

A Twin Too Late?

Benelli's 650cc Tornado was meant to challenge the British twins. ALAN CATHCART rode one

Photos: Kel Edge & AC Archives



As a British fan of Italian bikes, I guess it was inevitable that I'd end up owning a Tornado 650, that bipolar Benelli twin which, 50 years ago, represented a Latin lesson to Britain's best in how to make a 650 twin fit for modern times.

So back in 1985 I bought one of the last such bikes ever made, a 1973 Tornado 650 S2, ironically enough from British Laverda guru Tim Parker, who was emigrating to the USA. I guess he'd had the Benelli as a way of reminding himself how technically superior the bikes from Breganze were, at least versus Benelli's first postwar attempt at building anything bigger than 250cc – whereas in my case, after a decade of racing desmo Ducatis, I wanted something completely different for my occasional rides on public roads.

In the 30 years of ownership before I finally sold it to a friend, the Tornado became part of the family, and while I can't say I clocked up a huge mileage on it, it was always there for a spirited Sunday morning ride around the Warwickshire lanes and Cotswold hills, or a summer evening blast out to a riverside pub. Living in the heart of England meant I'd often meet up with ex-employees of Norton, BSA and Triumph, who'd be fascinated to see a bike they'd only ever read about in magazines, and that so closely resembled the thousands of twins they'd helped build over the years.

It wasn't until autumn 2020 when I spent an enjoyable 120-mile day riding round Eastern Pennsylvania with Retro Tours (www.retro tours.com) on their 1972 Benelli 650 S, that I realised



how much I missed my occasional Tornado trips. Hopping aboard revealed a different riding position on this US model, with a more upright, relatively close-coupled stance thanks to the taller, pulled-back handlebar compared to the sportier, flatter one on the Euro-spec S2. But there's the same idiotic place for the ignition key, in the side panel behind your right leg, so you have to feel behind you to click it on, then thumb the button to get the Benelli's short-stroke motor to burst into life through the musically resonant Lafranconi exhausts, then settle to a 1500rpm idle most unlike a parallel-twin's usual dull thud. Well, the factory it came from was just around the corner from Gioachino Rossini's house in Pesaro where he composed his opera *The Barber of Seville*...



Left: Torque spread and lack of vibration impressed Sir Alan
Above: Not svelte looking, but certainly ready for the road

Sweet & Smooth

The earliest Tornados apparently vibrated much more than the S-versions, and I never found the S2 or this one to tingle anything like as much as a Norton Atlas or even a Bonneville. That's presumably thanks to the copious rubber mounts – what the Italians call 'silentbloc' – and the balance weights in the handlebar ends. The Retro Tours Tornado shook a bit at rest, but once I'd selected bottom gear on the clean-shifting right-foot gearshift, and successfully paid out the ultra-fast action clutch without stalling, it smoothed right out once under way.

Only if you rev the twin right out to anywhere near the 7200rpm redline does it start to vibrate unduly, but although the short-stroke motor asks you to do that, shifting up at 5500 revs sees it running sweet and smooth as you hit a higher gear right in the fat part of the torque curve. At 3500rpm it's good for 60mph, and 80mph has the engine running at just 5000, ready to go the distance. Tornados feel pretty long-legged, the only discomfort coming from the super-hard seat on this bike, which had been re-foamed and re-covered by Sargent's of Florida, evidently over-enthusiastically – my S2's racy-looking seat was much more welcoming.

There's a huge gap between the ultra-low bottom gear and second on the Tornado's five-speed gearbox, then the middle three ratios are close together before another big space to fifth, which feels like an overdrive. The four light flywheels have the short-stroke motor picking up revs super responsively, though the biggest surprise is the huge amount of torque on tap from such a short-stroke engine, and not only in tight, twisty stretches. The Tornado surges forward when you open the throttle, and top gear roll-on is excellent from anywhere above 3000rpm, though you must keep it running above that under load, else it'll protest by detonating.

Neutral is easy to find, by the way, so this is a congenial bike to ride in town, where the short 1380mm wheelbase and what seems like a not excessive undisclosed fork rake, coupled with the adequately light clutch operation, make the Benelli quite rideable at low speeds in traffic. Despite the fairly hefty 209kg dry weight, it feels well balanced and quite low-slung on its



Left: If on sale in 1968, it would have given BSA/Triumph something to think about
Left: Disc brakes?

No thanks. Grimeca four-leading shoe drum was the front stopper

Below: Simple clocks and warning lights – note massive starter button!

18-inch wheels, thanks to the engine's compact build, which allowed chassis designer Luigi Benelli to deliver a low cee of gee versus other 650/750 parallel-twins, as well as an ideal 810mm seat height.

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Such light urban steering might have a downside in high-speed instability, but that's absolutely not the case with the Tornado – Luigi Benelli had never designed a frame for a bike this heavy or powerful before, but you'd never guess that from the way it steers. Though the Marzocchi fork does a decent job of ironing out bumps, it gives very little feedback from the front tyre, so there's a slightly dead feeling from the steering, though it's super precise at high speeds, despite the short wheelbase. Stability is absolute – you really do get the best of both worlds from the Tornado, and I can quite see how Chas Mortimer found the Benelli so effective a ride on the Imola circuit's fast, sweeping turns, in its days before chicanes.

The only disappointment on my Retro Tours ride was the very stiff action of the meaty-looking 240mm 4LS Grimeca front brake, which to make matters worse didn't give so much stopping power even after I'd used the brake lever as a grip exerciser for my right hand. Sorry, this isn't right, 'cos I know from my old S2 that this is one of the best front drum brakes ever fitted to a series production motorcycle. OK, it's heavier than a (four times more costly) 250mm 4LS Fontana, the ne plus ultra of drum brakes – but in effectiveness it should be right up there. Benelli got a lot of stick back then for not fitting disc brakes once Tornado production finally commenced, invariably from people who'd never compared those frequently ineffective early discs with a big, properly set up drum brake, like this one could be. Still, there's good engine braking from that 360° parallel-twin motor, without you having to fan the clutch lever to stop the rear wheel chattering under extreme reverse loads.

One of the things I enjoyed most in my 30 years of Tornado ownership was letting other people ride this torquey, eager-revving, stable-handling and above all oil-tight bike, then clocking their reaction on their return. With only 3000 such bikes made, and half of them sold new in Italy, Tornados are few and



far between, so very much a sleeper of a bike that few people get to experience. Because it came late to market (see below), people have generally scorned the drum-braked OHV Benelli 650 – I mean, it's not even a 700! – as a neo-vintage model that missed the boat. Well, commercially speaking I guess it did – but that's not to say that the Tornado wasn't the right bike at the wrong time. The bipolar Bicilindrica was better than comparable British OHV twins, but arrived in dealer showrooms too late. It was an excellent motorcycle that did indeed show British manufacturers what they should have evolved their own parallel-twins into, but didn't. Pity on them.

The Tornado Story

The Benelli Tornado, built from 1970-74, represented the Italian idea of what a traditional British parallel-twin should have been. Trouble was, the launch of Honda's CB750 in 1969 left the bike still fighting yesterday's turf war of Italy vs Britain, not the future global conflict of Japan vs The Rest.

Its roots really lay in the USA, where Benelli had been doing good business in the 1960s with its sub-250cc bikes, but was now crying out for something beefier. "We and our dealers had many customers who'd learned to ride on our small Benelli models, but now wanted something bigger," recalled Larry Wise, eldest brother of the Wise family, Benelli's US importer. "We had nothing to offer them. Something Italian to compete with the Honda CB77 Super Hawk was what we needed – that, and a 650 twin to go against the British, especially BSA and Triumph."

In December 1966 technical chief Luigi Benelli was asked to design a 650cc parallel-twin, after Luigi Benelli saw the prototype Laverda 650 at London's November 1966 Earls Court Show, and decided this was what Benelli needed, too.

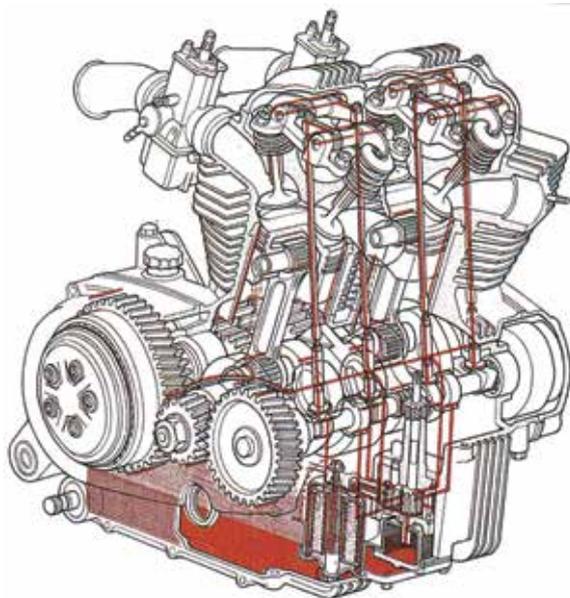
The Tornado 650 duly appeared at the Milan Show, November 1967, although at this stage the engine was still only a wooden mock-up. The details revealed that it was targeted at British twins, rather than the rival SOHC Laverda, which was so clearly inspired by Honda's CB77. Still, the wet-sump all-aluminium Benelli motor was a far more rational and modern design than anything yet made with a Union Jack on the tank. It had a horizontally-split crankcase to ensure oil-tightness and unit-construction five-speed gearbox with an oil-bath clutch and gear primary drive. The lightly finned cylinders were slanted forward slightly by 12°, with a four-bearing Brit-style 360° steel crank and radically oversquare engine dimensions for the day of 84x58mm, giving 643cc.

Two valves per cylinder were set at a thoroughly modern included angle of 58 degrees, operated via tappets and rocker arms by short steel pushrods driven by a single camshaft positioned low down in front of the crankshaft, as on a Norton Commando. Running a 9:1 compression with its twin 29mm Dell'Orto carbs (with curious square slides) the engine made

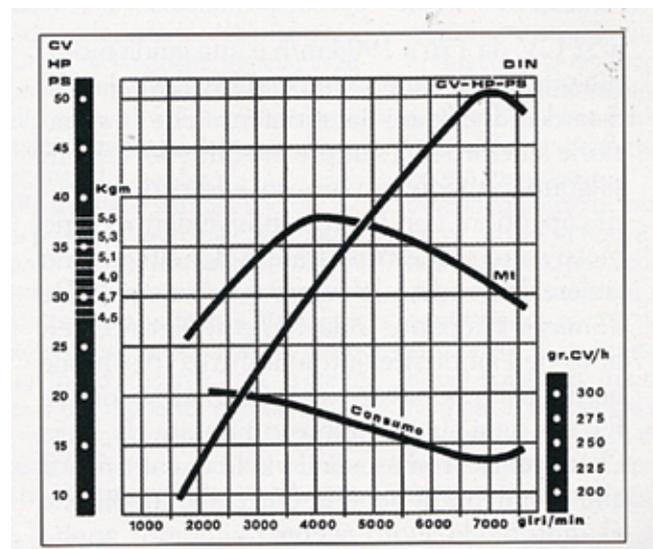


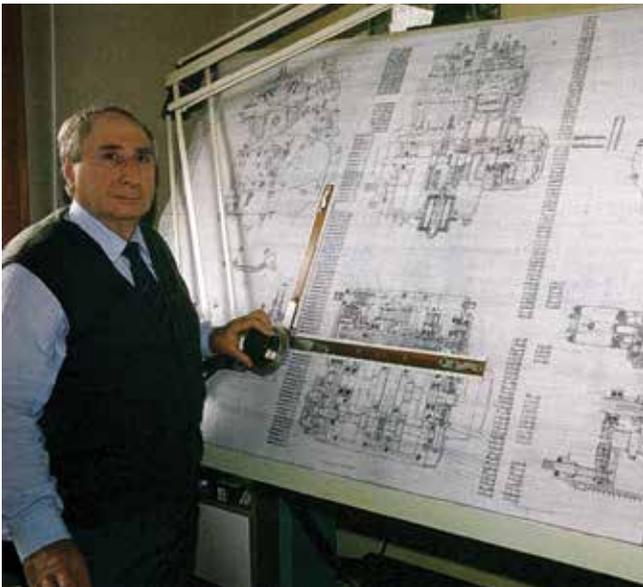
Above: With British competitor 736cc Rickman Enfield
Left: Short-stroke ohv twin was one Italian take on what British twins should have become

50bhp at 7400rpm at the rear wheel. A very clean-looking motor, it had all-internal oilways to avoid messy-looking external hoses, with a substantial single-stage oil pump driven directly off the camshaft, and a cartridge oil filter. All in all, Prampolini's compact, rational engine design may lay valid claim to being the ultimate expression of British twin-cylinder technology, but made in Italy. It was housed in a twin-loop cradle frame with a 35mm Marzocchi fork and either Ceriani or Marzocchi dual shocks. Electric start was a later option and there were drum brakes at both ends.



Left: Tornado 650S oil lubrication system in red
Right: 1971 Tornado 650S dyno chart

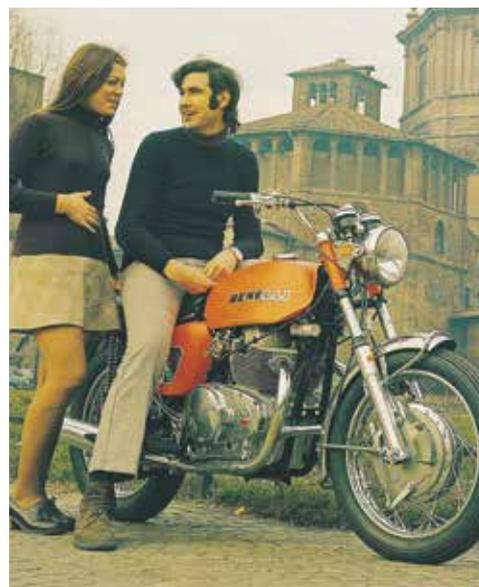




Far left:
Designer Piero Prampolini at his drawing board

Left: 1970 PR photo

Below: Short 1380mm wheelbase and lowish seat made the Tornado easy to handle



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The Tornado attracted much favourable comment on its public debut in November 1967, while factory testers clocked up the miles with few reported problems, apart from substantial vibration above 4000rpm – then considered all part of life's rich passion on a fast bike. Steve McQueen was hired by the Wises as a celebrity marque ambassador for Benelli, but before committing to this he insisted on riding the Tornado himself first. So after completing Bullitt in San Francisco, McQueen flew to the Benelli factory to ride a prototype. He liked it, but being an avid fan of the Rickman brothers' Métisse frames, he wanted a narrower, tighter-looking chassis with a more compact fuel tank. The factory obliged, but the whole deal then seemed to die a death, and the planned promotion never happened.

The reason isn't hard to find – Benelli couldn't yet put the Tornado into production, lacking the necessary machine tools! Exactly who was responsible for this oversight is (probably deliberately) shrouded in the mists of time, but it might well have been that finances were tight, and it took more than two years for the tooling to finally be installed. The first batch of bikes built late in 1970 were air-freighted to the USA, but by then it was all too late – the ship of pushrod 650 twins had sailed.

In the meantime, Laverda had upsized its twin to a 750, Moto Guzzi had launched the V7 and BSA/Triumph the triple, while Ducati's 750 GT appeared in 1970. Worst of all, Honda's CB750 changed the rules of the game for ever. Late in 1972, having finally got the Tornado 650 into series production, the Benellis were forced to sell their company to Alejandro De Tomaso, whose plans didn't involve a neo-vintage pushrod twin, as he saw the Tornado 650.

Sales got off to a reasonable start in Italy, at 613 bikes in 1971, but way behind the Laverda and Honda 750s (both over 1900 sold). For 1972 Prampolini produced the improved 650 S, with electric start, higher compression, different gear ratios and a rebalanced crank to reduce vibration. The result was a slight increase in outright performance and a much broader and more fluid power delivery, plus an even better spread of torque than before. Sales almost doubled in Italy as a result, and began to ramp up in the USA. But de Tomaso's revival plan for Benelli didn't include the Tornado. Instead, he instructed Prampolini to acquire a CB500 Honda four and copy it, the result being the

Benelli 500 Quattro (and with two extra cylinders, the 750 Sei).

The Tornado was revised again for 1973, but production dwindled to just 300 bikes in '74 and finally ended with just over 3000 examples built in total, comprising all three variants of the model. It had been a classic example of a bike that was thoroughly up-to-date when it was conceived, but lessened in appeal and profitability for each of the three years it sat on the sidelines waiting for the green light to start production. Benelli's first big bike was overtaken by events, in coming almost four years late to the marketplace owing to a mixture of inefficiency, and financial hardship. Pity – it deserved better.



SPECIFICATIONS

Engine type	Air-cooled pushrod OHV parallel-twin
Bore x stroke	84 x 58mm
Capacity	643cc
Power	50bhp @ 7400rpm (at rear wheel)
Torque	39.75ft lb @ 4000rpm
Compression ratio	9:1
Carburation	2 x 29mm Dell'Orto VHB
Transmission	5-speed, helical gear primary drive
Clutch	Multiplate oil-bath
Frame	Tubular steel duplex cradle
Front suspension	35mm Marzocchi telescopic fork
Rear suspension	Twin Ceriani shocks
Fuel tank	12.5 litres
Wheelbase	1380mm
Weight	209kg dry
Brakes:	F: 230mm Grimeca 4ls drum R: 200mm Grimeca sls drum
Tyres	F: 100/90-18 RL 4.00x18
Seat height	810mm
Top speed:	111mph