

**Note:** In this procedure, we are only concerned with the larger portion of the tail wheel hub because both bearings are in that piece. Put the other parts aside for the moment.

- If you have seals guarding the bearings, remove them with a seal removal tool (available at most auto parts stores - see below). Use care to prevent damage to the tail wheel housing. Pry a little on one side then rotate the wheel 90-degrees and pry a little more. Do this all the way around until the seal pops out. Throw the seals away.



Seal removal tool  
(About \$15 at any auto parts store)

- The "cone" (tapered roller bearing) on each side should then be able to be removed with no trouble.
- Clean and inspect the cones for any corrosion or malformation. Replace them if necessary.

**Note:** My bearing and race part numbers are **Timken 03062** and **03162** respectively. The seals are **National** part number **473414** (two required). Yours may be different but the part number should be stamped on the bearing, cup and seal somewhere. You may need a magnifying glass to see them.

- To remove the "cups" or races I have found that heating the tail wheel hub in an oven (a small toaster oven works well) at 400 degrees for 45 minutes allows the aluminum in the tail wheel to expand more than the steel "cup". Use a pair of thick gloves to handle the hub and take it to the workbench and bang the "cup" out by slamming it hard against a block of wood or a wooden workbench. The cup should come out completely but if not, a brass drift can be used from the opposite end of the tail wheel hub opening and using a hammer, slowly work the cup out as you go around the inner circumference of the cup. **Use caution not to scar the surface of the hub!**
- Inspect the inner walls of the tail wheel hub surface where the cups were for damage and smoothness. Clean with solvent if necessary. The surface should be completely free of deformities.
- Clean all parts in solvent and prime and paint if necessary. Do not paint the inside of the hub where the cups go! Let dry thoroughly.

### Installation

- After the hub and all parts have been cleaned and painted, put the new cups in the freezer. Let them freeze for about 30 minutes. This shrinks the cups slightly for easier installation.
- While the cups are freezing, pack the wheel cones with good waterproof grease. You can use a bearing greasing tool or the palm of your hand working the grease into the bearing cone. The cone must be completely filled with grease. Set the cones aside on a clean surface or I just put them back in the can of grease to prevent contamination.
- Put the hub on the workbench and drop the "frozen" cup in the hub with the widest opening of the cup toward the OUTSIDE! You have to be able to drop the cone in later.
- The cup should go in at least partially. You can use a bearing installation tool (see below) to drive the cup in all the way. I use a small, angled dental mirror to check that the cup has seated. There should be no gaps between the cup and hub flange! (Some people have even used a socket that is slightly smaller than the hub opening but that is risky!)



Cup and seal installation tool  
(Used for seals AND cup installation)

- Repeat the previous steps to install the cup on the other side. Again, check for no gaps!
- Apply a liberal amount of grease inside the hub and around the cups. You can never have too much grease in these tail wheels.
- Drill a 1/16" hole through the seal as shown below. Drill just ONE seal as it will be installed on the opposite side of the hub grease fitting.

- Drop in the cone on one side and install the seals if required. You can tap in the seals very carefully with a block of wood and a hammer or use the Seal Installation Tool above. This tool will pay for itself with one use! Each disc in the set is actually two tools in one: a cup installer (the tapered end) and, when turned over, a seal driver (the flat end). This set is about \$20 at most auto parts stores and I recommend them highly as you can use them on the main wheel bearings as well. Tap the seal down until it is just flush with the hub flange.
- Put your finger into the axle hole and make sure the bearing turns freely.



National P/N 473414 seal  
(2 required)

- Apply a small amount of grease to the inside of the seal rubber.
- If you don't have seals installed, I would highly recommend having them installed. It may take a machine shop to modify your hub so the seals will fit correctly. An A&P can help figure that one out for you.

**Note:** The small 1/16" hole in the seal that is opposite the grease fitting will prevent the grease from pushing the seals out when you grease them later. Some seals are too small to do this so get the advice of your mechanic.

- Once both seals are installed, get your grease gun ready. (filled with the same waterproof grease you used to pack the cones)
- Connect your grease gun onto the grease fitting.
- Plug one side of the tail wheel axle opening with your finger or cork.
- Pump the grease gun until the grease comes out the other axle hole. This fills the entire hub with grease. You will grease it again when the tail wheel is installed.
- Replace the hub into the tube/tire in the same position it was before.
- Turn the wheel over and replace the collar over the hub.
- With the collar pressed down firmly, replace the snap ring. Let go of the collar and make sure the snap ring is seated properly.
- Fill the tire with Air or Nitrogen to the required pressure.

**Note:** If you have access to it, use Nitrogen. Air contains water that could degrade the tube rubber causing cracking and premature failure of the tube. Nitrogen is totally dry.

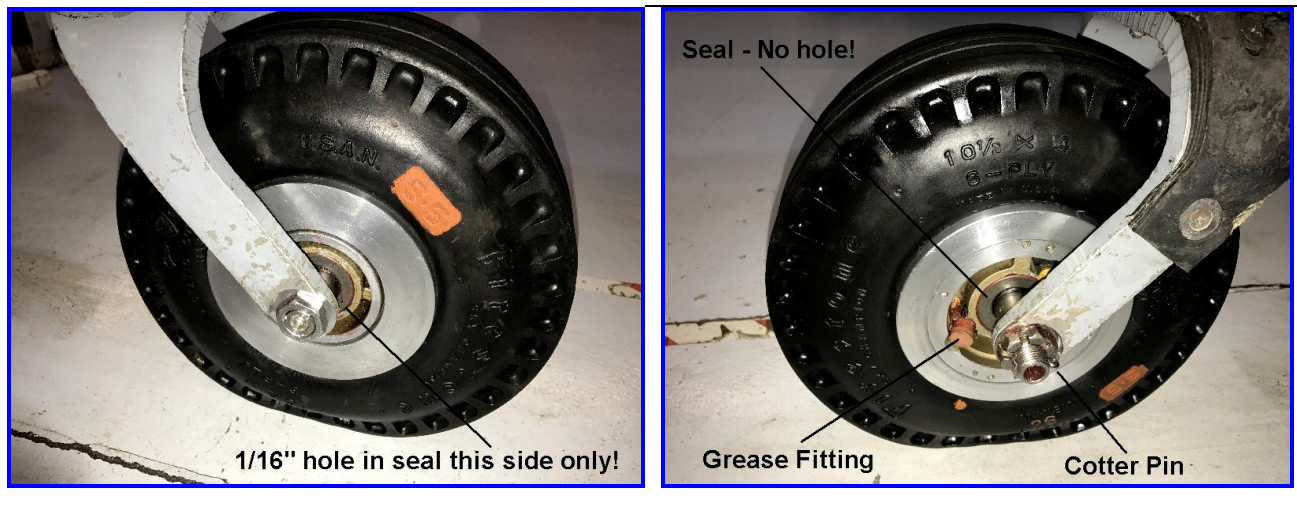
- ❑ Reinstall the tail wheel on the fork with the spacers and washers installed in the same position they were in before.

**Note:** Another technique for greasing the tail wheel after installation is to delay tightening the axle nut. Leave it rather loose and grease the tail wheel until the grease comes out between the seal and the spacers. Then tighten the axle nut as indicated below.

- ❑ Make sure the axle nut is tight. Not too tight but tight enough for the spacers and/or washers to be snug against the fork and tail wheel. Remember that the tail wheel rotates around the axle and the axle and the spacers/washers should not move when the tail wheel is rotated.

**Caution:** If your tail wheel has spacers (left and right spacers are different lengths) inspect them carefully! Be sure the ends of the spacers are perfectly flat and smooth where the seal rubber touches the spacer. IT MUST BE SMOOTH AS A BABY'S BUTT to coin a phrase. If not the seal rubber will wear prematurely causing a leak. These spacers must fit tight against the inner portion of the cone. Use the best end of the spacer(s).

- ❑ Install a new cotter pin (or other safety device) and be sure the tail wheel rotates freely.
- ❑ Re-grease the tail wheel to purge all the air out of the hub. You will see a small amount of grease coming out of the 1/16" hole when the air is eliminated. Grease your tail wheel frequently!



Finished Tail Wheel Bearing Installation  
(Note the hole in the seal on the left side only)

I hope this helps and please, keep it greased!

All the best,

Steve Mestler  
For the Seabee Club