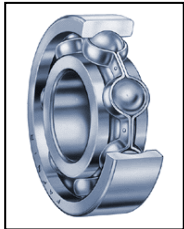


Adjusting Bearings

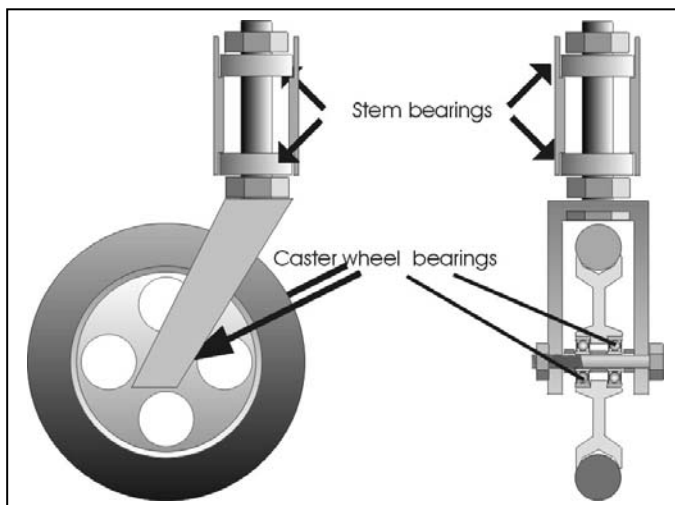
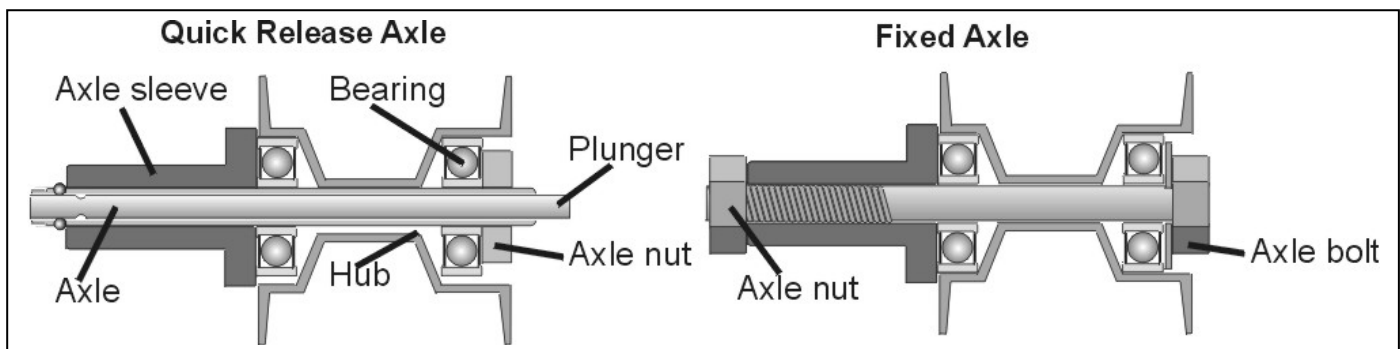
One of the most common service tasks is to check and adjust or replace the bearings. It is at the bearing - not the wheel that actual movement occurs. Servicing bearings is relatively simple; identifying the need for service is even easier. The rewards realized from replacing a seized bearing make learning a little mechanics very worthwhile.



A manual wheelchair has twelve bearings. Wheel bearings (4), caster bearings (4), and caster stem bearings (4). All the bearings are straight bearings and are different to bike wheel bearings which have a cup and cone design that requires pre loading when adjusting them.

Wheel, caster and stem bearings perform different tasks and need to be treated slightly differently

Wheel bearings carry the majority of the weight and need to spin with minimal resistance. There is often a quick release mechanism built into the axle that cannot be adjusted with the same precision as fixed axles.



Caster bearings are like smaller wheel bearings except they are much closer to the floor and as such are most likely to pick up hair and other contaminants. The hair needs to be removed on a regular basis particularly if there are furry pets around. The easiest way to clean the caster assembly is to remove the wheel, take out the hair, wipe it off, and then reassemble. Tightening the axle nut is the same as for the wheel bearing.

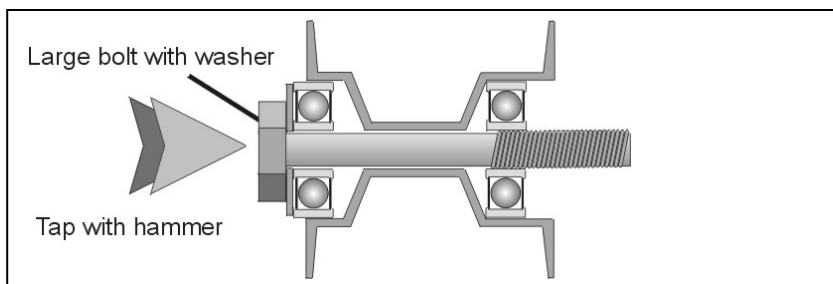
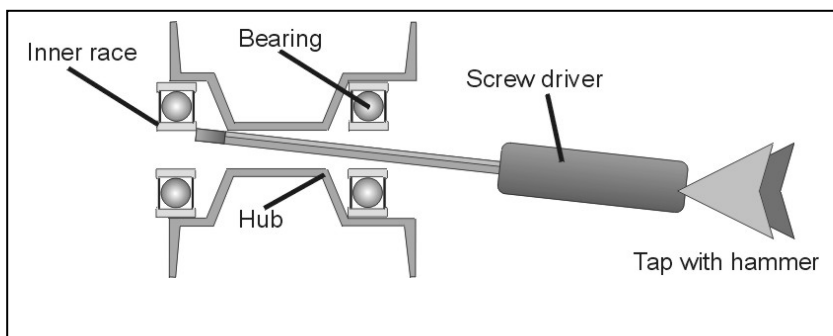
Unlike wheel and caster bearings, stem bearings don't really spin, they just turn. They can be adjusted to be a little tighter than previously described for wheels. This will help to prevent caster flutter.

Some chairs use bushings at the top instead of bearings. Bushings are basically discs of low friction material, like polypropylene or bronze with a hole for the axle. They are cheaper than bearings but tend to wear quicker. A bearing can often be used to replace a worn bushing.

Testing Wheel and Caster Bearings

1. Lift one side of the chair off the ground.
 2. Spin the wheel and let it rotate freely to a stop. (This is not the wheel of fortune; a gentle spin is enough.)
 3. If it slows and stops dead it is too tight.
 4. If the wheel slows and rotates backwards slightly the bearing is not being compressed, however it could be too loose.
 5. Grasp the tire and wiggle it in and out to see how much play there is at the axle, less is better.
- NB. Quick release wheels will always have a little play.

Removing and Installing Wheel Bearings



1. If you are replacing bearings you can use a screwdriver to knock out the old ones. However, a screwdriver can damage the inner race. If you intend to reuse the bearings find something with a more forgiving end or be gentle and tap all the way around the race, easing the bearing out slowly.
2. Repeat for the other side
3. Seat the new bearing using the largest bolt that fits in the axle hole and a washer big enough to reach the outer race.
4. Repeat for the other side.
5. Go to step 2 in the testing section.
6. Adjust the axle play to the smallest amount possible

Adjusting Axle Play (fixed axle)

1. Tighten the axle bolt until the wheel does not spin freely.
2. Back off $\frac{1}{4}$ turn at a time and spin the wheel until it just counter rotates after stopping.
3. Tighten the axle nut.

Adjusting Quick Release Axles

1. Check the play in the wheel and make sure it spins freely.
2. To adjust the play the wheel must be removed.
3. The axle nut is $\frac{3}{4}$ " and is easiest to adjust with a socket.
4. The axle has to be held with either a $\frac{7}{16}$ " wrench on the flat spots near the other end or a $\frac{1}{2}$ " wrench in line with the balls.
5. Keep tinkering with the length of the axle until the wheel has the least amount of side play when the plunger still pops out.

Compromised bearings can significantly increase the energy required to propel a manual chair. The slow onset of bearing deterioration makes it a very common occurrence because the user doesn't recognize the microscopically small increases in energy expenditure from day to day. Half an hour and \$100 worth of bearings can make an incredible difference to someone's manual wheelchair propulsion efficiency.