

CYCLOPEDIA

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



Coffee trike at York Rally. Stable cargo loads that can't snag the wheels have few restrictions

Left: Dan Joyce

Q
&
A

Legal

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

Your Experts



DR DOUG SALMON
Cycling GP
{Health}



RICHARD HALLETT
Cycle's
Technical Editor
{Technical}



RICHARD GAFFNEY
Principal Lawyer,
Slater + Gordon
Lawyers
{Legal}

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

Technical

Cable... stop!

Q I need to re-cable my trusty old Galaxy. Having spent some time reading forums, I have learned a lot. I never realised cabling was so technical. There appears to be debate, particularly over shifter outer cables: 4mm versus 5mm. What is your view?

John McCaffrey

A Under no circumstances use shifter outer casing for your brakes. The casing is not made to withstand high compressive force and is likely to burst if subjected to the pressure of hard braking, leaving you with no brake...

Secondly, use 4mm casing with indexed derailleur gears, not least because the smaller diameter ferrules will fit an indexed rear mech's adjuster barrel; 5mm gear casing is fine for older machines with friction shifting. Choose stainless steel inner cable, as the Teflon on the coated type can come off and gum-up the inside of the casing.

Richard Hallett

Cycling UK Forum

Need an answer to a question right now? Try our forum: forum.cyclinguk.org



Left: Alamy

Technical 26 ain't dead

Q I was told by a bike shop owner that it was starting to get difficult to get 26in wheels. Time to stockpile? *Slowroad, via the forum*

A Unlikely. The 26in wheel has been the standard size for so long it probably remains the MTB wheel size most readily found worldwide, which should guarantee continuing demand. Even if wheel manufacturers cease making 26in wheelsets, 26in rims for both rim and disc brakes will be available for the foreseeable future, as will hubs to suit whatever cycle you happen to be riding. Maybe time to find a good wheel builder? *Richard Hallett*

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-S710 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*

Get in touch

EMAIL your technical, health, or legal questions to cycle@jamespembrokemedia.co.uk or write to Cyclopeda, Cycle, PO Box 313, Scarborough, YO12 6WZ. We regret that Cycle magazine cannot answer unpublished queries. But don't forget that Cycling UK operates a free-to-members advice line for personal injury claims, **TEL: 0844 736 8452**.

► 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). 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. You might worry about the urethra, as radiotherapy can also sometimes cause a stricture, a narrowing, interfering with flow.

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

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



Friction shifting bar-end levers can be used with a wide range of different derailleurs

Knowhow

Making sense of commonly misunderstood cycling subjects



DAN JOYCE
Cycle Editor

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.

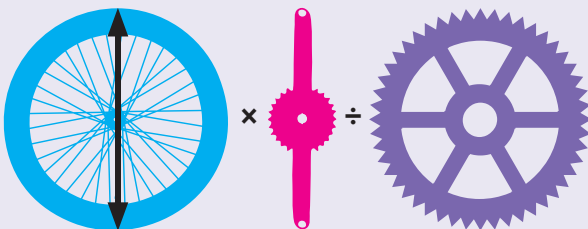
On chain-driven bikes, wheel size is a factor but you can travel more or less distance per crank revolution by altering the size of the chainring fixed to the cranks and/or the sprocket fixed to the rear wheel. If the chainring is twice the size of the rear sprocket, the rear wheel turns twice for each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



The number of teeth [T] on cassette sprockets and chainrings is usually shown

Calculating gear inches

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



TYRE DIAMETER × (**CHAINRING TEETH** ÷ **SPROCKET TEETH**)

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. ●

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.

How low can you go?

Fancy a big MTB cassette on your road bike or tourer? See cyclinguk.org/roadlink