

# HUBS, SPOKES, and RIMS

*Wheels are the foundation of a dependable touring bicycle, so choose wisely*

*by Sheldon Brown*

Folks devote a lot of attention to frames and gears but if you are going to suffer a tour-ending mechanical failure, the overwhelming odds are it will be a wheel problem that turns you into a pedestrian. From a simple flat tire, to a broken spoke, to a potato-chipped rim ('taco-ed,' if you're west of the Mississippi),

your wheels are the most vulnerable parts of your bike.

## The Great Spoke Scam

Up through the early 1980s, nearly all bikes had seventy-two spokes. Most had thirty-six spokes on each wheel, though older British machines used thirty-two in front, forty in back.

A few exotic time-trial racing bikes would shave a few grams off by using thirty-two-spoke wheels. Then, some marketing genius came up with a brilliant scheme that made thirty-two-spoke wheels the industry standard. Since thirty-two-spoke wheels were associated with exotic high-performance racing bikes, bicycle makers could now cheapen their products and represent it as an improvement! If you take the cost of eight spokes and eight nipples, plus the labor to install them, multiplied by some tens of thousands of bikes, it adds up to a nice piece of change!

It happened that the move from thirty-six to thirty-two spokes occurred at about the same time as a general improvement in spoke and nipple threading, and also some improvement in wheel-building machinery. Both of these factors helped improve the spoke tension levels of average wheels. Thus, wheel reliability didn't suffer too much. What did suffer was wheel repairability. Wheels with fewer spokes are generally less likely to be truable if they get bent.

In the last few years, this trend has continued to a ludicrous extent, as disposable racing wheels appear on more and more bikes. The sparsely-spoked boutique wheels look light, but actually most of them are not. This is because to build an even border-



line reliable wheel with fewer spokes, it is necessary to use a stiffer, i.e., heavier rim!

Such wheels may offer a slight improvement in aerodynamics, which may make them a good choice for racing on flat courses but are not a good choice for any touring application.

## Rim Choice

Folks outfitting touring bikes often look for extra-heavy-duty rims, believing that they will be more reliable. This isn't always the case. If you're going to have wheel trouble due to overloading, it will most likely be due to spoke breakage, and the risk of spoke breakage has little or nothing to do with the choice of rims.

Rim trouble usually starts with hitting a rock or pothole, causing the tire to bottom out and leading to a dent in the rim. If this happens to you, it's because you either chose a tire that was too narrow or the tire was not inflated hard enough. If you bottom out your tire on an obstruction, no rim can be expected to

withstand direct contact with a rock.

There are points in favor of selecting wide rims for touring, but not necessarily heavy ones, such as typical "aerodynamic" rims that are tall and narrow. Rim width should be proportional to tire width. Although you can get very wide tires to work okay on very narrow rims, there are problems with this. If the sidewall of the tire bulges out sharply sideward as it leaves the rim, as it will with a wide tire on a narrow rim, several problems can result:

—If you run the tire at a fairly low pressure, it may tend to "wallow" back and forth, causing poor handling and possibly falling off in hard cornering.

—If you run a wide tire at a high pressure, the ride will be excessively harsh.

—The greater outward pull of the edge of the tire against the rim sidewall can actually splay the sides of the rim outward at higher pressures.

—The sharp bend of the tire sidewall over the edge of the rim often causes chafing of the sidewall against the rim edge,

leading to sidewall failure.

—The overhanging tire can make it difficult to get a proper adjustment of cantilever brakes, so that the shoes will fully engage the rim when applied.

One other consideration in rim selection is the wearability of the braking surface. Every time you apply a rim brake, you wear some of the aluminum off of the sides of the rim. Eventually, the sides of the rim become too thin to withstand the air pressure, and the rim will start to bulge sideways. This will initially cause uneven braking, and, if ignored, a loud bang will result.

## Hub Spacing

Back in the 1960s and 1970s, when five-sprocket freewheels were the norm, rear hubs and frames used a spacing of 120 mm. When six- and seven-speed rear ends became the norm in the 1980s, 126

mm was common, and with the move to eight and more sprockets, the industry went to 130 and 135 mm hub spacing.

Many touring framesets are now being made in 132.5 mm, with the intent of being able to fit either 130 or 135 mm hubs.

If you have a choice, a wheel with 135 mm spacing will be stronger, all else being equal, because it allows more even tension between the left and right side spokes. If you are carrying a lot of weight in the rear, this might make the difference between a reliable and an unreliable wheel, though it's far from the only factor. **"Road" vs. "Mountain" Hubs**

Hubs that are 135 mm are commonly designated as "mountain" hubs, but are also suitable for road use. The cassettes are interchangeable, and any thirty-six-hole hub can be spoked into any thirty-

six-hole rim of whatever size.

So-called "mountain" hubs are generally a better choice for touring, if your frame will accommodate them, because of the stronger wheel resulting from the wider spacing and because they tend to have better seals on the bearings.

A "mountain" cassette is one that has lower gears (larger sprockets), exactly what a tourist wants, and a "mountain" derailleur is designed to accommodate the larger sprockets. Indeed, before the advent of the mountain bike, wide-range clusters and derailleurs were commonly called "touring" parts, before the marketers decided that "touring" had run its course as a useful marketing buzzword. **AC**

*Sheldon Brown expounds on all sorts of bicycle issues. More of his insightful ruminations can be found at [www.sheldonbrown.com](http://www.sheldonbrown.com).*