3 Dreamliner—tomorrow's motorcycle yesterday

Petrol at a discount of 25–35 per cent. A 10 per cent boost in speed and acceleration. And a refund of expenditure on riding gear. After extensive testing, that was my summary of the outstanding benefits of the comprehensive streamlining on the *Motor Cycle* Dreamliner—a five-year-old 350cc factory hack that we clad in a futuristic two-piece glass-fibre shell. Of course, the discount came from substantially more miles per gallon rather than a price cut; the performance boost from improved air penetration, not engine tuning; and the refund from the fact that special riding kit was no longer necessary.

The exhilaration of a bike and the comfort of a car is a vision that has lured more than one manufacturer into financial disaster. Red-blooded youth—the backbone of motorcycling worldwide—scorns comfort as much as it worships racy looks. No factory has yet found a long-term commercial pay-off in catering for the few who cherish the vision of a two-wheeled car.

But the prospects looked distinctly otherwise when we on *Motor Cycle* scrounged an old Bullet from Royal Enfield and collaborated with our sister journal *British Plastics* in designing and building the shell. It was late 1956 and dustbin (full frontal) fairings were all the rage in classic racing, where, for some years, they had given dramatic bonuses in speed, fuel economy and rider protection in the event of a high-speed tumble.

No one then foresaw the FIM's impending ban on dustbins for solo racing. Proprietary dustbins for roadsters were beginning to enjoy a boom on the accessory market. It seemed inevitable that the manufacturers would get in on the act and that sales would be assured by the association with racing, regardless of the practical benefits.

Certainly, with an all-weather mileage of some 30,000 a year, I would have appreciated some protection from winter's worst, provided it didn't involve the buffeting and reflected mechanical clatter that had previously choked me off handlebar screens. In pioneering spirit, we decided to fly the flag for 'tomorrow's roadster'.

Shell design was by Lawrie Watts, not only one of the country's leading technical artists but no mean aerodynamicist too. (He had already designed the streamlining for the first kneeler racing sidecars—world champion Eric Oliver's 1953 and 1954 Norton outfits.) Translating Watts's drawings into plastic beauty was the work of Richard Wood, then assistant editor of *British Plastics*.

To ensure adequate stability in side winds, Watts avoided the slab-sidedness that eventually prompted the FIM's racing ban. The front and rear halves were separate and could be quickly removed, thanks to the use of thumbscrews for the attachments and snap fasteners in the wiring harness.

Because construction techniques were primitive at the time, the gross weight was rather high—65lb including the Perspex screen, twin headlamps, rear lamp, number plates, rear subframe and all attachments. However, 20lb was shed (mudguards and stays, standard number plates, headlamp and cowl), so the net increase was 45lb.

My first acquaintance with the Dreamliner was at MIRA, for the comparative performance tests. And, confident as I was of the fuel savings I should find at high speeds, I was amazed by the low-speed benefits. Even at 30mph, where the bike and I scarcely seemed to disturb the air at all, a perceptibly smaller throttle opening was required and the gain was 23.5 per cent.

At 45mph the improvement increased to 26.5 per cent and at 60mph it leaped to 35 per cent. Yet those constant-speed checks didn't tell the whole story—for the Dreamliner could hold top gear in adverse conditions, which brought the naked Bullet down to third, so there was a twofold gain. Indeed, while there was no problem in averaging 60mpg at a constant 70mph all the way round MIRA on the Dreamliner, the naked Bullet failed to maintain that speed when faced with the 20mph headwind on part of the triangular circuit.

The story was similar in the two-way acceleration tests, where the unexpected low-speed benefit was even more remarkable because of the extra weight to be accelerated. Subjectively, any initial loss seemed to be well and truly counterbalanced by the time 60mph was reached and, naturally, the electronic timing showed that the shell paid off best upwind.

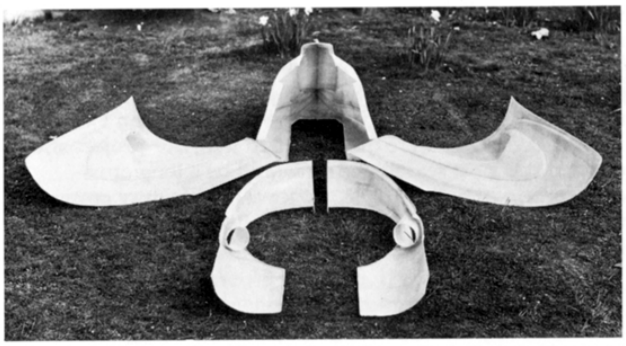
As for top speed, with me normally seated the Bullet was a good 10 per cent faster with the shell than without. Indeed, even when I adopted a racing crouch, the naked bike was not quite so quick as it was with me sitting bolt upright behind the screen. (Lying down made no difference to speed with the shell fitted.)

In racing, the fitting of a good dustbin fairing called for higher overall gearing, not only to take advantage of the reduced air resistance but also to prevent over-revving in top gear. On the Dreamliner there was nothing to be gained that way for the simple reason that the Bullet, in common with most roadsters, was overgeared in standard trim.

For everyday riding I was happy to wear just a raincoat and unlined gloves, although the weather was typical of a boisterous English autumn. On wet roads my clothes remained unsoiled. In rain, the Dreamliner protected me much better than any proprietary screen and legshields ever had. Handling was normal and on some trips my colleague Alan Baker (then technical editor) was more conscious of the wind on his naked Triumph Speed Twin than I was.

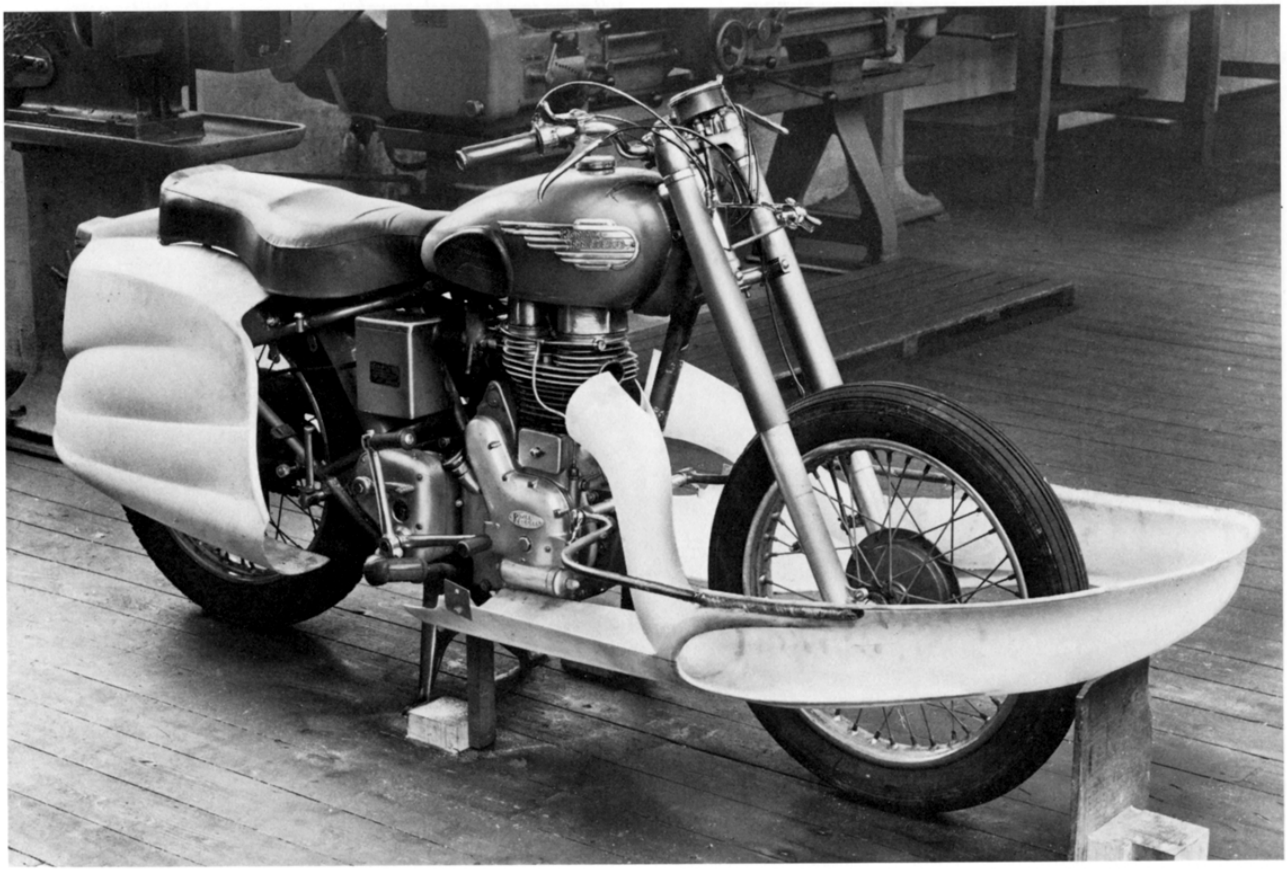
By that time we were quite chuffed with our project and I decided the most searching test would be a long cross-country trip in bad weather. An ideal opportunity cropped up when world 350cc champion Bill Lomas rang and invited me to Oulton Park, where he planned to put the

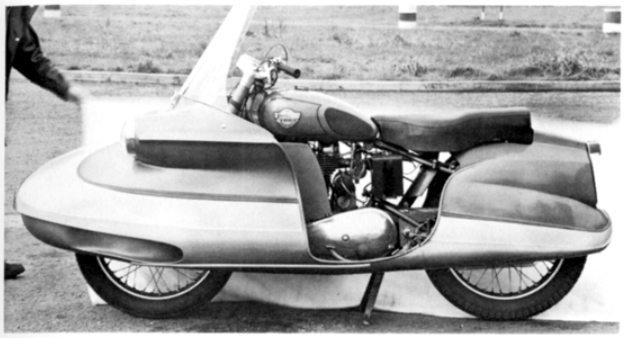
This is the well-hacked 350cc Royal Enfield Bullet around which Motor Cycle *built its Dreamliner. Ridden like this, it needed a following wind to reach 70mph*



LEFT *One of the earliest stages in Richard Wood's glassfibre work. Later production techniques could have saved a good proportion of the 65lb gross weight (45lb net)*

BELOW *The enclosure takes shape. Surprisingly, the engine could be made to pink by flat-out riding despite the two massive cooling ducts—probably some air was being deflected past them*

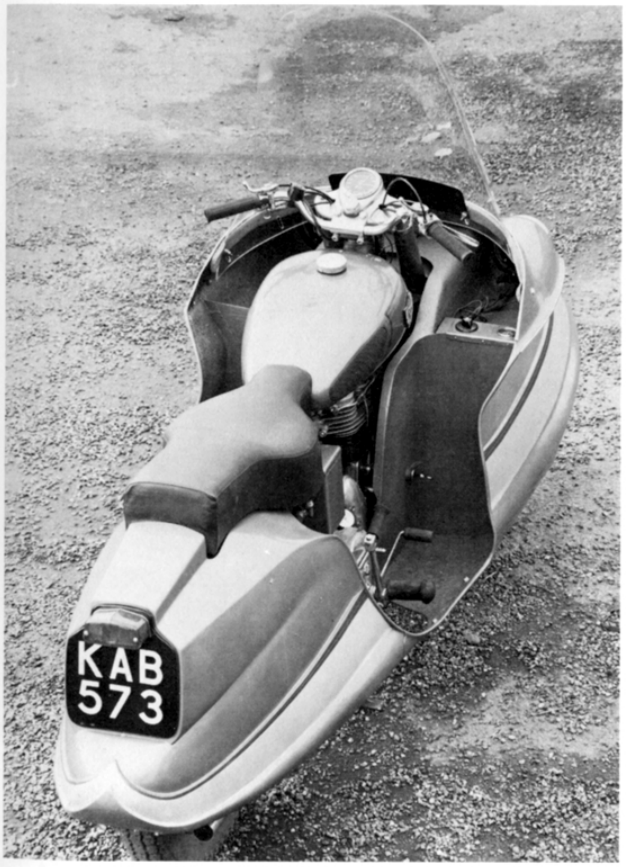




LEFT *There was no denying the Dreamliner's solidity and handsome lines. Yet removal of the bodywork was simple and quick, thanks to thumb screws and snap fasteners*

BOTTOM LEFT *This view gives some idea of the Dreamliner's cosiness. Unfortunately, ankle clearance was borderline when kickstarting*

BELOW *Handling was no problem and both the height and rake of the screeen were well chosen for effective weather protection*



exciting new 500cc Moto Guzzi V-eight racer through its paces before winter closed in.

My 400-mile round trip gave the MIRA results a really practical perspective and taught me more about weather protection and handling. Riding conditions on the way out were foul—slimy roads, intermittent drizzle and a strong, gusty, three-quarter headwind. Yet the Dreamliner cruised comfortably at 60–65mph and held top gear quite remarkably up long gradients. To my dismay the wind had largely abated for the return journey (when it should have been favourable). Even so, I cruised at 70–75mph and, despite fairly heavy traffic both ways, averaged 90mpg for the round trip.

Wearing a double-breasted overcoat and ordinary gloves, I felt as warm as I should have done in a draughtproof but unheated car. True, the absence of the rear mudguard let the left-hand skirt of my coat get a bit damp, but that could easily have been prevented by detail design—after all, our shell was intended only for basic tests. Handling was different rather than better or worse: the wind seemed to pluck at the bike rather than the rider.

For serious all-weather riding then, the Dreamliner amply vindicated comprehensive streamlining, reducing rider fatigue as well as giving higher performance and lower fuel consumption. Equally clearly, the stability of our shell owed a lot to sound aerodynamics, emphasizing that design is strictly a job for experts.

What few drawbacks there were could easily have been rectified. For example, ankle clearance when kickstarting was borderline, but electric starting would bypass that bother. Access to grease nipples and cable adjusters was impaired, but grease nipples are now an anachronism and cable adjusters belong at the handlebar end.

Prolonged full throttle produced pinking, but modification to the nostrils of the cooling ducts would have cured that. Removal and refitting could have been even easier with multi-pin electrical plugs and a single headlamp to give a central handhold.

Manoeuvrability in confined spaces obviously suffers—all one can do there is to keep front overhang to a minimum. Naturally, too, reduced air braking means more work for the brakes (as our 60mph coasting tests showed). But the effect was impossible to detect.

In a price-sensitive market, production costs would have had to come under the microscope. But glass-fibre techniques were advancing rapidly and a good deal of plating and polishing could have been saved on parts no longer exposed.

Most of the test riding was done in a military-style raincoat and walking-out gloves. A central lifting handle is one of a few refinements that could easily have been incorporated

MIRA's electronic timing showed this sort of crouch to be a complete waste of effort with the bodywork and screen fitted, though it boosted speed up to 8mph on the naked machine

Royal Enfield were as delighted as we were with the Dreamliner's undoubted eye appeal. And though they decided full streamlining was too big a single step to take, they used our shell as a model for their Airflow dolphin-type fairing.

Probably the greatest obstacle to the general adoption of streamlining is prejudice—the enemy of progress, the antithesis of reason. Yet who would deny that, had the FIM not outlawed dustbin fairings for classic racing, streamlining might long since have become fashionable because of its sporting connotation rather than its proven benefits. Such is the youth-oriented motorcycle market.

Dreamliner performance table

Test	Unfaired	Faired
Petrol consumption		
At 30mph	102mpg	126mpg
At 45mph	83mpg	105mpg
At 60mph	55mpg	74mpg
At 70mph (could not quite be maintained all round circuit)	—	60mpg
Acceleration		
15–40 mph second gear	6.4sec	5.5sec
40–65mph top gear	15.7sec	13.6sec
Mean time for standing quarter-mile	20.3sec	19.6sec
Mean speed at end	61mph	64mph
Top speed		
Sitting up upwind (third gear, 6mph faster than top)	59.5mph	66mph
Sitting up downwind	70mph	78mph
Sitting up mean	65mph	72mph
Lying down upwind	64.5mph	—
Lying down downwind	78mph	—
Lying down mean	71.5mph	—
Coasting		
From 60mph to a standstill	388 yards	500 yards