



# Horsing around safely

**H**orse riding was once viewed as an activity reserved for the rich, but with 4.5 million people in the USA alone now riding horses and the number of equestrians around the world on the increase, this is now a mainstream sport. Even lower grade sports stores and some supermarkets are now considering stocking saddles. What is clear is that it is a sport that requires high quality equipment.

WSA looked at cycle helmets in a recent issue but now we take a look at the different properties required in helmets for horse riding.

## Using your head

Ancient man soon learnt just how exposed the head is and made protective headwear for many activities beyond keeping the sun or rain off. As warfare was a popular pursuit in those times, much thought was put into protecting the head from blows and thus the protective helmet was born. Alexander the Great made his horsemen wear helmets when campaigning and the nomadic horsemen that ravaged the Roman Empire wore lighter leather hats that nevertheless protected their heads against falls and collisions. Much effort was applied thereafter to the suitability of cavalry headgear.

Although today there is no longer any cavalry there is, however, a huge number of people who ride and, as the horse can be a somewhat

unpredictable animal, there is always the risk of a fall. Head injuries due to falls from horses are frequently serious and often fatal. A helmet incorporating a high level of impact protection is therefore an essential piece of equipment.

A study in New Zealand in the 1990s showed that 27.5% of those injured whilst horse riding sustained concussions or other head injuries. Riding 15 to 24 hours per month, being female and riding English style were the characteristics most strongly correlated with injury. The lead author G.L. Christey stated in his summary, "Horseback riding injuries among participants in this study tended to be serious. Family physicians should inform their patients who ride horses about the risks associated with equestrian activities and should emphasise helmet use."

## What makes a good helmet?

The basis of a good helmet is the internal shell. If this is not of sufficient strength and quality, the helmet will be useless. Modern shells are injection moulded in ABS—a very tough plastic copolymer. To ensure consistency during moulding runs, a shell is taken every two hours and conditioned for a further two at 20°C, it is then placed over a 100mm-diameter tube and a 3kg pointed striker is dropped from 600mm on to its top. The shell must absorb the impact without showing any signs of brittleness.

Helmets also have to be made to recognised standards of performance. These have improved

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over the years as technology and testing methods have advanced.

### Performing to international standards

#### EN1384 1996 / BSEN 1384 1997

This can be prefixed by initials indicating where the helmet has been tested e.g. DIN EN1384 for Germany, while a 'BS' prefix denotes the UK. Although there should, in theory, be no difference between DIN and BS standards for example, some European countries have approved helmets that might not meet the levels required in other European states. However, the modern requirements are a major advance over previous standards and in the UK they offer bottom edge protection for the first time. This means that the helmet is impact tested close to the bottom edge as opposed to 75mm further up as on BS4472 helmets, so the protective liner must extend right down to the rim. This improvement was due to the fact that in 25% of falls the rider landed on the side, front or back of the head rather than the top.

It does not, however, include a penetration test and is the basic minimum standard for almost all applications.

#### PAS 015:1994 / PAS 015:1998

The Product Approval Specification (PAS) was developed by the British Standards Institute (BSI) in response to delays in developing EN1384. It was initially based on drafts for the European standard and took the highest options in each instance. Following the official publication of EN1384 in 1997, differences between it and PAS 015 led to a revision of the latter in 1998, which removed the anomalies and tackled new areas such as lateral rigidity (crushing) and protection when falling on an edged surface.

#### ASTM F1163:1998

This is the American standard and is similar to PAS 015:1998, but without any lateral rigidity or penetration tests so that helmets frequently have holes or slots for ventilation. Considerable debate over the perceived advantages of ventilation versus the greater risk of penetrative injury has resulted in a number of ventilated helmets now being available which will pass PAS and EN1385 penetration tests as well as the ASTM standard.

#### Snell E2001

Developed by the Snell Institute in the USA, this is the most recent standard. It includes all aspects of ASTM and PAS 015 plus a sharper horseshoe anvil to replicate a kick or impact with a sharp surface and higher impacts plus an additional anvil to represent uneven surfaces such as trees, fences or cobbled roads.

#### 14572: 2005

Introduced in 2005, this is a high performance standard developed by a sub-committee of the European Hat Standard Committee. It is designed to complement—and not to replace—the existing standards and includes a radical new lateral crush test.

### Quality symbols

#### Kitemark

This is the UK's BSI registered trademark and can only be used on products they have certified. As well as complying with the relevant standard, it also indicates that the manufacturer has complied with a rigorous system of regulation and testing. This includes random testing within every production batch.

#### SEI (Safety Equipment Institute)

The American equivalent of the Kitemark for ASTM standard helmets. Similar to the BSI, SEI's regulation includes design approval and audit testing of product. Helmets must be tested at least once a year and manufacturers must show adequate internal auditing of quality control and batch testing.

#### SAI Global

The 'five' ticks Standards Mark for the Quality Assurance Scheme of Australia shows certification of its version of the Kitemark, requiring batch testing and company auditing.

#### CE Mark

Neither a quality mark nor a standard, it is a mandatory declaration by the manufacturer under EU law showing compliance with essential requirements of all relevant EU directives. It is intended to indicate that products entering a European country meet the basic safety requirements of the EU. Under the Personal Protective Equipment Directive, all safety equipment must carry the CE mark to show compliance with the appropriate European safety standard.

### A safe bet?

It must be made clear that no helmet can be guaranteed to prevent serious injury. It is also true to say that even a helmet made to the highest possible standard will not perform if it is not fitted correctly and properly fastened. The safest helmet is therefore one that has been tested to the appropriate standard, is the most suitable for the intended equestrian activity, and fits the wearer's head securely.

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*Interior view of typical helmet showing lining and harness.*

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