

# WHEEL SIZE MATTERS

*Picking which size is right for you, and why*

by Jan Heine

Which wheel size is ideal for a touring bike? Almost no other question has been discussed as widely among touring cyclists. When Adventure Cycling got started as Bikecentennial in 1976, most touring bikes used 27-inch wheels. Then mountain bikes popularized the 26-inch wheel size. The racing-bike wheel size of 700C has now replaced 27-inch wheels, which is now almost defunct. And more recently, 650B has been promoted

as an “in-between” wheel size that offers the best of all worlds. Some bicycles, especially folding bikes, use very small wheels. Each size has eager proponents and detractors, but few people understand how wheel size affects the ride of their bicycles.

Wheel size terminology can be confusing because we are mixing the metric French system (650B, 700C) and the British system (26 inch, 27 inch), plus the emerging mountain-bike wheel sizes (27.5 inches, 29 inches). When you look at

than a 700C wheel. For the magazine *Bicycle Quarterly*, we tested different wheel sizes on various surfaces with a power meter in a carefully controlled experiment. We found that there was no difference in speed between the three popular wheel sizes (26 inches, 650B, 700C), even on equivalent cobblestones and certainly not on smooth pavement.

If your front wheel has too much rotational inertia, it becomes difficult to change your line in mid-corner, for example, to avoid a pothole or to round a curve with decreasing radius. With too little rotational inertia, your bike requires constant corrections to stay on course. You want a wheel/tire combination that is just right, with neither too much nor

too little stability.

Another *Bicycle Quarterly* test had three people ride three bikes with identical geometries (fit, trail, bottom bracket height, etc.),

but with different wheel sizes (26 inch, 650B, 700C). All test riders independently found that they preferred smaller wheels for wider and heavier tires, and larger wheels for narrower, lighter tires. When we calculated the rotational inertia of the wheels, we found that these preferences all yielded similar values.

Based on that test, we concluded that 700C wheels are best for narrow tires up to about 30 mm. For wider tires (30 to 42 millimeters), our testers preferred the somewhat smaller 650B wheels. Tires wider than 42 millimeters handled best on even smaller 26-inch wheels. It is no coincidence that the outer diameter of

What about large-wheeled mountain bikes? The little independent testing that has been done indicates that 29ers don't roll faster than mountain bikes with 26-inch wheels. However, the large-wheeled bikes certainly feel different.

### Handling

Why do larger wheels feel different? The front wheel's rotational inertia affects how a bike holds its line, both on straightaways and in corners. Larger wheels and/or heavier tires/rims have more rotational inertia, making it harder to turn the front wheel to initiate cornering.

the International Organization for Standardization (ISO) designations of the most popular sizes, things begin to make sense (see sidebar).

Names don't really matter: What we care about is which wheel size gives us the best performance on our bikes. There are several factors to consider.

### Rolling Resistance

Many riders believe that larger wheels roll faster; it makes intuitive sense. A tiny wheel will bump against a pebble while a large wheel will just roll over it. However, the differences between the common wheel sizes are not that great. A 26-inch wheel is only 10 percent smaller

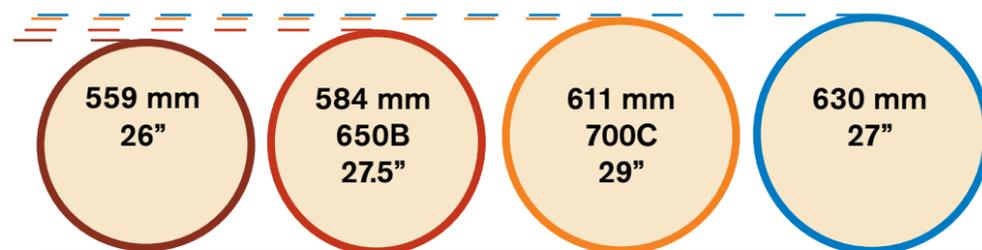


Figure 1: The differences between the common wheel sizes are not that great.

bicycle wheels has remained relatively constant, somewhere between 26 and 27 inches, since chain-driven bicycles were first developed 130 years ago, despite much experimentation with other sizes. Motorcyclists have arrived at similar conclusions; they went to smaller wheels when their tires became wider and heavier, so that the rotational inertia remained the same.

This means that you should first decide how wide you want your tires to be. The wheel size will follow from that. If you love narrow tires, you should use a larger wheel. If you prefer wide tires, your wheels should be smaller.

### Bike Fit

Small riders also have to think about fitting the wheels into their frames. The front wheel must clear the downtube, which runs at a steeper angle on a smaller (shorter) frame. Using smaller wheels requires fewer fit compromises. Keep in mind that if the wheel gets too small, you may compromise handling. Because wider tires (and thus smaller wheels) make a lot of sense on touring bikes, you can avoid many of the fit issues that can crop up on small racing frames with narrow tires and large wheels.

What about large frames? Many makers tend to put small wheels on their small bikes and large wheels on their larger ones to keep the proportions of the bikes similar. The larger wheels do make the larger bikes more stable, but there is no reason that taller riders need more stable bikes. I am six feet tall, and I ride relatively small 650B wheels with wide 42-millimeter tires because they give my bike stable, yet nimble, handling.

## ISO?

Wheel sizes traditionally were designated by the outer diameter of the wheel, but this measurement depends as much on tire width as it does on rim diameter. A more logical system has been adopted by the International Organization for Standardization (ISO), which lists the bead-seat diameter – the diameter of the rim in the place where the tire seats.

Of the four common wheel sizes on touring bikes (Fig. 1), 26 inch is the smallest. 650B is the same as 27.5 inches but is about 5 percent larger than the 26-inch wheel. 700C (aka 29 inches) is another 6 percent more in diameter, making it 11 percent larger than the 26-inch wheel. The old 27-inch size is just a tad larger than 700C – not enough to make a functional difference, but too much to allow you to interchange tires and rims between the sizes. You can also see that the new mountain-bike sizes and the old British sizes are unrelated: The old 27-inch rims (630 millimeter) are actually larger than those of a 29-inch mountain bike (622 millimeter). That is why many people, including my “Mechanical Advantage” predecessor, the late Sheldon Brown, advocate using the ISO system.

### Availability

What good is your dream bike if you can't get tires for it? Before you choose your wheel size, look at the tire options. Not all sizes are supported equally. Sturdy, puncture-resistant touring

tires are available in most sizes, but if you're like me and prefer supple high-performance tires, your options are more limited. For wide high-performance tires, your best choices are in the 650B size. Randonneurs have been using that size, and some wonderfully supple, wide, fast tires have been introduced in recent years. (Disclosure: My company, Compass Bicycles, sells some of those tires, as well as tires for other wheel sizes.) On the other hand, narrow high-performance tires come almost exclusively in 700C. Traditionally, 26-inch wheels have been for mountain bikes, and even “slick” tires in that size usually have sturdy casings that may resist flats but also decrease your speed and comfort. (Generally with tires, you can have comfort and speed or flat resistance, but that is a topic for another column.)

If you travel abroad, it makes sense to pick a wheel size that is well supported in the countries you will visit. If you are able to find any bicycle tire on the Bolivian Altiplano, it's probably going to be a 26-inch one. That size appears to be the most common size, as far as availability goes. No matter where you tour, you probably should take a narrow, lightweight folding tire as a “space-saver” spare, just in case. When you are stranded on top of a mountain pass miles from town, you won't be able to buy any tire, no matter its size. **AC**

Jan Heine is editor of *Bicycle Quarterly*, a magazine about the culture, technology, and history of cyclotouring. His blog is at [janheine.wordpress.com](http://janheine.wordpress.com).

## Alabama's Magnificent Bicycle Adventure



**Alabama's Magnificent Bicycle Adventure**  
April 20-26, 2013

**Come Explore Lower Alabama, the Gulf Shores & Mobile Bay!**  
**AMBA is different than other 6 day bike rides:**

- AMBA is staged in **one** location and has out and back loops every day.
- While you bike, your non-biking mate and kids can go sightseeing, golfing, shopping, go-karting, swimming, or just relaxing on the beach and still meet you for dinner!
- Since AMBA is staged in one location, you set up and break down camp just **once**, and, your car is available every night.

For more information go to:  
[www.amba1.com](http://www.amba1.com)