



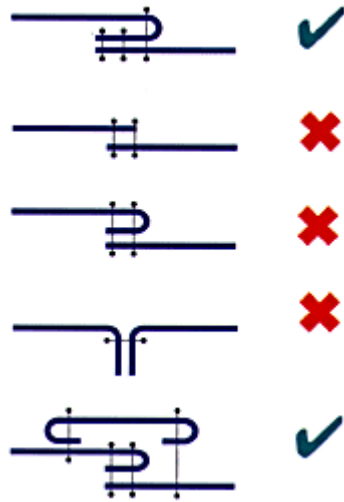
BP5: PTW Design and Protective Equipment

Reference: BP5 012	Title of Project:	Standards for Motorcyclist Protective Clothing
Version: 1	Website:	www.brake.org.uk/index.php?p=356 http://www.bikesafe.co.uk/Bikesafe/ceclothing/CEprotective.html
Brief Description of Project:	<p>By law, in Europe, motorcycle clothing can only be designated “protective” if it is capable of providing protection from injury. The Personal Protective Equipment Directive (PPE, 89/686/EEC) requires that any clothing or equipment sold or provided as a source of protection from injury must be categorised as protective (PPE) and comply with the relevant European Standard. Motorcycle clothing that is only intended to provide protection from weather conditions is not included as PPE.</p> <p>Appropriate clothing will carry the CE standard mark.</p> <p>Standard EN 1621-1 covers the effectiveness of ‘mechanical impact protection. To meet the standard, clothing has to include protection to this standard at key vulnerable locations of the garment.</p> <p>Standard EN 13595 covers the protective qualities of the garment, including construction techniques and potential to resist abrasion.</p> <p>Standard EN13594 covers gloves and EN 13634 covers footwear.</p>	



Motorcycle protective clothing constructed to an acceptable European standard will display the CE symbol and make reference to European standards such as EN 1621-1 and EN 13595. Garments complying with these or similar standards will generally have the following features:

Correct Stitching



1. A full lining with the lining not attached to the outer shell in zones 1 and 2. Linings are generally produced from either nylon or cotton. Cotton is a natural fabric which absorbs moisture whereas nylon is often stronger but can melt.

2. A double thickness outer shell material in high risk areas such as zones 1 and 2.

3. Impact protection tested to EN 1621-1 in zone areas.

4. Several rows of stitching in all structural seams with protected/covered rows. By covering some rows of stitches they are protected from sunlight and general abrasion that can seriously weaken the seams prior to an accident.

5. Adequate adjusters at the ankle and wrist cuffs to ensure that the garment remains in place during an accident and does not expose your flesh to the road surface.

Hot weather riding, especially in southern Europe, is often cited as a reason for riders not using protective clothing to EN1621 and EN13595. There is concern that the effects of rider over-heating and discomfort may offset any safety gain from wearing protective garments.



Modern breathable fabrics, such as Cordura, can provide some improvement to hot weather performance but in a southern European summer this may not be sufficient for some riders. As an alternative, there are body armour garments using 'airflow' mesh which can be worn over a t-shirt.

	<p>It is likely that reluctance to wear protective equipment, even helmets, is a 'cultural' issue for PTW riders in some countries. This needs to be overcome to realise the full benefits of CE equipment. This hypothesis is borne out by the much greater willingness to wear appropriate protective clothing in Australia (de Rome et al (2002)), where average summer temperatures in some areas are higher than those in southern Europe.</p>
<p>Monitoring Data:</p>	<p>There is the EN standard testing data which assess performance and effectiveness.</p> <p>In addition there has been research into the mitigating effects of 'protection' in collisions. Hurt, Ouellet & Thom (1981) in California, undertook the first, large scale comprehensive study of motorcycle crashes in 1979. They collected detailed injury data for 900 motorcycle crashes using on-scene, in-depth investigations by specialist teams. They documented the type of clothing worn and classified it as either protective or non-protective. The study found that 74% of riders who suffered hand injuries were not wearing gloves and 68% of those suffering feet/ankle injuries were not wearing protective boots.</p> <p>In a similar study in Munich, Schuller et al. (1986) interviewed 264 injured motorcyclists immediately after their crash and then some two years later. He subsequently found a reduction in hospitalisation by an average of 7 days for those who had worn leather protective clothing compared to those who had not. The protected motorcyclists were also able to return to work or school on average 20 days sooner and were 40% less likely to suffer a permanent physical defect than their unprotected counterparts. He concluded that motorcycle clothing is significantly effective in preventing or reducing at least 43% of injuries to the skin and soft tissue with a 63% reduction in deep and extensive injuries.</p> <p>More recently Otte et al (2002), has found that riders wearing protective clothing had significantly fewer leg injuries in crashes at the same relative speed (eg 40% vs 29% injury free at speeds between 31-50 km/ph). He also identified a significant benefit in reduction of foot injuries for riders wearing high boots. Overall he also reported that riders without protective clothing sustained injuries in collisions at lower speeds (80% at < 50 km/h compared to 80% <60 km/h for riders with protective clothing).</p> <p>There are a number of other studies which confirm these benefits.</p>

	<p>The limitations for injury prevention and reduction are summed up in the report on motorcycle safety by the European Experimental Vehicles Committee in 1993 (EEVC, 1993). They noted that protective clothing cannot, so far as is known, significantly mitigate:</p> <ol style="list-style-type: none"> 1. Severe bending, crushing and torsional forces to the lower limbs; 2. Massive penetrating injuries to any part of the body; 3. High energy impacts on the chest or abdomen causing injuries through shock waves, and severe bending forces such as when the torso strikes an upright post.
Results:	<p>Effective protective clothing appears to provide a measurable reduction in severity of some common types of injury, for example an observed reduction of 63% in deep and extensive injury to skin and soft tissue, Schuller et al. (1986).</p>
Key Effective Conclusions:	<p>Research into the ‘theoretical’ protection provided by CE equipment during standards testing and the studies of the effects on casualties clearly confirms the value of protective clothing <i>of appropriate quality</i> in reducing the severity of collision injury.</p>
Projects for Comparison:	<p>Standards Australia Guidelines. Helmet standards (BP5 013). ‘SHARP’ UK helmet standard (BP5 014).</p>
Justification:	<p>The research, both performance and collision based, appears to confirm the mitigating effects of appropriate protective clothing on many common types of PTW collision injury.</p> <p>The promotion and use of CE approved protective clothing appears to meet the objectives of eSUM WP3, BP5 by providing a reduction in the severity of PTW injury.</p>