

WHEELCHAIR MAINTENANCE AND ADJUSTMENT FOR DUMMIES CLINICIANS

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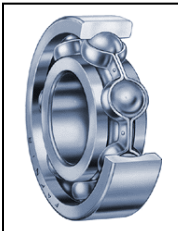
Some people who use wheelchairs are very good at keeping on top of the regular maintenance required by the chair. In the twenty years or so that I have been involved in teaching wheelchair skills I have met less than a handful. Their three-year-old chair has less than a month's accumulation of dropped food. The original finish is visible in more places than where clothing rubs off the dirt. Their quick release axles still release and their tires have been inflated in the last month.

The vast majority of wheelchair users have absolutely no idea the chair needs maintenance. Chairs these days are well made and any deterioration in their performance happens over such a long period of time that it often goes unnoticed. Tire inflation which changes more quickly than other factors takes two months to get down to half it's initial value and then another two months to half that. In other studies we established that there is no statistically significant increase in energy expenditure until pressures approach 25% of the recommended value. Is it any wonder that with such a slow rate of change, deterioration goes unnoticed?

Numerous clients attend the centre on an out patient basis complaining of shoulder pain. Treatment with conventional PT modalities, acupuncture, IMS and a balanced programming of stretching and strengthening usually prove beneficial ...particularly after we serviced their wheelchair.

One of the most common service items 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 fixing a seized bearing make learning a little mechanics very worthwhile.

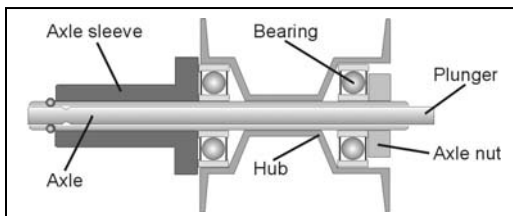
Bearings



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

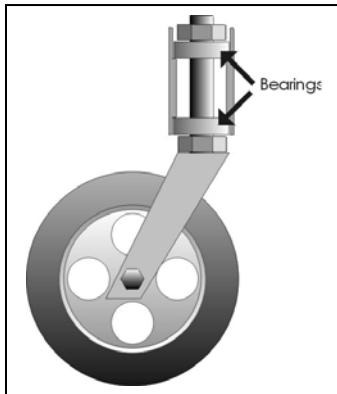


These bearings carry the majority of the weight and need to spin with minimal resistance. To set the bearing correctly; install the wheel and over tighten the axle nut to make sure the bearing is seated properly, back the nut off a quarter turn and wiggle the rim side-to-side, adjust the nut until there is minimal side-to-side play (wheels with a quick release axle can not be adjusted as precisely as those with a fixed axle and will always have more wiggle), then spin the wheel and let it rotate freely to a stop. If the wheel slows and rotates backwards slightly the bearing is adjusted correctly. If it slows and stops dead it is too tight.

Caster Bearings

These 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 which need 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.

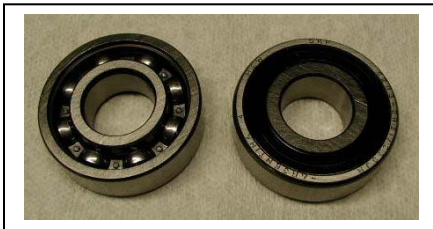
Caster Stem Bearings



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 a bearing. 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.

Should You Lubricate Bearings?



Yes and No.

Almost all wheelchair bearings are sealed bearings, which keep all foreign bodies out and keep the lubricant inside. The lubricant eventually breaks down and at that time bearing wear increases dramatically.

Spraying WD 40 on the outside of a bearing and wiping it off will not hurt the bearing and will help to keep it clean. Smearing grease on the outside will not help the bearing and will attract dirt and other abrasive material, which could hurt the bearing and certainly make the chair less appealing.

If you want to lube a bearing you have to very carefully remove one of the seals (black bit) to expose the cage (shiny bit), wash the bearings in a solvent and let thoroughly dry before repacking with grease and replacing the seal. Do not use WD40 as a lubricant for bearings, it is too thin and will actually accelerate bearing wear

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.

This workshop will also answer the following questions:

- How do I get the screw out when the head is damaged?
- How do I make a bolt shorter?
- Which way makes it tighter?
- How can I tell if it's metric or imperial?
- Why won't the axles quick release?
- How tight is too tight?
- What are a nylock nut and a Phillips #2 and why should I care?