

Advice on Bound rubbercrumb-grit surface



The law and management of public access rights vary widely between the four countries of the United Kingdom. Practical elements of the following advice apply in all of them but the law in Scotland and Northern Ireland may differ from in England and Wales.

Riders and drivers of horses are referred to generically as equestrians.

More advice is available on www.bhs.org.uk/accessadvice.

IMPORTANT This guidance is general and does not aim to cover every variation in circumstances. Where it is being relied upon, The Society strongly recommends seeking its advice specific to the site.

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Benefits of rubbercrumb-grit surface

Where multi-user routes, defined by the British Horse Society **below** as including all equestrians, require a sealed surface, the Society recommends use of polymer-bound rubbercrumb-grit surfaces as a superior alternative to asphalt ('tarmac') or concrete. It is safer and more comfortable for use with horses and on foot, and can be as comfortable and safer on cycle, wheelchair or mobility scooter.

The proportion of rubber to grit is usually about 50:50 which provides sufficient rubber for resilience and a comfortable surface for all users with good longevity. The grit is of equivalent particle size to the rubbercrumb.

It has many advantages over compacted stone or other unsealed surface and provides environmental benefit as well as being more useable throughout the year, being less affected by extremes of weather, cold and hot, than asphalt.

Figure 1 shows the Trans Pennine Trail with icy and slippery compacted-aggregate surface changing to ice-free bound rubbercrumb-grit.

Bound rubbercrumb-grit has many advantages for surfaces used with horses, and other users, primarily:

- Non-slip to shod or unshod hooves
- Flexible so providing a surface with 'give' to reduce impact on joints and accommodate minor earth movement or root growth
- Porous so unlikely to form puddles and dung will wash through
- Unaffected by frost, light snowfall and ice when adjacent traditional surfaces are slippery
- Able to be used comfortably at trot or run without jarring joints
- Lower injury rate from joint concussion or impact in a fall
- Lower temperature surface in hot weather, so more comfortable for users, and benefiting the immediate environment by reducing heat retention and radiation



Figure 1 Ice-free rubbercrumb compound

All of these points benefit pedestrians, cyclists and users of mobility vehicles and pushchairs as well as horses.

None of the benefits are true of asphalt ('tarmac').

Tarmac is unpleasant and often dangerous for use with horses because the criteria which make it ideal for motor traffic mean it is inherently slippery for horses and although surface treatments, 'top dressing', can improve its safety for horses without detriment to vehicles, those dressings can be contraindicated for other

reasons such as noise generated by tyres. Treatments can be expensive and generally lose their effectiveness so need repeating, which is not cost-effective.

Tarmac can cause repetitive impact injuries for pedestrians, runners and dogs as well as horses and is uncomfortable and tiring to walk on. It is a very high absorber of solar heat, which increases discomfort for users and is detrimental to the immediate environment by raising temperatures much further than rubber.

Generally horses are kept to a walk on tarmac to avoid slipping or concussive injury; a constraint which is equivalent to motorists keeping to twenty miles an hour because of surface conditions. Notably, a diversion of a bridleway was confirmed despite incurring an additional two miles on a tarmac road because "horses could trot on to make up the time"; a decision which failed to take account of the road surface which meant trotting was potentially injurious to the horse.

Tarmac should be avoided on routes where dominant use is on foot or horse as it reduces the quality of the way to the unpleasant and unsafe surface condition of a road. When tarmac is laid other than on a road, it is often worse for horses than a road because the specification is even more slippery than standard road specification. Some lethally slippery asphalt surfaces have been laid on bridleways and byways, rendering them unusable where the 'normal traffic of the neighbourhood' includes horses, which is contrary to the highway authority's duty to provide a surface safe for all users.

Recycling and carbon footprint

Motor vehicles in the UK produce 100,000 waste tyres a day. Fortunately, tyres can be recycled, taking out metal and fibre to leave the rubber. The rubber can be reduced to crumbs which can be combined with fine aggregate and bound with polymer to form a resilient surface material which is ideal for horses and all other users. It is chemically inert, which can be advantageous at sensitive sites as there are no leachates or pollution arising from it. There is also an environmental benefit to using a surface with a recycled element. Its carbon footprint is therefore less than bitumen, which has a higher fossil fuel element.

A supplier of bound rubbercrumb-grit surface states that,

100m² of Flexipave at 50mm depth uses 400 recycled tyres and saves 8,800kgs of CO₂ being released into the atmosphere.

Numerous businesses in Britain supply and install surfaces using polymer/resin-bound rubbercrumb-grit.

Longevity and cost

Bound rubbercrumb-grit is guaranteed for several years longer than tarmac. Its porosity¹ and flexibility to ground movement or tree root growth contribute a reduced maintenance commitment as well as a significantly improved amenity value for all users. Surfaces laid more than fifteen years ago in West Yorkshire have had high use and required no maintenance.

The cost per square metre is dependent, like asphalt, on site conditions, accessibility and groundworks but several bridleway and multi-user track applications in 2024 were installed at similar price to asphalt, with far higher benefits. Bitumen costs are rising faster than rubbercrumb.

One product, Flexipave, supplied and installed by KBI UK, is described as:

- Versatile surfacing material made up of recycled car tyre rubber, stone aggregate, and a unique polyurethane binder.
- Highly porous: a void capacity of 17%–23% within the material allows a flow rate of up to 41,000 litres per m² per hour.
- Built-in flexibility (hence the name) allowing it to expand and contract with changes in temperature, as well as loading, and therefore does not crack.
- Installed by hand so does not require large equipment and can be laid in areas with difficult access.
- Unlike tarmac, no edging is required: edges are chamfered to 45 degrees and are self-retaining.
- Due to the rubber content, Flexipave is slip-resistant for horses as well as all other users.
- Colour options are available for the stone element.
- Some example applications are available from www.kbiuk.co.uk.

The BHS has experienced Flexipave on the routes below with horses. They have positive response from users and councils. (Similar products are available.)

¹ The sub-surface must take account of porosity and prevent washing out of the sub-surface.

Example sites

- Barnsley council, bridleway Trans Pennine Trail, [Folly Lane](#) (Flexipave) has a significant gradient where the substrate and surface were always washing out. The grips dug across the slope and backfilled with the rubber mix, which is porous, act as both drains and sumps and have been successful in slowing down the water and protecting the sub-surface and surface. The initial installation in 2010 is on a public bridleway with high level of horse use locally and as part of a popular long distance trail. It has had negligible maintenance and is in excellent condition.
- York City Council cycleway where previous surfaces had waterlogging problems (Flexipave).
- Wokingham Borough Council, [on greenways](#) (Flexipave), tested by BHS with approval in 2015-16. Wearing well and popular except with some cyclists who think it is slower than asphalt, however, the slower cycling speed is considered negligible and of safety benefit to other users.
- Lancashire County Council, two lengths of disused railway, Stacksteads bridleway 676 (Bacup) and part of the Britannia Greenway (Bacup) (Nuflex).
- Milton Keynes Council-Network Rail changed from concrete steps which many horses used to jump or slip on, to bound rubbercrumb-grit in 2019-20. Steep ramp with one low riser step, surface means it is non-slip and has deflexion so is safer than the previous concrete (although recognised as only a partial solution on a challenging site).
- Kent County Council bridleway in Burham, wet site and product standing up well to use, including with horses.
- Gloucestershire County Council Nailsworth Trail.
- Kirklees Council, Stretch Gate, Shepley bridleway between villages past railway station so semi-urban previously patches of tarmac, mud and gravel (Flexipave). Also on footpaths for several years.
- North East Lincolnshire Council, Bottesford Beck bridleway, south Scunthorpe
- North Yorkshire/North York Moors National Park, Scarborough 'cinder track'
- Warrington, Trans Pennine Trail
- Central Bedfordshire, Biggleswade bridleway
- Central Bedfordshire, bridleway next to Centre Parcs site

- South Shields, Lissard Lane

In addition to public rights of way, Flexipave is now specified for use on multi-user trails across Scotland where a bound surface is required, by the Jockey Club on horse routes to gallops and within racecourses, and by the Ministry of Defence at Hyde Park barracks. (Similar products are available.)

All existing sites are, so far as we are aware, standing the test of time and use. Maintenance has been minimal even on the Barnsley site which has now been in heavy use for fifteen years. Satisfaction of users and councils has been high.

Answers to common concerns

For Flexipave (similar products are available):

- Repair kits are available for patches (e.g. from access to services) or to repair the surface, though latter rarely required.
- Its environmental impact is low with no leachate or pollution and has been approved and used on sites with environmental constraints such as Sites of Special Scientific Interest and scheduled monuments, and adjacent to watercourses.
- While there are not as many contractors able to provide it as tarmac, there are plenty of approved installers.
- Its lifespan in England has been shown to be more than fifteen years with no maintenance on a high impact site. Sites in America have longer history and still in use with minimal maintenance.
- If end of life (not yet known what this will be but more than fifteen years) it can be overlaid with a new layer.
- It is not ideal on routes used with heavier or turning motor vehicles because their tyres can 'lift' or scuff the rubbercrumb-grit, however, it can be laid between strips of tarmac or other material to provide for vehicles on the wheel strips and equestrians on the rubbercrumb-grit, or used to fill geocell products which would give strength for occasional vehicle use. Occasional use with light vehicles is not an issue providing they are started, stopped and turned with care.

Research on use of rubber-aggregate

A dissertation from a post-graduate civil engineer, [Evaluation of the Properties of Rubber-Aggregate Pavements for Use in Multi-User Path and Tracks](#)² makes the argument for use of bound rubber-aggregate on the basis of many factors, including cost. Independent reports from another engineer to the Society indicate that the study was performed well and is of high value.

Definitions

The Society defines **multi-user as including riding, driving or leading a horse**, on a pedal cycle, on foot, with a wheelchair or other mobility aid, or pushchair.

Equestrians are legitimate users of roads, just as cyclists and pedestrians, but are commonly forgotten. **Horse riders and carriage-drivers are vulnerable road users.**

'Active travel' is interpreted as active commuting, aiming to encourage people to walk or cycle instead of using motor vehicles, although 'active travel' routes are also promoted for exercise and recreation, even when equestrians are excluded on the basis that their use is only recreational. While equestrians are unlikely to commute by horse, they do undertake short utility journeys on or driving a horse and would likely do more if there were safer routes. Riding a horse is very active; claims that only the horse is active are false, a rider uses significant energy to balance and move with a horse.

Unfortunately, definitions used by other organisations (there is no legal definition) usually fail to include equestrians.

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² Samuel James Mullaney, School of Civil Engineering, Individual Research Project Dissertation submitted in partial fulfilment of the requirements for the degree of MEng in Civil and Environmental Engineering May 2019