

Flat pedals

The latest flats are more stable and efficient than ever before, but what's the pick of the new designs?

Words & photos: Mick Kirkman

Over the last few years, we've seen trends change in everything from wheel size to fork construction and flat pedals are no different — they've shifted towards lower platform heights with bigger surface areas. The theory is that a bigger platform offers greater stability, while a thinner profile increases ground clearance while eliminating the top and bottom pedalling dead-spots you get on thicker, BMX-style designs.

Slim, wider pedal bodies are now commonplace, and over the past few months we've put some of the best modern flats through their paces.

It's been widely documented that platform pedals can offer the best way to learn correct technique in mountain biking. Thanks to the direct (rather than 'floating' clipless) connection between shoe and pedal, you can use the pressure to lean and control the bike, and to generate grip and momentum.

There are a few downsides to this design too — you're not joined to the bike, so it can still bounce around all over the place, and flats are also less efficient when climbing, but whether you're a total beginner or on old hand, it's never too late to see if the humble flat pedal can change your ride.

USED AND ABUSED

How we test

As well as rotating pedals between bikes during recent bike tests, each flat pedal in this group test witnessed action over the winter months to help assess durability. We took the repetitive strain of constantly switching between 12 sets, and after swapping, repositioning and removing pins to achieve the best grip levels, the pedals were then ridden back-to-back down on a variety of tracks and trails to assess their relative functionality and performance.

JARGON BUSTER

Know your flat pedal

PLATFORM SHAPE

A slimmer platform has become a priority in modern flat pedal design. Riders and engineers have noted a huge range of benefits, including improved ground clearance, reduced rider centre of gravity, resistance to flipping, and improved efficiency by spinning closer to the centre of the pedalling axis. A thinner platform can also be made wider, which increases shoe contact for more stability and control.



FOOT STANCE

The closer the pedal body sits to the crank arm, the greater the ground clearance when you're leant over and the more efficient your pedalling stroke. Using a stubby axle allows companies to position the platform further in-board, but you may occasionally experience some rubbing where your heels catch the crank arms.



PIN HEIGHT, PLACEMENT AND REMOVAL

It's inevitable that flat pedal pins will get damaged as they're in the firing line for ground strikes. Bottom-loading pins are easier to replace as the Allen heads don't get crushed or full of mud, and some designs also offer hex-bolt heads as a back-up for removal. Some pedal brands also offer a choice of traction studs, and the height, width and thickness of these pins are critical to grip and performance.



BEARINGS AND SEALS

Most mid to high-end pedals have good internal sealing, which is usually in the form of one or two rubber-lipped seals or O-rings to prevent water or grit getting into the axle/bearing interface. Replacement sealed bearings and bushes should be readily available for most modern pedals these days, and servicing is generally straightforward enough for competent home mechanics.

REQUIRED STIFFNESS

As a direct link between you and the bike, a flat pedal needs to be as stiff as possible. With a rigid platform, minimal energy is wasted and it also allows you to feel exactly what's going on underneath you, which helps with control, balance and grip. Most of the pedals in this test are plenty stiff enough but, like most things, it's all about compromise as making a pedal wafer-thin can cause it to flex more.

AZONIC FLAT IRON

£124.99

SPECIFICATION Weight: 392g (pair) • Contact: info@trigpointsales.co.uk



Azonic has an extensive new kit line-up for 2014, with the ultra-thin Flat Iron grabbing our attention thanks to its radical forged aluminium body that's only 10mm tall. Using a stubby 4130 chromoly axle and oversized bearing (with associated hump) at the crank side means the outer platform edge can be made super-thin. Azonic claims this flatter profile brings your feet closer to the pedalling axis and increases handling and feel, as well as reducing overall weight.

The Flat Iron isn't lighter than the other pedals, but the lower platform height works well and lowers the effective BB height to add stability and control.

The inside bearing bulge looked like it might interfere with foot placement or be uncomfortable, but it wasn't much of an issue on the trail; there's just a sense of the unusual shape through the sole. Grip and feel are decent, feet don't come unstuck, and it's obvious how low your weight is when cornering.

The £125 asking price is steep and the unusual shape proved a bit of a mud magnet, but our major concern arises from the lack of a full-length axle, which causes the pedal body to flex slightly under heavy loads. It's not as bad as the Tioga, but flex is bad and the 'soft' sensation from the Flat Iron when cranking hard or landing jumps didn't inspire confidence.



BURGTEC PENTHOUSE MK IV

£99.99

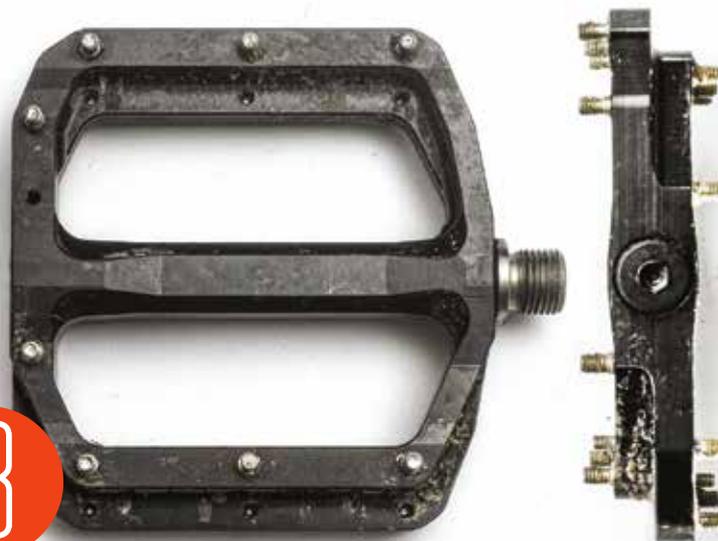
SPECIFICATION Weight: 449g (pair) • Contact: burgtec.co.uk

Over the past decade the Penthouse flat has earned near legendary status on the downhill scene. Several DH racers have landed World Cup podiums on them and now, fortunately for trail riders, Burgtec has refined the older pedal from a huge, heavy block to a much slimmer platform for 2014.

The body is still hewn from a solid aluminium billet with massive studs on this latest Mark IV version but, crucially, the weight is now competitive at under 450g. With its 16mm thickness and 1mm of concavity, the pedal has an excellent platform, and a new double bush and single bearing internal layout means it should cope with years of abuse.

Tons of grip from eight aggressive bottom-loading pins means shifting around in a sticky-soled shoe isn't an option. The Penthouse also quickly mashes up the soles on your shoes and there were a few more instances of crashing pedals against shins as the taller pins encourage the pedal to flip over.

Burgtec's proven reliability is now cheaper than ever, and if you're after the ultimate in grip, then look no further. We'd actually prefer a less locked-on feel, and if shorter studs were a stock option we'd rate this as one of the best trail-riding flat pedals around.



DMR VAULT

£99.99

SPECIFICATION Weight: 423g (pair) • Contact: dmrbikes.com



TEST
WINNER!
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Machined from an extruded piece of aluminium, the DMR Vault spins on a steel axle, with a sealed bearing at the outside and a DU bushing closer to the crank arm. Having used many pairs over the years, we've found them hugely reliable.

The platform is larger than most and it's also slightly more concave, but it does sit in close to the crank arm, keeping your stance efficient for pedalling. A neat touch is that grip level is tuneable — the flip-flop pins can be inserted from the top or bottom for a longer or stubbier traction stud. They are also easy to replace, coming with both Allen heads and a hex bolt fitment.

With cutaway corners, leading platform edges offer more clearance to trail obstacles, but the best trait is that the roomy surface area affords close to perfect grip levels with the thinner studs. Shoes feel well planted, but are still adjustable enough to reposition if needed. The 17mm platform doesn't offer the height reduction of some here, but all testers agreed that feel underfoot is class-leading in all conditions.

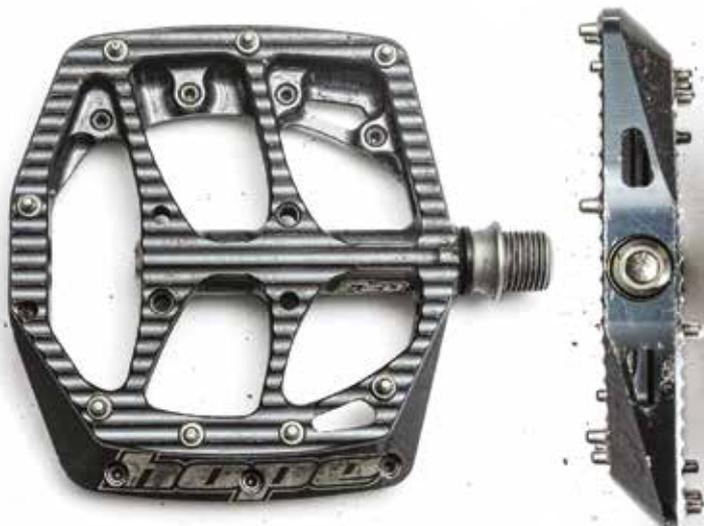
There are cheaper pedals, but the Vault's platform profile is impeccable and very durable. Our only criticism is their weight and the way that the outer edges stick out more than some rivals, which could lead to more ground strikes when leant over.



HOPE F20

£119.99

SPECIFICATION Weight: 383g (pair) • Contact: hopetech.com



This beautifully finished, knurled F20 platform is Hope's first flat pedal, and typically for the northern brand, has proven tough enough to withstand a wet winter of riding with no signs of play or ingress. To aid this reliability, each heat-treated chromoly steel axle spins inside a trio of cartridge bearings and a Norglide bushing protected by a combination of two seals at the crank end and rubber O-ring and end cap at the outside edge.

The machined surface features an anti-slipping 'ripple' design, but we couldn't notice any benefit. Hope also offers 10 forged steel pins per side, but they aren't particularly tall and have rounded tops rather than sharper edges or exposed threads as on most flat pedals. This, together with the near-flat body, means that grip is lacking. We removed the centre studs looking to create extra concavity and a more planted feel, but we still found that when descending on rough ground or winching up technical, muddy climbs, our shoes just didn't feel sufficiently locked in.

If Hope was to offer a deeper platform and bigger or sharper pins as standard, the durable, nicely sized F20 could be a real contender. As it stands, there's a lack of bite which is out of kilter with the rest of the Hope's design philosophy.



LOADED COMPONENTS AMX SIGNATURE

£89.99

SPECIFICATION Weight: 374g (pair) • Contact: freeborn.co.uk

We haven't seen much kit from Loaded Components in the past, and we ordered this flat pedal based on its picture, but it turned out to be the test's surprise performer. The US-designed pedal offers up a healthy balance of a mega-wide body and low ride height, combined in an easy-turning, lightweight package.

Even with a full-width axle design, the 12.9mm-tall platform is one of the lowest here and has a very open, UK-friendly design that gives good mud-shedding ability. We found the bottom-loading 'backdoor' traction studs and very slightly concave design strikes a balance between having enough grip to never worry about your shoes moving or bouncing, and the ability to reposition the feet after a foot-off berm or dab.

Inside the chassis, a steel axle spins on six sealed bearings per pedal, with the inside edge of the platform sitting tight into the crank arm to place less leverage force on the inside edge bearings. This also produces a narrower width or 'Q-factor', which makes for better pedalling efficiency. Since the pedals are still spinning straight and true after a tough winter, there's little to gripe about, meaning the Loaded Components AMX is one of the best new-school flats on the market. Available in seven colours, Loaded also sells replacement anodised pins that shed a few extra grams.



NUKEPROOF ELECTRON

£34.99

SPECIFICATION Weight: 349g (pair) • Contact: nukeproof.com

This composite-bodied flat pedal is by far the cheapest on test, but we've seen Alpine guides run these nylon-reinforced platforms for multiple seasons with zero issues. Being lightweight, they're easy to turn over while cranking.

Nukeproof's platform height is competitively low-profile, but a raised central ridge sits proud of the front and rear edges, where the body wraps around a chromoly steel axle. This convex shaping means you can feel the middle bump through the sole, and the foot's toes and arches get a little claw-like wrapped around the top of the pedal for a marginally more uncomfortable and tiring ride.

For traction, two inboard studs are integrated and moulded into the pedal body, with six extra removable steel pins around the outside edges. While most pedals offer more studs, the Electron is still plenty grippy as the pins are sharp and pointy enough to dig into shoes ruthlessly. There's way more bite than you'd imagine, but watch your shins as these thinner pins can easily puncture flesh.

The Electron is fantastic value, and tough enough to handle the abuse of aggressive riding, but it could be better if the body shape was a bit flatter or even slightly concave.



RACE FACE AEEFFECT

£99.95

SPECIFICATION Weight: 358g (pair) • Contact: silverfish-uk.com

There are two designs in Race Face's new flat pedal line, a huge Atlas geared to pure gravity riding and the smaller-bodied Aeffect for trail riding. Being smaller, the Aeffect offers more ground clearance, but the £40 more expensive Atlas uses a more sophisticated bearing design and weighs less, despite its larger body.

Even with smaller platforms than the majority of latest-generation designs, the slightly concave and thin Aeffect provides excellent overall grip and feel, and would make perfect sense for riders with smaller feet. Foot retention is by way of 10 thin, sharp pins per side, which offer a good level of security, and there's just enough freedom to shuffle feet, if needed. The body shape is very open, which makes sense in muddy weather conditions to resist clogging with heavy dirt.

At 358g, the Aeffect is one of the lightest here, thanks to a weight-saving stubby axle with external end caps. It's the only pedal here to offer a useful grease port design, where riders can keep internals running smoothly by flushing grease through the DU bushes and cartridge-bearing internals. This Aeffect isn't cheap, but looks classy, is reasonably low-profile with its 17mm thick platform, and recommended if you're after a smaller design.

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SHIMANO SAINT PD-MX80

£59.99

SPECIFICATION Weight: 494g (pair) • Contact: madison.co.uk

This Saint pedal is part of the third generation of Shimano's highest quality gravity-orientated groupset. Slimmer and wider than the older DX model, the new Saint flat uses a set of 12 loose 3/32in ball bearings at each end, inside a Lock bolt sleeve wrapped round a tapered steel spindle. The heat-treated axle will be familiar to Shimano pedal users, and we found bearing seals here to be just as reliable and maintenance free as on SPDs.

Despite a larger-sized platform than its predecessor, the part that the shoe rests on is still quite small and deeply dished from the outside in, which wasn't to everyone's taste. For maximum bite, you'll need to remove the small washers from underneath the bottom loading pins too (a faff which takes around 20 minutes) as the pedal isn't grippy enough with the shorter stud length.

The outer edge of the Saint platform sits slightly proud of the inboard side, and this, together with the raised inner axle bearing housing, makes the pedal feel a tad lumpy — even wearing Shimano's matching AM41 flat pedal shoes. The price is great, but the pedal is too heavy for all-day pedalling and has a wide Q-factor, which isn't the most efficient. Shimano needs to nail the feel of the platform to create a real winner.

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SPANK SPIKE

£109.99

SPECIFICATION Weight: 438g (pair) • Contact: hotlines-uk.com

You can see from the condition of the Spike that it became something of a go-to product during testing. The wide platform has a flat profile, which could provide a little less secure grip, but Spank has carefully positioned the traction pins and set them at the perfect height to create a great cradle for shoes that feels comfortable and planted. Impressively slip-free and secure, it still leaves you with the ability to adjust or shuffle your shoes a touch if you need to.

The cold-forged body is just 12mm tall and, together with the scandium-enriched steel axle, is designed for DH abuse, with a less-than-chunky 438g on the scales. An outboard IGUS plastic bushing at the end of the hollow taper axle and an oversized sealed bearing sitting tight and flush to the crank arm means reduced leverage forces on the inner bearing casement. This keeps pedals closer together for a reduced width between the hips and more comfortable pedalling.

Chamfered platform edges are designed to offer better ground clearance and glance off rocks and obstacles, but our sample still took a fair few hits, which might go some way to explaining why the bearings seized up and died after just a couple of months of testing. Spank assured us this was unheard of, suggesting a rogue quality bearing might be to blame, but it also happened on the first set of Spikes we tested three years ago. A new replacement set has been running issue-free, but the score reflects a possible weakness.

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SUPERSTAR DELTA

£55

SPECIFICATION Weight: 404g (pair) • Contact: superstar.tibolts.co.uk

We're huge fans of Superstar's top-scoring Nano Tech pedal, so the Delta has a lot to live up to. This new platform is a thinner, lighter design, and although it's unique to Superstar, it's only £18 more expensive than the bargain Nano Tech.

The aerospace-grade aluminium platform has bottom-loading steel pins for easy damage replacement, and a medium-sized 96mm wide/106mm long platform. The slimline body is noticeably thinner than most here even with its full-width steel axle, which spins on three small tritium-sealed bearings and a sintered split bushing in each pedal. You can replace the steel axle with a £20 more expensive titanium version for a significant 60g weight saving.

At the crank edge of the Delta, a small lump on the inboard bearing housing had us worried that we'd be able to feel it in the sole/ball of the foot area. This issue has been a huge deal breaker before in slim pedals with similar design principles, but, thankfully, nobody found any problems out on the trail.

Grip and security are plentiful, although there's the slight sense that feet aren't quite as planted and comfy as on those benchmark Nano Techs. The reduced height, clearance and stability are noticeable though, and the newer pedal is less likely to flip over than the old one.



TIOGA MT-ZERO

£79.99

SPECIFICATION Weight: 528g (pair) • Contact: extrauk.co.uk

These radical MT-Zero platforms take the low-profile flat pedal to the extreme. In the quest for ultimate stability, clearance and perfect pedalling, rather than try and accommodate a shorter axle or use a tapered one, Tioga has foregone a spindle across the pedal body, and relies instead on a chromoly platform threaded into a massive external bearing at the crank arm.

As a result, the MT-Zero is the thinnest standard-fitting pedal on the market, with the concave body measuring 7mm on the outside edge and a wafer-thin 4mm in the centre. Tioga had to make the platform from investment cast steel to be tough enough for mountain biking, but we had some significant issues with this steel plate, as well as other Tioga design principles.

Put simply, the pedal platform flexes downward when cranking hard or climbing stood up. More worrying, though, is how easily it bends toward the ground through berms or landing jumps. This was so bad on one trail centre red route that we only managed one lap before retiring. And if that wasn't enough, the external Zero axle bearings force your feet out into a very wide, uncomfortable stance, making the pedal awkward for balance and uncomfortable for pedalling.



WELLGO MG-1

£44.99

SPECIFICATION Weight: 377g (pair) • Contact: i-ride.co.uk

As the only pedal here made from magnesium (rather than heavier aluminium) the Wellgo is impressively light for the money and pedals well due to a noticeably low turnover bulk. Despite the bargain price, the bearings and steel axle are reliably high quality. We've run this version silently for years with zero maintenance, and if you fancy saving even more weight, there's also a titanium axle option that's retro-fittable to the MG-1 chassis.

Although magnesium is a great material for a flat pedal in most circumstances, the fact that the metal is relatively soft means it is easy to gouge and scrape large chunks (or the top-threaded pins) out of the pedals if they connect with the ground. It's also more likely to break, which is something to bear in mind if you're keen on hammering rocky trails on a DH bike.

Since the Wellgo design has been around for years, the platform shape is a little old fashioned in comparison to modern flats. Feet feel secure enough thanks to the concave platform, but the smaller surface area is slightly too deep and less sure underfoot in wet and muddy conditions than some of the bigger pedals here. The taller platform also reduces bike feel and will be easier to flip over when catching an edge.



Verdict

Flat pedals are all about confidence and feel – they offer the freedom to take your feet off if needed, but the best designs also keep you planted in the platform's sweet spot whatever the trail is doing beneath you.

The Holy Grail is an ultra-slim platform that's durable and stiff enough for prolonged use, but after years of attempts from multiple brands, nobody has yet cracked a way to accommodate a durable axle and bearing into a wafer-thin pedal.

Azonic and Tioga have to be applauded for making some of the thinnest pedals ever, but they're just a little too flexible to be regularly used for proper riding.

Several of the designs here really impressed us, namely Burgtec's rock-solid Penthouse MK IVs, the light and slim Loaded Comp AMX and Superstar's new, reduced-height Delta pedals. Some weigh slightly less than DMR's Vault, and some offer more ground clearance... but the verdict is unanimous.

The Vault offers massive amounts of grip, with a slight concavity that perfectly cradles your feet, and the axles and bearings have proven time and again that they can deal with prolonged periods of abuse. The overall standard of flat pedals is getting higher and higher, but there's still nothing out there able to beat the DMR Vault.



DMR's Vault is the king of trail punishment



	Azonic Flat Iron	Burgtec Penthouse MK IV	DMR Vault	Hope F20	Loaded Comp AMX Signature	Nukeproof Electron	Race Face Aeffect	Shimano Saint PD-MX80	Spank Spike	Superstar Delta	Tioga MT-Zero	Wellgo MG-1
Price	£124.99	£99.99	£99.99	£119.99	£89.99	£34.99	£99.95	£59.99	£109.99	£55	£79.99	£44.99
Weight	392g	449g	423g	383g	374g	349g	358g	494g	438g	404g	528g	377g
Pins (per side)	8	8	11	10	10	8	10	9	9	10	7	9
Thickness	10mm	16mm	17mm	15mm	12.9mm	17.5mm	17mm	20mm	12mm	14mm	4mm	23mm
Contact	info@trigpointsales.co.uk	burgtec.co.uk	dmbikes.com	hopetech.com	freeborn.co.uk	nukeproof.com	silverfish-uk.com	madison.co.uk	hotlines-uk.com	superstar.tibolts.co.uk	extrauk.co.uk	i-ride.co.uk
Rating	6	8	10	6	9	7	8	6	7	9	2	7