

**ALTHOUGH THE CAR** industry has often developed innovative suspension techniques for the products that end up in their dealers' showrooms – think of Citroën's hydropneumatic or British Leyland's hydroelastic systems – the same can hardly be said of bike manufacturers.

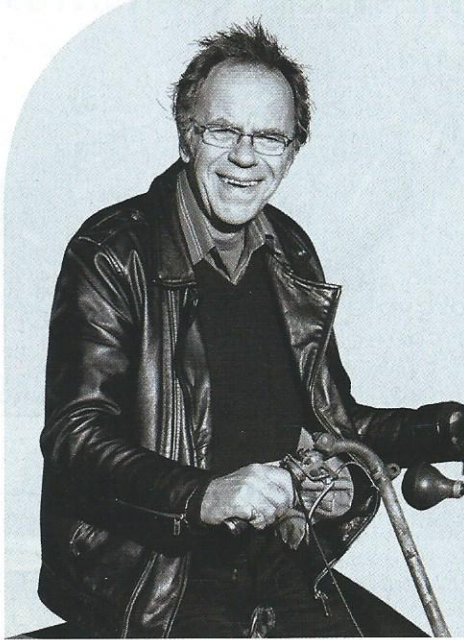
Girder forks gave way to telescopic ones in the 1940s, which were refined a bit with the advent of alloy sliders in the 1960s, and a vogue for 'Earles-type' forks featuring a brace of shock absorbers suspending a sort of front-facing swinging arm was employed by BMW, Greeves and others, albeit adding chassis weight. However, upside-down forks did, to an extent, compensate for the inherent floppiness of telescopic forks when they emerged in the 1990s, but they also piled on the pounds.

And at the rear end, twin shocks followed by mono shocks on a pivoting 'fork' have been the norm for decades, but these set-ups have a number of inherent drawbacks, the most obvious being that as the suspensions compress and expand, the chassis geometry, and thus the vehicle's handling characteristics, change.

As riders we tend to compensate for these changes with subconscious acuity, but over time a number of specialist designers have addressed the issue with weird-looking suspensions that drew accusations of eccentricity, which, in turn, mitigated against their mass production. For example, the hub-centre steered designs of Jack DeFazio, Tony Foale and Bimota, and the Saxon/MoTodd contraption that ultimately appeared as the BMW's Telelever front fork. The latter essentially involved a front swinging arm that had the effect of increasing the rake and trail during braking, instead of doing the opposite. But even if they worked, almost all these appurtenances added weight and complexity – further undermining their commercial appeal.

Step forward then Scottish-born Norman Hossack, a fascinating character who, as a clubman racer of some merit growing up in Rhodesia, was hired by the McLaren motor racing team in the early 1970s as a chassis builder and mechanic – after turning down a similar role with Barry Sheene! During his time at McLaren, Hossack built a radical and highly efficient two-stroke engine using what was essentially a square piston, but sadly space doesn't permit further discussion of that here. More pertinently though, he observed that under hard braking the steered front ends of racing cars juddered significantly, diminishing driver control and braking efficiency. His solution was to stiffen the bulkheads that held the suspension units. As a motorcyclist, Hossack set about solving the same problems inherent in motorcycle suspensions by applying the common racing car practice of two wishbones held on a common upright, abetted by a steering linkage.

In Hossack's cunning design the axle rotates through 90° and is over-hung, the consequences being that the steering head and trail angles



## MARK WILLIAMS

### Steady as he goes

*A salute to Stormin' Norman Hossack, and his never changing steering geometry*

could remain constant, as would the wheelbase – something those of us long used to plunging front ends under hard braking might well find unsettling – at least initially. Moreover, a single shock absorber can be placed behind or in front of the steering head and the manipulating of these components permits levels of anti-dive to suit different demands.

Hossack's design also had significant weight saving benefits at the front end and indeed overall, his trellis-framed 1979 Honda XL500-engined prototype weighed some 60lbs less than the stock production bike! However, despite these advantages the financial strain of maintaining his patents obliged Hossack to abandon further development, which allowed BMW to pretty much resurrect it as its Duolever in 2004. Despite a smattering of interest in the motorcycle press (including from yours truly) in the early Eighties, Hossack sold his by then highly competitive racer to Vernon Glashier, who promptly won the 1983 Bemsee Single Cylinder Championship on it. Glashier subsequently accomplished the same in the 1986, '87 and '88 250cc series aboard a version of the bike powered by a Rotax two-stroke.

Meanwhile, the designs deployed by Jack DeFazio, the engineers at ELF petroleum for their 'frameless' racer and Yamaha with their FZ750-based RADD MC2 (and later their

GTS1000) used differing hub-centre designs – which, by the way, first appeared in the 1923 Ner-a-Car – that were all ultimately flawed, not least due to added frontal weight.

Using Ducati, Laverda and Suzuki motors, Hossack continued to build bespoke racing frames featuring his suspension and in 1994 F1 entrepreneur Keith Duckworth commissioned Hossack to design a Triumph 900 Trident chassis, which worked especially well, but it never went further than a single prototype. Perhaps by then disenchanted, Hossack applied his inventive genius to packaging machines and medical equipment, eventually moving to California where his affection for Ducatis – a Bolognese 250cc single was his first-ever race bike – led him to build one of his suspensions for his daily driver, a Ducati 800 Sport. Mated to the company's signature trellis frame, it looks as good as it performs, and with a total weight saving of some 15lbs.

On this side of the Atlantic, designer Claude Fior is credited with penning a very Hossack-like double wishbone front suspension for the reborn Brough-Superiors now being built in France for a stinking rich clientele, and Spanish custom house El Soliatrío produced a TM-engined street-tracker for last year's DirtQuake festival sporting a very Hossack-ish front end. Now we have sneak pics of Honda's next generation Goldwing with front suspension that looks suspiciously similar to Hossack's. So nearly five decades after its debut, does this mean Norman Hossack's innovative thinking will finally find its way onto a production line? We can only wait and see. **CBC**

*'In Hossack's cunning design the axle rotates through 90° and is over-hung, the consequences being that the steering head and trail angles could remain constant, as would the wheelbase...'*

#### WHO IS MARK WILLIAMS?

Williams is a serial motorbike magazine junkie, having published, launched and edited *Bike*, *Which Bike?* and *Motorcycle International* among others. This means he's tested, ridden and even owned more bikes than is probably good for him