

Bush Chatter

A newsletter for the Sunraysia Historic Motorcycle Club Inc,

*By Mark Zimmerman
February 24, 2009*

Despite technology that's nearly a century and a half old, the wire-spoke wheel still has a lot going for it. Wire wheels are light, and when properly configured and maintained, strong and stiff, although not so stiff that they don't flex slightly when loaded, a feature that was particularly desirable in the days before front and rear suspension made the scene-and still isn't a bad thing. The traditional look of a wire wheel is also undeniably attractive, which goes a long way toward keeping them popular, especially with the cruiser/retro/vintage crowd.

On the downside, wire wheels do require slightly more maintenance than their cast or machined cousins. But unless you've let things get completely out of hand, it's relatively easy to perform and needs doing only occasionally.

The Theory

Wire wheels are composed of three main components-the hub, rim and spokes. The hub is basically an aluminum-alloy tube that connects the wheel to the bike. It contains the wheel bearings, and normally has two flanges on either side that are drilled to accept the spokes. Besides providing the motorcycle-to-wheel connection, the hub also acts as a convenient spot to hang things like sprockets, brakes and sometimes the speedometer drive. Outside of the occasional bearing check, most hubs need just about zero maintenance.

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The rim is little more than a band of metal formed into a circle. Constructed of either aluminum alloy or steel, its job is to hold the tire in place (and give us something difficult to polish). Rims can be dented if struck hard enough, and I've seen more than one develop cracks between the spoke holes, especially after coming off a harsh encounter with a New York City pothole. Like hubs though, rims are relatively trouble-free and will perform well enough even with a few dings in them. After years of hard use, my trail bike's rims have acquired the general shape of a stop sign and they still work fine, although I'll admit I rarely run the bike at 75 mph down the interstate.

The spokes are the third piece of the wheel pie, and in many ways the most important. Spokes are thin, steel rods that are threaded at one end. The opposite end has a domed head that fits snugly in the hole drilled through the hub flange (though some designs are reversed and locate the spoke nipple there.) This end is normally turned 90 degrees or close to it; however, in some applications, a straight spoke may be used for increased strength. The threaded end passes through a hole drilled in the center of the rim, or occasionally through the outer edges (the latter design allows the use of a tubeless tire). An elongated steel nut called a nipple fastens the spoke to the rim and allows spoke tension to be adjusted.

Because spokes need to cope with driving forces from one direction and braking forces from the other, they are arranged in a tangential pattern-that is, they run at an angle from the centerline of the hub in a crossway configuration to their location in the rim. This allows one half of the spokes to brace the wheel under acceleration, while the other half braces braking forces. The spokes also cross from one side of the hub to the opposite side of the rim, which results in a triangulated structure that prevents the hub and rim from twisting in relation to each other, and provides a measure of lateral strength.

That being said, a lack of lateral strength is still the wire-wheel's weak point. But because a motorcycle banks through turns and sideways thrust loadings are relatively low (forces tend to be felt as downward pressure through the center of the wheel), lateral strength isn't that big an issue unless the wheels are poorly designed or have become weakened due to loose or missing spokes.

Of course if you're a sidecar enthusiast, the situation is reversed. Because sidecars turn like cars, side loadings on the wheels are enormous, especially at the front, and breaking some spokes is fairly common, which is why most chairs use either solid or cast wheels or have someone like Buchanan's lace them up a set with spokes as big around as a No. 2 pencil.

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Lastly, if you've ever looked at a spoke wheel and wondered how those spindly little wires on the bottom could support an entire motorcycle, let alone the combined weight of the bike, rider(s) and luggage, the answer is they can't. Spokes work very well in tension but have very little compressive strength. Essentially, the motorcycle hangs from the upper spokes while the other spokes simply keep everything aligned and prevent the rim from wandering away. This is key, because once spokes lose tension, the rim and hub quickly fall out of line. Ride a bike with loose spokes for any length of time and chances are good you'll soon be rebuilding the wheel, which is neither cheap nor something a novice should be tackling unless he's got a lot of time and a real interest in becoming a wheelwright.

The Practice

Wire-wheel maintenance involves a few simple tasks and even fewer tools. The wheel needs to be inspected on a periodic basis for physical damage, loose or worn components, alignment problems and, most importantly, spoke tension. So what's periodic? Certainly, I'd give my rims the once-over if I whacked a pothole or big frost heave or maybe ran over the neighbor's kid's bicycle (don't ask), but the only time I really give them a formal inspection is when I do major service or install new tires. So, in this case, I'd say that periodic means every 3000 miles or once a year, unless your owner's manual specifies otherwise. Of course, since the whole job takes maybe 15 minutes to half an hour, you may want to perform it on a more regular basis.

While a decent job of inspecting the wheels can be done with the bike on its kickstand, it'll be far easier if the bike is upright, with both wheels off the ground. If your bike doesn't have a centerstand (and whose does these days?), use a lift or whatever it takes to get the bike into position.

A cracked rim is rare but not unheard of, so I like to start by inspecting that hoop for fractures. Most are small, hairline fissures that radiate outward from the spoke holes, and in most cases will run from one hole to another. If any are found, the rim will need replacement, but like I said, cracks are rare. Hub cracks are even less common, but it never hurts to give everything a look, just in case you're one of the lucky ones.

Modern wheel bearings are paragons of reliability and generally don't cause any problems unless they've been severely abused, typically by being hosed down with a high-pressure washer or steam cleaner (which tends to wash the grease out of them), or just by a lot of mileage. In any case, a wheel bearing will normally start to "rumble" or whine before it reaches its expiration

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date, so the easiest check is to just spin the wheel and listen; if it doesn't turn smoothly or there are weird noises coming from the hub center, a further look is warranted.

A bearing can sometimes develop excess freeplay, which will affect handling for the worse and eventually cause bearing failure. To check freeplay, raise the wheel slightly off the ground and grasp it at opposite points (12 and 6 o'clock work as well as any). Try to move the wheel back and forth, 90 degrees to the axle. In some cases, slight movement may be normal or at least acceptable (your service manual will have the details), but as a rule, any kind of shift indicates the bearings need adjustment or replacement.

The last type of wheel check is for true or runout (jargon for out-of-round). There are two types of runout: axial, which is a side-to-side wobble, and radial, which is an up-and-down hop. Both checks can be performed well enough by eye, at least initially, as all you're going to do is give the wheel a spin and watch it rotate. If the wheel appears to be rotating true, chances are pretty good everything's fine. Since no wheel is 100 percent perfect, manufacturers typically allow between 1 and 3mm of runout in either direction.

If there's any doubt, fix a pointer to the frame or fork (a tie-wrap will do fine), and allow it to just kiss the rim at the closest point. For axial runout, position the pointer to the side of the rim. To measure radial runout, select a point on the rim's inner or outer edge. Slowly rotate the rim until the gap between the pointer and the rim is at its greatest. If the dimension exceeds the manufacturer's recommendation, the wheel will need to be trued.

Assuming no problems are found, the final and most critical phase of the operation is to check the spokes. The time-honored method is to give each one a tap with a small wrench or screwdriver handle and listen to the sound. A nice, clear ping indicates the spoke is reasonably tight, while a flat, dull thunk means it's loose, and, as you can guess, a loose spoke is little more than a broken one that hasn't had the good sense to come apart yet.

Frankly, I don't use the ping-and-ring method anymore; it's a little too subjective and I'm as deaf as a post, anyway. However, it is a good way to make a cursory check. Just remember, you're not tuning a zither, so don't expect every spoke to hit a perfect C-sharp.

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A far more accurate method of checking spoke tension is to use a spoke nipple wrench or, even better, a spoke nipple torque wrench. If you've never seen one, a spoke wrench is a short wrench with square-cut jaws designed to fit snugly over the spoke nipple. They're available from any motorcycle dealer for less than 10 bucks, and if you don't know what size to order, you can get a universal wrench that'll cover the most commonly used sizes. Special-designed spoke torque wrenches work best, but they're more expensive; a really good one, like Fasst Company's adjustable model with interchangeable heads, runs nearly 300 bucks, so unless you plan on truing a lot of wheels, a torque wrench is something of an extravagance.

Starting with the spoke nearest the tire valve stem, apply moderate pressure with your wrench. Moderate means just that; typically, spokes are tightened to somewhere between 20 and 60 in.-lbs., which equates to 1.6 to 5 lbs.-ft. That's not much, and it's easy to overtighten the spoke if you get ham-fisted. I should also warn you that it's difficult (if not impossible) to accurately torque a corrosion-seized spoke. If the nipples are rusty or obviously loose and resist tightening, it's time to have the wheel looked at by a pro. Chances are the nipples have seized, and if that's the case, you'll need to consider plan B, especially if the wheel is badly out of true.

If the nipple turns easily, give it no more than a quarter turn. Skipping the next three spokes, repeat the procedure at the fourth spoke in line. The butt end of that one should be on the opposite side of the rim from the first. Work your way around the rim giving every fourth spoke no more than a quarter turn. When you get back to the original spoke, move to the next one in line, again tightening every fourth spoke. Repeat the procedure until all the spokes are nice and snug. Doing it this way may seem tedious compared with just tightening every spoke in line, but going at it the easy way may pull the wheel out of true. The every-fourth-spoke method takes longer but ensures the rim stays round, and as we all know, a round wheel is a happy wheel, a happy wheel makes for a happy motorcycle and a happy motorcycle always has a happy rider.

True or Not?

Truing an out-of-round wheel

What we haven't discussed here in any detail is truing an out-of-round wheel. Part of the problem is that truing a wheel requires a level of expertise and patience that goes beyond that of ordinary preventive maintenance. Also, a novice can take a slightly out-of-true rim and turn it into a wobbly mess in less time than it took to write this sentence. For that reason, I'd suggest that if you're unlucky enough to encounter a seriously warped or damaged wheel, you have it

professionally rebuilt. Of course, if you'd like to learn how to do it on your own, there are several excellent books and videos out there that detail the procedure.

Removing Fork Caps

Easy-off the right way

Removing your typical fork cap isn't exactly rocket science, but it can be a pain in the butt, especially the first time you do it. Since it's an integral part of fork maintenance, here's the 1, 2, 3 on removing (and installing) them without pain.

1. Wrestling with the forks when they're off the bike is a headache 99 percent of the time. It's a lot easier to loosen or remove those caps when the forks are still attached to the bike.
2. Spring preload can make the caps difficult to remove, and damn difficult to install. Relieve the spring pressure by blocking up the bike so the fork hangs freely.
3. Give yourself plenty of room to work. Some jobs, such as replacing the fork springs or adjusting preload or fork oil level, can be done with the forks attached to the bike-but not if the handlebars are in the way.
4. A wrap of masking or electrical tape will protect the fork caps from marring when you put the wrench to them; an old towel should be used to protect the fuel tank and front fender.
5. Most forks have pinch bolts in the upper and lower clamps. Because the upper pinch bolt compresses the internal threads of the fork tube, it locks the cap in like it was welded, so always

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back the upper pinch bolt off before trying to remove the cap bolt. If you don't, the threads are liable to come out with the cap.

6. To remove the caps, use the appropriate socket and a ratchet or preferably a T-handle to spin the cap out. As you're turning, maintain a slight downward pressure. This will prevent spring tension from overpowering the cap and forcing it up and out when it reaches the ends of the threads. Not all caps are under tension, but those that are can sometimes pop out with enough force to dent your forehead, so pay attention. In most instances, you'll be able to feel the tension on the cap diminish as it reaches the end of the tube. (If the cap gets really loose, chances are good there's no tension on it and you can simply spin it out.)

7. To reinstall the cap, lubricate the threads with grease or antiseize. If there's no preload on it, simply install it and run it like any other bolt. If there is a preload on the cap, engaging the threads can be a little tricky. One way to overcome the spring tension is to place the cap in your socket with the ratchet or T-handle attached and rest it on top of the spring again, bear down and engage the threads; while maintaining down pressure, gently rotate the cap using the ratchet. If the cap resists, stop and make sure the cap is square to the threads. A cross-threaded fork cap is difficult and expensive to repair.

8. Fork caps need to be tight, but not crazy-tight. Tighten them (and the pinch bolts) using a torque wrench.

9. If you remove both fork caps at the same time and the jack drifts, your bike is going to fall over. Either do one leg at a time or make sure the bike is properly supported.

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Spokes are angled so that half brace the wheel under acceleration while the ones angled the opposite way support it during braking.

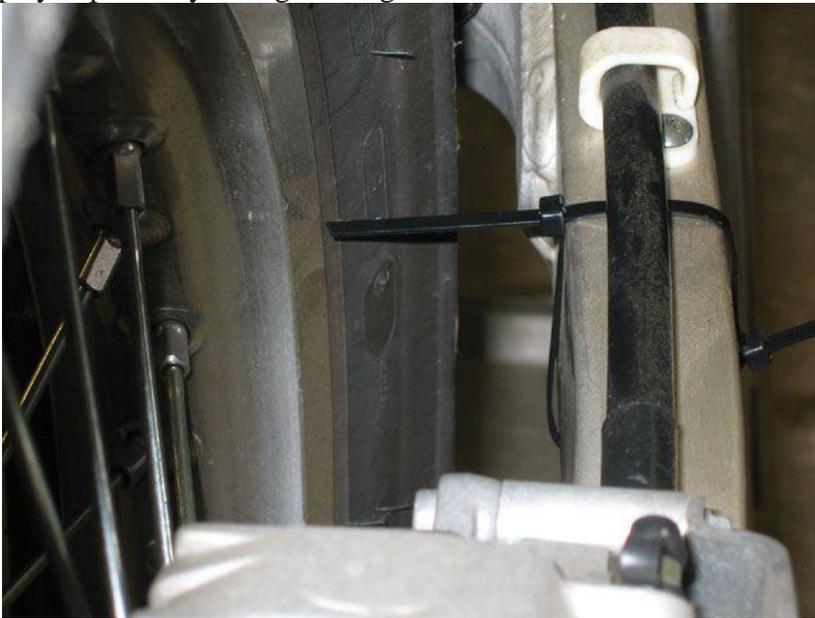


Cracks usually radiate outward from the spoke nipple seats.

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Try and rock the wheel at a right angle to the axle. If no play is present you're good to go.



A tie-wrap makes an impromptu, yet perfect, wheel truing device.

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From the top: spoke torque wrench with interchangeable heads, universal spoke wrenches and standard spoke wrenches.



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Start at spoke No. 1, skip No. 2 and No. 3 and tighten No. 4. Skip the next two, and so on. When you've worked your way back to the start move ahead one spoke and repeat the sequence.

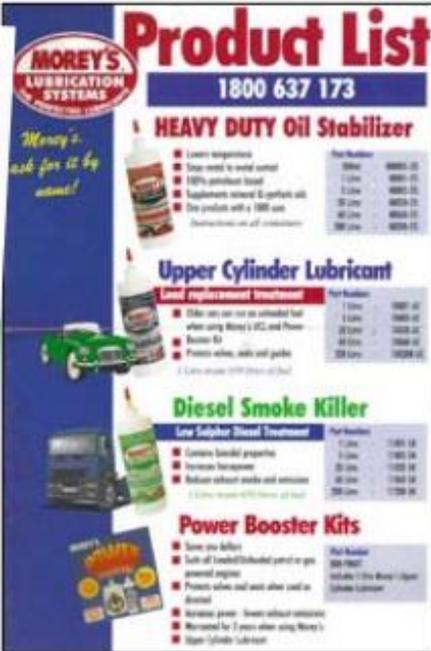


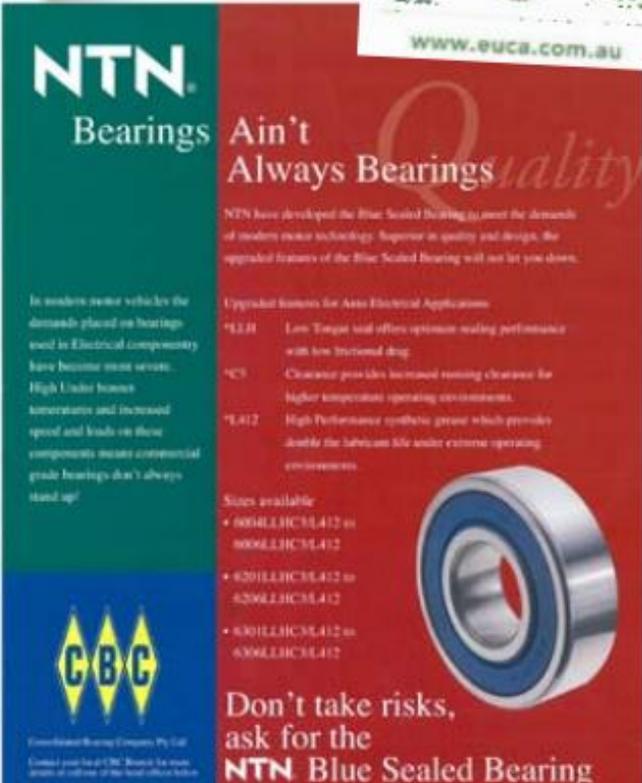
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Graham Burton-Clay at Sunraysia Bearings, 34 Orange Avenue, Mildura, telephone 5023 4337, is offering all SHMC members trade prices on a wide range of items including those featured below... All you have to do is flash your membership card to get one of the best deals going around. The Sunraysia Bearings team have 50 years experience in the industry, and the business is locally owned and operated by people that live and work in our community. Thanks Graham! Let's support the bloke who supports us. The good stuff!











Who's who in the club.

- President:** Jack McCarthy jacmac@ncable.com.au
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- Secretary:** Chris Sibley, christophersibley@inet.net.au
- Treasurer:** Graeme Brown grbrown1@internode.on.net
- General committee:** Ron Brown, Robert Ferguson, Jeff McCarthy, Adam Zinich.
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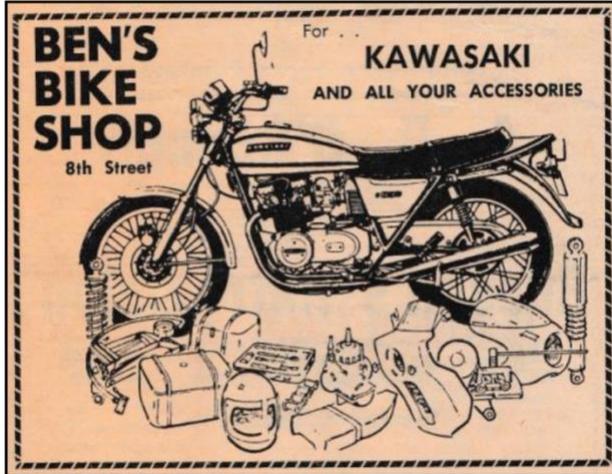
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Regular events Regular Club Runs *Monthly meeting rides leave from Hudaks on 15th Street opposite Centro at 10am. The run finishes at the Mildura Scout Hall in 12th Street, Mildura. .*

The mid-month ride leaves from Hudaks on 15th Street opposite Centro at 10am on the second Sunday of the month. Turn up with a full tank. Many more events listed on our website



Bush Chatter is always on the lookout for news and information around the club. If you have a tall tale, or a true tale, or some interesting stories/anecdotes/ photographs/ jokes etc. You know the drill!! Send them to me at hammondmp@outlook.com. or call me on 0419 352 291. Thanks in advance and cheers!!

Report from the 'Club Band'

Phone Peter Hammond on 0419 352 291 for information,

F. W. (Bill) BAYLISS & SON

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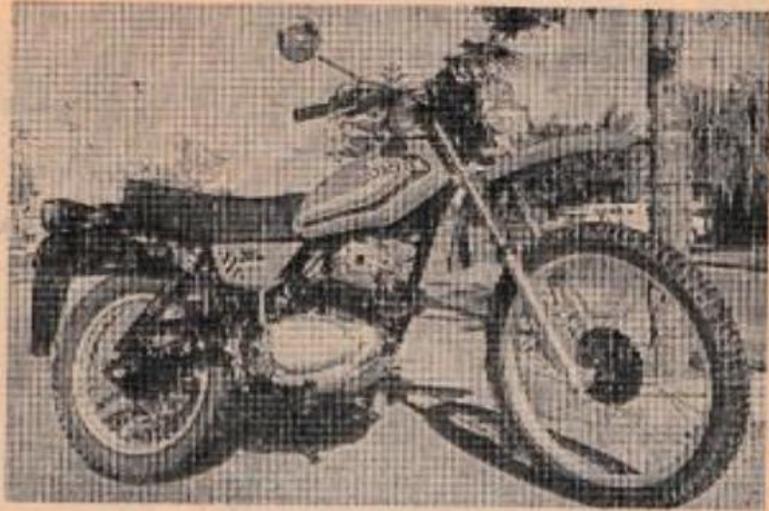
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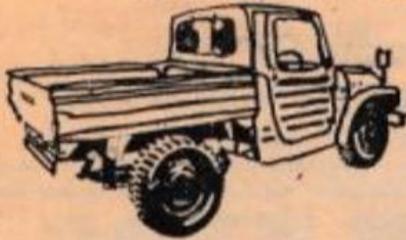
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