Questions answered, subjects explained – Cyclopedia is your bimonthly cycling reference guide

Q Load carrying law

Q Last summer I bought an Elephant Bike and have revelled in its ability to carry loads, including DIY materials like planks and last year’s 1.5m Christmas tree. While the bike happily took it, I did wonder where the rules stood?

The Highway Code seems vague. The vehicle markings section mentions special markers for projections over 2m long. Rule 98 says “you MUST secure your load and it MUST NOT stick out dangerously” but offers no explanation on what ‘dangerously’ is, speaks only to “drivers”, and refers only to “motor vehicles” in the linked legislation.

Gavin Welch

A You are correct when you point out that the Highway Code is unhelpfully rather vague on the point of load carrying and cyclists. While being advisory, Rule 66 of the Highway code specifically refers to cyclists: “you should not carry anything which will affect your balance or may get tangled up with your wheels or chain”.

Rule 98 seems to be intended primarily for motor vehicle drivers but it would be sensible to adhere to this rule, which states that you must secure your load and it must not stick out dangerously. The supporting legislation referred to in this section, The Road Vehicles (Construction and Use) Regulations 1986 do indicate that a load carried “shall be in such a position that neither danger or nuisance is likely to be caused to any person or property by reason of falling or being blown from the vehicle or by reason of any other movement or load.”

A further point to take in to consideration when carrying a load is Section 24 of the Road Traffic Act 1988, which states that “not more than one person may be carried on a road on a bicycle propelled by mechanical power unless constructed or adapted for the carriage of more than one person.”

If in doubt, common sense should prevail. If the load feels too heavy or unbalanced, or sticks out dangerously, or could get tangled up in your wheels or chain, then you should definitely think twice.

Richard Gaffney
**Health**

**Prostate cancer**

**Q** Ever since being diagnosed with prostate cancer, I have been advised by many that cyclists are prone to this condition. I have been champing at the bit to get back on my bike. Now I wonder if it is advisable to do so?

*Keith Dutton*

**A** You’ve been given bad advice. There was a study in 2014 from University College London, which claimed to find a link between cycling and increased risk of diagnosis of prostate cancer. It was widely publicised, but the conclusion was based on a small number of men diagnosed, and the methodology of the study was criticised by experts as faulty. Other studies have failed to find any link. A recent study from China appears to show physical activity halving the risk of cancer.

You may wish to look at Trevor Mulryne’s account of taking up cycling after prostate cancer treatment on the Prostate Cancer UK website ([bit.ly/cycle-prostatecancer](https://bit.ly/cycle-prostatecancer)). Meanwhile, a recently published study in the Journal of Urology, the largest to date, comparing cyclists with runners and swimmers, debunks the cycling-causes-impotence story and found only a weak link with urethral damage.

Reduce the risk by avoiding a high-saddle-and-low-bars position, and try to avoid numbness by stopping to get off or standing up on the pedals regularly. If you can sit comfortably on the bike, you are good to go.

*Dr Doug Salmon*

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**Technical**

**Budget bar-ends**

**Q** I need new bar-end shifters for my 9-speed drivetrain but they seem to have gone up in price by 50%. In some cases the 10- or 11-speed versions are cheaper. Am I right in thinking I can run 10- or 11-speed bar-ends, as I run both sides always in friction only mode, never in index?

*Trikeyohreilly, via the forum*

**A** If you are talking about Shimano’s Dura-Ace bar-end shifters, then your problem is that neither 10-speed nor 11-speed rear shifters have the friction option found on the 9-speed version. They only work with their respective systems. Since you only use the friction setting on your 9-speed shifters, you could forget indexing altogether and try Dia Compe’s ENE bar-end shifters, which use a retro-friction system with no indexing option.

*Richard Hallett*

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**Technical**

**Flats to drops**

**Q** I want to convert my 2014 hybrid to drop bars. It has Shimano 105 10-speed derailleurs and hydraulic disc brakes (BR-M615). Can I just fit 10-speed Tiagra hydraulic shifters?

*Bob Simons*

**A** Shimano’s compatibility chart suggests the Tiagra hydraulic shifters will only work with their dedicated mechs and hydraulic brake callipers. Certainly the left-hand shifter won’t work with the FD-5710 front mech, since the pull ratio is different. The right-hand shifter may work with a 105 10-speed rear mech, since the 10-speed Tiagra mech appears to use older Shimano geometry.

The best bet is to buy the shifters and both mechs as a set; they’ll work fine with your existing 10-speed cassette and chainset. Swap out the callipers too. Tiagra brake callipers will work with either 140 or 160mm rotors and can be used with flat-mount or, using an adapter, IS fittings.

*Richard Hallett*
Measuring gears

“What do you mean by lower gears?”

Cycle’s reviews often call the gearing of test bikes “too high”. But what do we mean by high and low? And what are inches?

Highs and lows

A low gear is one that enables you to cycle slowly – e.g. uphill – while pedalling at an easy cadence. A high gear is one that enables you to cycle quickly – e.g. downhill – while pedalling at an easy cadence.

The first pedal cycles had the cranks fixed to the front wheel. The distance travelled for each revolution of the cranks was solely determined by the size of the wheel.

That’s why penny farthings arose. A bigger wheel went further, so was faster for a given cadence. Wheel size was gear size. A penny-farthing with a 52in wheel had a 52in gear.

On chain-driven bikes, wheel size is a factor but you can travel more or less distance per crank revolution by altering the size of the chainring fixed to the cranks and/or the sprocket fixed to the rear wheel. If the chainring is twice the size of the rear sprocket, the rear wheel turns twice for each crank revolution. Such a bike with 26in wheels would travel the same distance per crank revolution as a 52in penny-farthing: 2 × 26in = 52in.

Number crunching

There are three ways to measure gears. The simplest is the ratio between the chainring and rear sprocket: divide the number of teeth on the chainring by the number on the sprocket. Let’s say the chainring has 48 teeth, the sprocket 16. That’s 3:1. For each crank revolution, the wheel turns three times. This measurement only works for a given wheel size.

Gear inches describe the effective diameter of the wheel, telling you how big an equivalent penny-farthing wheel would be! Divide the chainring size by the sprocket size, as above, then multiply by the bike’s wheel diameter. If the wheel diameter is 26.69in (a typical 700×28C setup), our 48/16 geared bike would have a gear of 80in (to the nearest inch).

Gear development tells you how far the bike travels in a given gear for each revolution of the cranks. It’s the effective circumference of the wheel in each gear. To find this: divide the number of teeth on the chainring by the number of teeth on the sprocket; multiply by the wheel diameter (as with gear inches); then multiply this figure by pi (3.14) and convert to metric. That’s 2.03 metres for the 700×28C bike with 48/16 gearing, above.

By calculating each gear ratio, you can plot the overall range – that is, bottom gear to top gear – and also how big the steps are between gears and whether different chainring/sprocket combinations overlap.

Calculating gear inches

We liked this representation of calculating gear inches on Bikepacking.com so have redrawn it here.

Jargon buster

- Cadence Pedalling rate.
- Chainring Toothed ring attached to the crank.
- Cog One of the teeth on a chainring or sprocket.
- Sprocket Toothed ring attached to rear wheel.
- Wheel diameter Nominal diameter is often used. That’s the approximate diameter in inches: 27in for a 700C wheel. Cycle uses the measured diameter, including the tyre fitted.
- High and low gearing The highest gear (top gear) is achieved by combining the largest front chainring with the smallest rear sprocket. The lowest gear (bottom gear) is when the chain is on the smallest chainring and the largest sprocket.