

# Which Bike?

NOVEMBER

75p

52

EVERY MONTH ALL NEW AND USED BIKE PRICES



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FACE OFF:**  
**HONDA CB750FA,  
SUZUKI GSX750 AND  
KAWASAKI Z750E**

**PLUS**  
**WHAT'S THE BEST TWO-FIFTY TYRE?**

# Which Bike?

**NOVEMBER 1980**

**No. 52**

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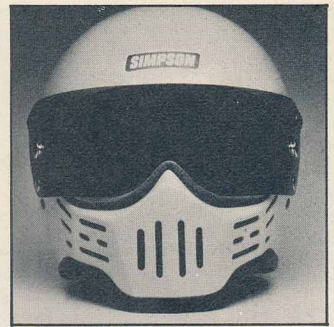
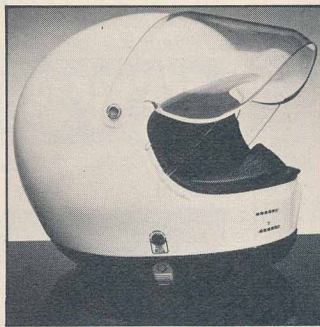
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While most would agree that the use of sub-standard crash helmets is fool-hardy, it's difficult to criticise the use of modern and sophisticated helmet designs. Yet many new-style lids are being used on the road despite them infringing the BSI regulations in small details. *Rick Kemp* and *Tom Ravensdale* look at lids, the law, and some of the new helmets on the market.

You probably read the shock-horror story in the weeklies a few months back about the American Simpson helmet failing to get BSI-approval. It was a classic misunderstanding: the helmet had never been submitted for approval by the importers, who knew that although the RXM-1 had passed the tough Snell 75 regulations in America, its unusual shape would deny it BSI approval.

Yet many British motorcyclists use Simpson RXM-1 helmets, which are freely available for those who want to pay the price. Are these riders breaking the law because they're not using a BSI kite-marked helmet?

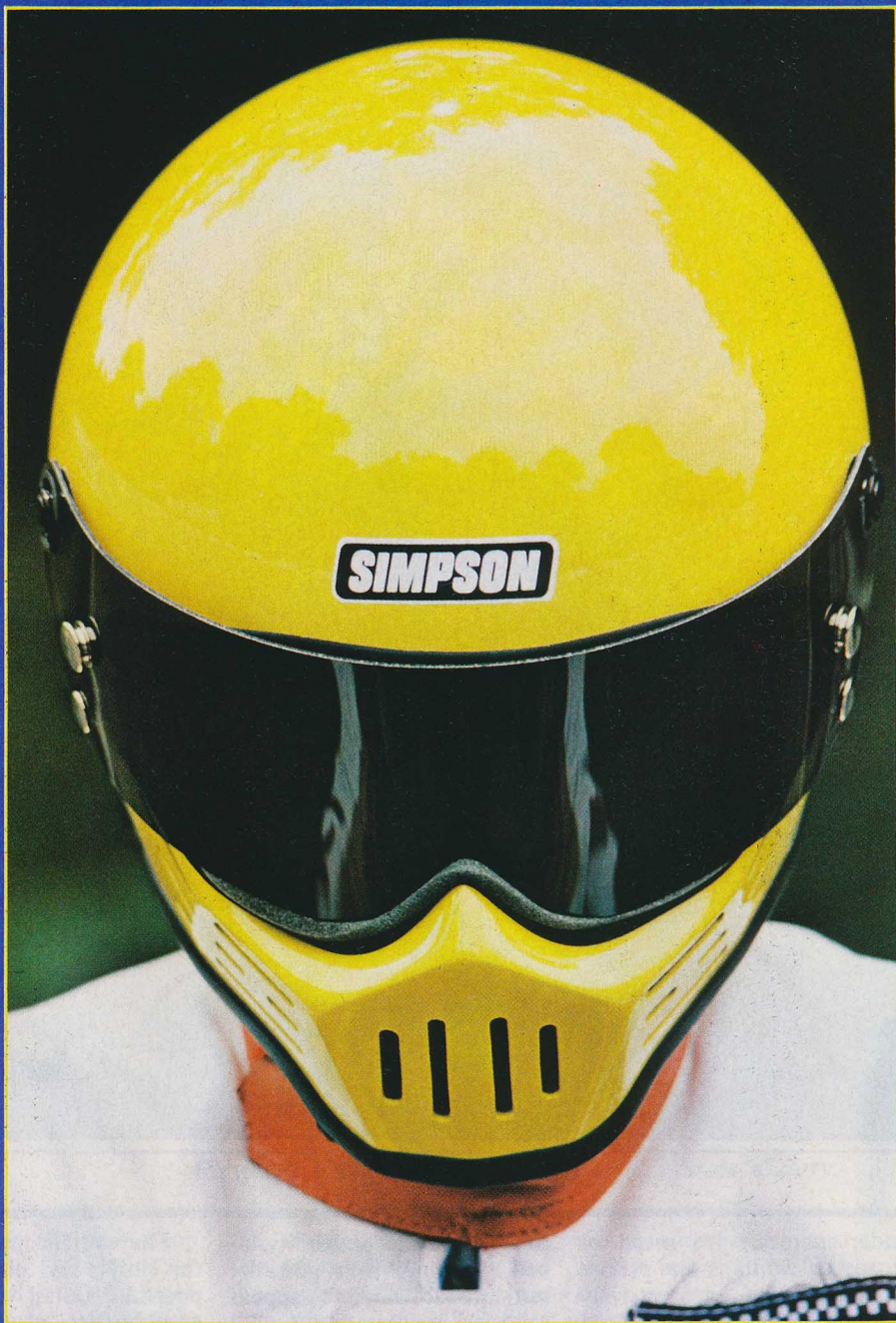
Not necessarily so. Although the law requires you to wear an approved lid, there's a clause in the regulations (The Motor Cycles (Wearing of Helmets) (Amendment) Regulations 1977 part of the Road Traffic Act 1977 No. 129, section 2, paragraph (a), sub-para (ii)) that allows riders to use helmets that can reasonably be expected to afford the same protection as a BSI helmet.

So if you're stopped by a copper, does he have to prove that your helmet isn't up to scratch? That has yet to be proved in a test case so nobody really knows. The only thing we're sure of is that it's confusing. And even the regulations themselves are open to question.

EEC standards don't agree, either. For example, most helmet standards are designed around impact attenuation: usually, the test helmet is fitted on an instrumented dummy head, raised to a very precise height and then dropped using gravity to impact a specified surface shape. Other methods are used but the principle is fairly general. The weight of this mass roughly corresponds to that of a human head (13lbs) including the helmet, but there's no allowing for the fact that heads seldom strike a road surface in an accident without being attached to a body. However, there is no agreement on the height from which the dummy head should be dropped — obviously the higher the dropping point, the faster will be the impact speed.

We, of course, have two standards: BS 2495/77 and BS 5361. We also have ACU standards for helmets in sporting use. The point is that various inter-

# LIDS



# AND THE LAW

national authorities stipulate impact speeds ranging from 11.6mph to 18mph — a speed range somewhat lower than that of a real life motorcycle accident. Most standards require impacts on the same area of helmet but, again, it's a

low speed impact of far less severity than can be anticipated in a real accident.

Sweden has gone a little further in their tests by dropping a helmeted head form onto a rotating road surface at

## SIMPSON

The Simpson uses laminated Kevlar fibres in the shell, the same stuff Dunlop use in their racing tyres. This is stronger than glassfibre so less of it can be used to achieve the same results – making the whole thing lighter. It won't pass the BSI test because of the vents in the jaw piece.

## GPA STRAPLESS

Much loved by Grand Prix drivers, the GPA strapless is a polycarbonate helmet that won't come off unless the catches are released intentionally. Apart from not having a strap to be tested, it's got air vents in the jaw piece and the visor has a friction device inside the shell which requires an inverse curve and a slit either side of the aperture, which also doesn't conform to BSI. The other GPA is a favourite with power boat racers. Like the Simpson, it uses Kevlar fibres, but the jaw piece is rubber. This helmet falls foul of the BSI because of an inverse curve which runs along the top.

## ALDMAN

This is a Swedish research helmet designed for ice hockey but which passes most of the motorcycle tests. The shell is made from a high impact, high density foam, covered in a special skin. The chin strap is bonded into the foam and goes right round the top of the helmet so it can't pull off without breaking; the skin has very low friction properties so when it hits the road it will slide rather than rotate. The hole you can see in the front is the result of the spike impact test – it broke the surface but didn't reach the inside. So here's a new technology helmet weighing only 530 grams.

## BELL GOGGLE HELMET

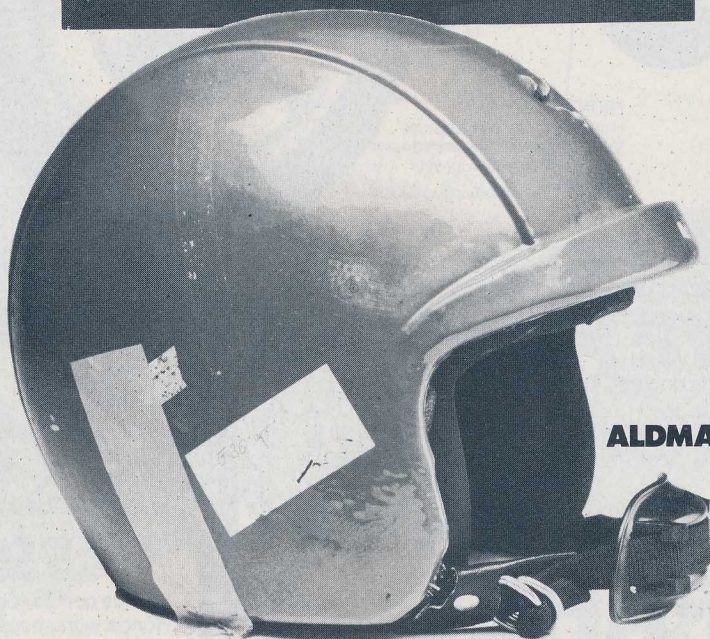
This is one of the best made and most expensive helmets available, specifically designed to be used with goggles and visor; it's particularly good if you wear glasses. But it won't pass the BSI test because the aperture's too wide, coming further back than the 'jet' line which the BSI use as their norm.

## MPA

This is a polycarbonate helmet with integral visor. The aperture is contoured to take the visor, improving streamlining to the point where there's virtually no wind noise from the visor in its down position. Again, it's the inverse curvature that's the problem.



SIMPSON



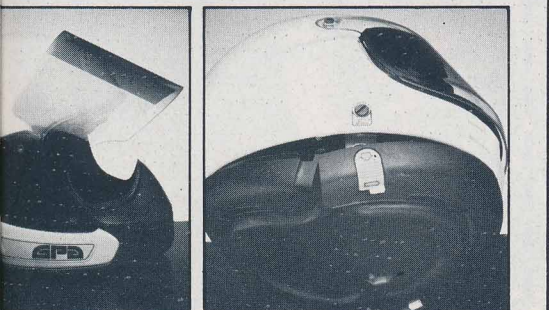
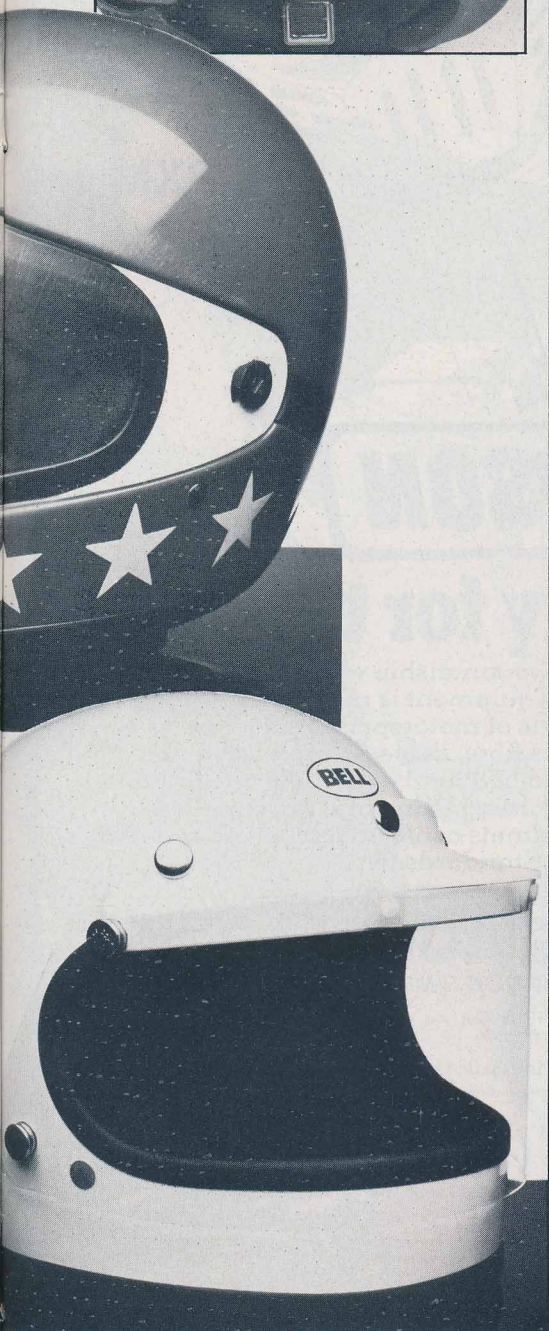
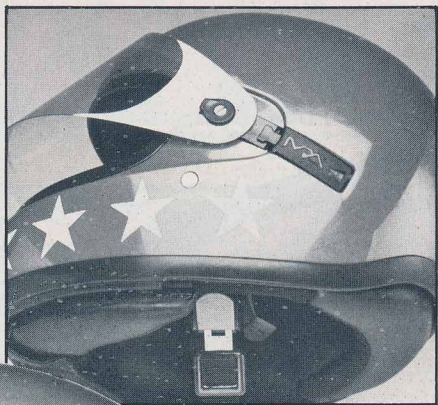
ALDMAN



GPA STRAPLESS

MPA

BELL GOGGLE HELMET



pre-determined speeds — a little nearer the real thing. However, Mohan and his fellow scientists showed in 1979 that in free fall, the effective head mass at impact is at least twice its mass at rest! So, again, how realistic is a standards test in whatever country it is designed? And if the numerous committees who set standards for their respective countries disagree so widely in how helmets should be tested, then who is right? After all, they can't all be.

There is also the problem of how such tests, once agreed upon, should be administered. Tests are normally applied to a few helmets from a batch and, if they pass, then it's assumed that the rest of the batch will, too. This may be true where polycarbonate helmets are concerned (though not necessarily), but glassfibre helmets are hand-made and, unless very stringent quality control is maintained, then no two helmets can possibly be made exactly the same.

Briefly, then, helmets are tested in most countries by single or double blows to a very small part of the head, usually above a line through the ears; at impact speeds of less than 20 mph and at energy levels of less than 110 ft-lb; with *no* allowance for real impacts against very soft or very sharp objects; without allowance for rotation or neck twist (except Sweden); and with no tests for 'real' multiple impacts. There are no tests on the jaw piece, goggle or visor, although a new standard (BS 4110), pending for some time, is soon to be implemented in Great Britain.

So, with such disagreement and shortcomings, what's the point of standards and how effective and scientifically justifiable are they? Why did the French feel a dynamic strap test was necessary years before we in Great Britain did? The answer is surely more likely to lie in the areas of politics and commerce than pure science.

On the other hand, is there enough hard scientific data available for really effective evaluation of helmet protection criteria *anywhere* in the world? It's doubtful. Problems like this are merely nibbled at, and most work is conducted by individuals who publish their findings where and when they can. There are no 'Eureka' discoveries to be made here and few incentives for full-scale research. Indeed, the motorcycle safety helmet has changed surprisingly little since its prewar conception as a skull dome held on with straps. We know they come off in almost a quarter of all accidents, though to give credit where due, amendments in English standards are being implemented right now to help alleviate this problem.

But what about all the foreign helmets and new designs which cannot be sold for road use in Great Britain due to the standards? How can the ACU approve helmets where the BSI don't? Surely the racing fraternity is more safety conscious than anyone? There are, of course, different criteria needed for road and circuit or track usage and I

can see the point in narrow eye piece helmets being barred for road use, but more often than not the reasons for approval or non-approval are nit-picking rather than logical.

Why did the Porsche helmet fail the BSI tests? Why won't the Krebs pass? How can the GPA strapless *be* tested when one of the BSI tests is a strap pull? Vents on the jaw piece are at present illegal, which removes many excellent helmets from our shop shelves, yet an open face, which has a pretty large vent, is alright. You don't have to have a jaw protector and it isn't a tested part of the helmet if it exists, yet it mustn't have de-misting vents if it does! This problem is now under review along with that of inverse-curvature.

It's generally agreed that the Snell 75 Test is the most stringent in the world yet the Simpson, which passes this exhaustive battering, has not been submitted for BSI test because of its breathing vents. The GPA strapless has not been submitted, either. The Aldman research helmet passes some pretty heavy tests and rotates less than any other helmet known in a spinning road test drop, yet it wouldn't pass a BSI test despite doing much the same job with a quarter of the weight of traditional helmets. And the Bell goggle/visor helmet is one of the strongest and best made protectors in the world, yet wouldn't pass a BSI test on the grounds that its vision line goes back too far!

Who can say with *authority* that such design aspects are good or bad? There are points on both sides: the full-face helmet protects more of the head and face than an open-face helmet, but an open-face helmet offers better vision. Is it better to prevent an accident (by offering better vision) or give up a bit of vision (and thus safety) for better protection in an accident? Polycarbonate helmets are more likely to smash under impact than glassfibre but is it conceivable that the energy lost in a helmet which is collapsing under impact is better lost in the helmet than in the head?

We are legally bound to wear helmets, yet little or no government money has been spent on helmet research and that helmets are tested correctly. The area is too grey to be definite yet the standard is rigidly applied to the extent that it hinders helmet development. What's the (commercial) point of developing a brand new helmet filled with new ideas, demisters, new retention methods and streamlining, etc, if it won't meet the standard?

To be fair to both BSI and manufacturers, both would welcome information on what *is* the right helmet design. After all, makers are not in a position to put together a team of surgeons and pathologists to research accident injury and head protection fundamentals. This is the job of the scientists, research bodies, universities and governments. Tell them what's best and I'm sure they'll welcome you with open arms.

WEB

