



Helmet standards and capabilities

The opinion of Brian Walker, one of the leading experts on the mechanics of helmets, and whose company Head Protection Evaluations is the principal UK test laboratory for helmets and head protection systems of all kinds

Cycle Helmets

I have read so many opinions over the past few years on this subject, which in the main have been technically adrift of reality or based on misinformation. I felt that it was time to respond.

Helmet standards

Having personally conducted or supervised thousands of impact and other tests on cycle helmets, all of which were recorded, I note the following:

1. The manufacturers of all forms of safety helmet have to sell their goods in a brutally competitive global market. With very few exceptions, safety helmets are made down to the lowest standard permitted within a given 'local' market.
2. Due in the main to the introduction of the weak harmonised EN1078 European standard, present day cycle helmets generally offer a lower level of protection than those sold in the early 1990s.

In the early 1990s, market research suggested that in excess of 90% of the cycle helmets sold in the UK were certified to the Snell B-90 standard, at that time the most stringent cycle helmet standard in the world. In 1998, Head Protection Evaluations (HPE), my safety helmet laboratory, conducted a test programme for the Consumers Association (reported in Which? October 1998) to assess cycle helmets available in the UK. By that year all of the helmets were labelled to EN1078. The results showed that, with only one or two exceptions, the helmets tested were quite incapable of meeting the higher Snell B-90 standard, to which many of the models had been previously certified. Some helmets were even incapable of meeting the weak EN1078 standard.

Some people argue that helmets are effective if 'properly worn'. How those words have haunted me through many years! Apart from some racing cyclists, I hardly ever see a cycle helmet worn properly. Cycle helmet retention systems are the worst of all. I consider it one of my biggest failings that I have not persuaded the helmet industry to come up with something much better. God knows, I have tried! Anyone who wears a cycle helmet will know just how long it takes to adjust the chin strap so that the helmet is both reasonably comfortable and sits firmly in place on the head. Try adjusting a cycle helmet on a infant's head – it's a nightmare and in my experience hardly ever achieved satisfactorily. In the HPE laboratory we have examined many cycle helmets that were manufactured in such a manner that correct adjustment was completely impossible.

Clinical studies

Medical case studies are often referred to as evidence for the effectiveness of cycle helmets. My own experience of studies in this field is that they very often arrive at erroneous conclusions. Certainly my ten years' of involvement with the Medical Commission on Accident Prevention at the Royal College of Surgeons in London illustrated that the recording of accident data in A & E departments is often limited in both detail and accuracy. It also varies enormously from one authority to another. In fairness, that this is hardly surprising when one considers that the priority must always be patient welfare, coupled with working within a highly stressful environment.

Many studies ignore completely the differences between impacts involving only the injured cyclist and those resulting in collisions with motor vehicles, yet it is fundamental to assessing cycle helmet effectiveness.

Evidence in court

In a recent Court case, a respected materials specialist argued that a cyclist who was brain injured from what was



essentially a fall from their cycle, without any real forward momentum, would not have had their injuries reduced or prevented by a cycle helmet. This event involved contact against a flat tarmac surface with an impact energy potential of no more than 75 joules (his estimate, with which I was in full agreement). The court found in favour of his argument. So a High Court has decided that cycle helmets do not prevent injury even when falling from a cycle onto a flat surface, with little forward momentum. Cycle helmets will almost always perform much better against a flat surface than any other.

In other legal cases with which I have been involved, where a cyclist has been in collision with a motorised vehicle, the impact energy potentials generated were of a level which outstripped those we use to certify Grand Prix drivers helmets. In some accidents at even moderate motor vehicle speeds, energy potential levels in hundreds of joules were present.

Concluding remarks

My purpose is not to dissuade people who wish to, from wearing cycle helmets. They do, I promise, work a little better against a flat surface, than the Court decided in the case I cited above. After all the Snell B-90 standard called for four impacts on each test sample, two of which were tested against flat surfaces with an impact energy of 100 joules each. The tragedy is you cannot buy helmets to this standard any more. Manufacturers prefer the easier standard that they helped to write.

Rather my purpose is to illustrate that the whole cycle helmet issue contains many hidden issues of which most researchers are quite unaware.

Referring back to the Court case mentioned early, the very eminent QC under whose instruction I was privileged to work, tried repeatedly to persuade the equally eminent neurosurgeons acting for either side, and the technical expert, to state that one must be safer wearing a helmet than without. All three refused to do so, stating that they had seen severe brain damage and fatal injury both with and without cycle helmets being worn. In their view, the performance of cycle helmets is much too complex a subject for such a sweeping claim to be made.

Brian Walker

Head Protection Evaluations Farnham,
Surrey, UK
March 2004

The Bicycle Helmet Research Foundation (BHRF), an incorporated body with an international membership, exists to undertake, encourage and spread the scientific study of the use of bicycle helmets. Also to consider the effect of the promotion and use of helmets on the perception of cycling in terms of risk and the achievement of wider public health and societal goals.

BHRF strives to provide a resource of best-available factual information to assist the understanding of a complex subject, and one where some of the reasoning may conflict with received opinion. In particular BHRF seeks to provide access to a wider range of information than is commonly made available by those that take a strong helmet promotion stance. It is hoped that this will assist informed judgements about the pros and cons of cycle helmets.

For more information, please visit www.cyclehelmets.org.

Document downloaded 17 Jul 2018. The copyright in this document is owned by the Bicycle Helmet Research Foundation, but it may be reproduced or distributed freely so long as the content is not modified in any way.