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Wheel Bearing MAINTENANCE

When was the last time you inspected the wheel bearings on your trailer?

I know! This is not a boating story, but properly done, it can lead to more boating and less time stuck beside the road. If you take a minute to consider what a wheel bearing must endure, you will understand why it is critical to keep up on the maintenance.

We leave home with a fully loaded trailed headed for the lake or river. When we arrive we plunge the hot bearing hubs into cool lake water and hope the inner grease seals do their job of keeping the grease in and the water out. Since we don't use our boats daily, they sometimes sit on their trailers for long periods between outings. If water has entered the bearing cavity it has plenty of time to form rust on the bearings. Rust is Iron oxide which is commonly used as an abrasive. Each time you use the trailer, the problem gets worse until one day some good Samaritan pulls alongside in traffic and says that your trailer wheel is wobbling and smoking.

With a little bit of preventative maintenance can avoid this. Follow along as we do a bearing and seal inspection and replacement. This procedure is straightforward, and with the right tools and correct parts, it can be accomplished in an afternoon.

WHEEL BEARINGS

A pair (inner & outer) of tapered roller bearings are used to provide not only vertical support as the wheel rolls down the road, but also lateral support during cornering. Each bearing consists of a matched pair of components referred to as the cone and the cup. The tapered cone is the actual roller bearing and the cup, where the cone rides is the race. The inner and outer races are mounted in either end of the hub using a press fit. The hub also mounts the inner seal and the dust cover or in the case of marine bearings, a bearing buddy is used to protect the bearings from dirt and water. The hub assembly mounts the wheel and tire as well as the brake rotor while providing an enclosure for the bearings and the grease, ensuring the bearings have a consistent supply of lubricant available.

The assortment of tools needed to change or maintain wheel bearings.

Let's begin by raising the trailer so we can remove the wheel and tire. Once raised, the first step is to place a jack stand under the trailer to prevent it from falling should the jack fail. Remove the tire and wheel and take a minute to examine the inner rim of the wheel. If there is grease caked up on the inner rim, it indicates your inner wheel bearing seal has failed.

When working near or under a trailer or vehicle, always use a jack stand in case the jack fails.

The inside of the hub and rotor assembly showing an overabundance of grease indicating a leaking inner seal.

At this point if you have disc brakes, as our example does, you will have to remove the caliper before the hub and rotor can be removed. Simply remove the caliper mounting screws and slide the caliper off the rotor. If the caliper is dry and has adequate brake pad thickness, carefully position and support the caliper to rest on the spring while you complete the repair thus avoiding having to bleed the brakes when you reassemble it.

Next, remove the bearing buddy or dust cover by gently hitting it at an angle with a hammer on the outer edge. Note; if the gentle approach fails, replacement parts are available at the auto parts or marine store. Once the dust cover is removed, remove the cotter pin retaining the large hub nut. Next may be a castle lock which covers the axle nut. See Fig. 6. The nut is followed by a retaining washer. At this point, if you rock the brake rotor, the outer wheel bearing will usually fall out. Try to prevent it from falling on the floor. Once removed, place the bearing on a clean cloth or paper towel, grab the rotor or drum and slide it out straight toward you without cocking it.

Flip the hub over so the inner seal is pointing up and use a large prybar to remove the seal. Once the seal is removed, the inner wheel bearing can now be removed. Using paper towels, wipe as much of the excess grease from the bearings and place them in a can of solvent such as mineral spirits. Once they have had a chance to soak, use an old toothbrush to remove as much of the remaining grease as possible. If compressed air is available, use a small nozzle to blow out the remaining grease followed by another soaking in clean mineral spirits. Note: Be careful not to mix bearing parts if you are going to reuse them.

If you plan to reuse your bearings, they bearings must remain with their original races since they have established a wear pattern. Because of the force required to remove them, seals deform hence they are a throwaway item. Never reuse the seals but save them in case you need to use them to match or identify the new ones at an auto parts store.

A good sized pry bar will allow you to get under the seal and pry it out. Hold the hub in a vise and gently but forcefully pry the seal out. Unfortunately, the seal will be ruined in the process.

Take this opportunity to clean and inspect the axle stub, especially the seal and bearing surfaces. If the clean seal surface is not smooth and shiny, use a strip of 320 sandpaper to gently shine the surface to remove any traces of the old seal or burrs, since these would prevent the new seal from working properly. Look for any signs of discoloration due to heat, or damaged threads.

Lately this small seat has become my favorite tool for working on wheel bearings and tires. My back and knees love it!

Once the bearings are clean take a moment and a magnifying glass to inspect them carefully. Holding the inner race on your finger, rotate the outer roller cage and carefully look at the surface of the

ORDERING TIPS

Due to computerized inventories, the friendly corner auto parts store clerk may be young and eager but unless you can provide year, make, and model of your vehicle, and it is older than ten years old, they will not be able to help. Saying that you have a 1973 green boat trailer will just get a blank stare. This is where taking a sample of what you need comes in handy. With a little urging, "Old Joe" a retired mechanic may be working behind the counter that day and be able to help. If you dig deep enough, most manufacturers of basic parts have what's known as a progressive size catalog which lists their product line according to size. Using this and your sample, a good parts counter person can usually help.

When buying bearings, a note of caution. Today, most replacement bearings are made offshore and lack the quality of the original bearings. Wheel bearings are a good place to spend the extra money and buy the best. Timken and New Departure are well respected US brands known for quality. Also beware of counterfeit bearings. To defeat the knock offs, some genuine Timken bearings have a hologram on their packaging.

From left to right, the dust cover and Bearing Buddy followed by the cotter key Castle lock, and hub nut. The inner and outer bearing races and their matching bearings. Finally, the inner lip seal.

rollers. Look for pitting or signs of distress on the race surface. Unless EVERY roller is immaculately shiny and there are no rough sports felt during roll over, replace the bearings. At this point in the project, replacement is easy.

If you elect to replace the bearings, the next step is to drive both inner and outer races out. Using a brass drift with a sharp edge, support the hub on the work bench, locate the drift on the sharp inner edge of the race, and hit the drift with a hammer, moving around the inner perimeter of the race so as not to cock it. Slow methodical blows spaces 60 degrees apart will remove the bearing race.

Flip the hub over and remove the second race. Once this is done, thoroughly clean the interior of the hub using mineral spirits to remove all traces of grease and debris. Remember, one little chunk of missed debris WILL find its way into your new bearing at the most inopportune time and ruin the bearing.

A brass rod is used to catch the inner edge of the bearing race so it can be driven out. Move back and forth around the inner perimeter tapping firmly. Do not stay in one spot to prevent cocking.

Once the hubs are clean, you can replace the outer races by using a special driver to drive them into the hub. Do yourself a favor and do not try to drive them in with anything but a proper driver, you will just cock or scar them rendering them prone to failure. Harbor Freight makes a nice set of inexpensive bearing race drivers.

A bearing race driver. These make installing the new races in a snap, and they don't damage the race surface.

It is critical to pre-lube the wheel bearings prior to installing them. A tool which utilizes a grease gun is available to pack the grease in the bearings, or the old tried and true manual method is also quite viable although slightly messy. I still use the manual method which involves taking a golf ball size glob of grease and placing it in your open palm and holding the new bearing in the other hand while

BEARING GREASE

When you choose a bearing grease remember to get a grease specifically recommended for marine use. Star-Brite and Green Grease make specially formulated grease designed for the marine environment. Both are designed to provide lubrication when in contact with water while resisting rust and corrosion. I have had good experience with Green Grease for over 15 years and have logged over twenty thousand miles using it.

Green Grease or an equivalent should be used to lubricate the boat trailer bearings. Stay away from traditional automotive greases if possible.

gently scraping the grease to force it into the bearing cages until the rollers are completely covered internally. Take a few strokes, then rotate the bearing rollers and continue. The grease will gradually disappear from your palm as it works its way into the rollers and soon you will have packed a bearing.

Once the bearings are packed, place the larger inner bearing in the corresponding race, then place the new seal in position so it can be driven into the seal bore. Using a seal driver which locates on the inner diameter of the seal while supporting the outside surface, drive the seal into the hub until the outer face is level with the edge of the seal bore in the hub.

A seal driver. The inner diameter of the seal centers on the black plastic locator allowing the outer metal ring to be drive the seal without fear of slipping off the seal and damaging it.

Take two golf ball sized globs of grease and spread them inside the clean hub cavity. These will provide an ongoing supply of lubrication. Do not over lube. In operation, the grease will melt and find its way into the bearings. Too much grease will just overload the seal and end up coming out and covering your brakes and wheels.

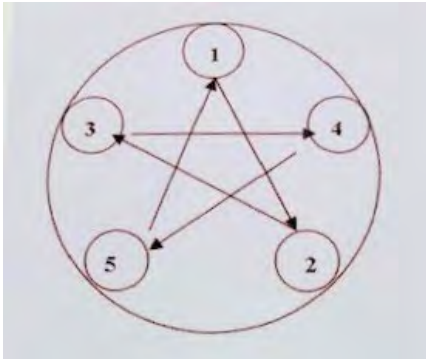
An inch lb. torque wrench is used to apply 200 INCH lbs. and seat the bearings in the races before backing off a quarter turn then tightening finger tight before installing the castle lock and cotter key.

At this point, if the axle is clean, the reassembly can begin. Using your index finger, take a small dab of grease and apply it to the seal surface of the axle to ensure the new seal won't initially run dry. Slide the hub over the axle while keeping it aligned to prevent damage to the new seal. Support the hub aligned in place while you insert the outer wheel bearing. Follow with the thick washer and the nut. Using an inch pound torque wrench, tighten the axle retaining nut to 200-inch lbs., then back off 90 degrees. Gently spin the hub and verify a smooth rotation. Then gently tighten the nut finger tight. Place the castle lock on the nut until its notches line up with the cotter pin hole. Insert the cotter pin and bend the tangs to prevent removal. Clip the long ends off the cotter pin to ensure clearance with the dust cover or Bearing Buddy.

Once the cotter key is inserted, it is folded over on itself then trimmed using a pair of side cutters. The remaining ends are then folded further back to ensure they clear the dust cap or Bearing Buddy

The Bearing Buddy being installed by gently tapping it into place while keeping it properly aligned to prevent cocking.

Clean and dry the inside of the wheel rims and reinstall the wheels. Starting with clean dry rims allows you to monitor the back side to see if the seals are doing their job.



Using the star pattern when mounting wheels to the hubs helps to avoid cocking and damaging it when tightening the lug nuts.

Finished job, ready for some wheels and tires.

Add a bit of Never-Seize to the nut threads and install the wheel. Lower the trailer and be sure to gradually torque your lug nuts using a star pattern to avoid warping or cracking the wheel. Before you head to the lake, take your trailer on a ten-to-twenty-mile road trip just to ensure everything is functioning properly. At the conclusion, return home and crawl under the trailer and look for signs of leaking seals. Retorque the wheels and you should be all set for a while.

Handy tips – here are 10 tips for somewhat trouble-free towing.

1 Never use tires over ten years old, regardless of the tread depth. Select "ST" tires specifically designed and rated for trailer service

2 Use a load range tire and axle combination one step above what is recommended for your trailer weight.

3 Even if you don't really need a tandem axle trailer, it is a wise investment. It allows you to remove a damaged wheel and tire, chain up the damaged axle to the frame, and limp to safety, as opposed to having to leave the disconnected trailer beside the road while you seek help.

4 Carry a complete hub assembly with bearings and seals as well as a spare tire and brake rotor, in case you cannot find the proper parts.

5 Make sure you adjust your hitch ball height so the trailer frame rides level thus ensuring equal load on all four tires. This will do wonders for overall handling as well as trailer tire and brake wear.

6 Make sure that 10% of the total weight of your trailer is on the hitch ball.

7 Make sure your trailer brakes work. For the one time when you really need them, they better work.

8 Many people do not fasten their boats to the trailer, relying on gravity and a simple bow strap to keep them attached to the trailer. Ask yourself what would happen if you had to make a sudden violent maneuver or plunge into the median to avoid something. Would your boat still be on the trailer?

9 If your trailer has electric brakes, many states require an auxiliary battery mounted on the trailer to activate the trailer brakes and stop the trailer in case the trailer becomes unattached from the tow vehicle.

10 You can get an infrared thermometer gun with a laser for around $25. Make it a habit to do a simple two-minute walk around your trailer and tow vehicle at each gas or rest stop and check the tire temps and bearing temps. They should compare favorably with those of the tow vehicle. More importantly, keep an eye on one which is starting to rise above the rest. Most tires and bearings, short of a puncture, will give you adequate warning of impending doom. Heed the warning.

Happy Towing

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