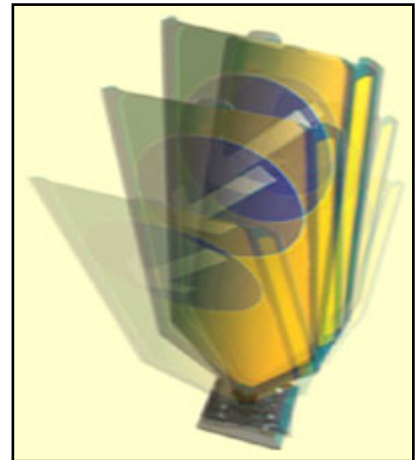




**BP6: 'Softening' the Highway Infrastructure**

<p><b>Reference:</b> BP6 001</p>	<p><b>Title of Project:</b></p>	<p><b>'Frangible' and 'Flexible' Street Furniture</b></p>
<p><b>Version:</b> 2</p>	<p><b>Website:</b></p>	<p><a href="http://www.thepassiverevolution.co.uk/products.html">http://www.thepassiverevolution.co.uk/products.html</a></p>
<p><b>Brief Description of Project:</b></p>	<p>A range of manufacturers produce passive street furniture to a variety of specifications.</p> <p><b>There are 2 main types:</b></p> <p><b>FRANGIBLE</b> items are designed to collapse when struck by a vehicle, reducing the retardation effects and the transfer of energy to the vehicle occupants.</p> <p>However, in a PTW collision the rider will frequently be separated from the vehicle and may directly strike the object.</p> <p>Little research appears to have been done on the effects on the human body, and specifically PTW riders, of an impact at speed with a 'frangible' object.</p> <p>The materials used in the construction and installation of 'frangible' street furniture are very varied and include GRP, steel, aluminium and wood.</p> <p><b>FLEXIBLE</b> street furniture is designed to bend and recover when struck. The photograph below shows 'Super Flexi Poles' in Hume City, Australia.</p> <p>In high speed, rural locations where risk of over-run is greater than in urban situations the introduction of 'flexible' bollards or chevron markers has been widespread. In these locations a considerable benefit is provided to a rider losing control and striking road side objects by the use of flexible, 'softened' street furniture. The situation with 'frangible' poles is less clear.</p>	





<p><b>Monitoring Data:</b></p>	<p>Performance monitoring data describing vehicle impacts to ‘flexible’ and ‘frangible’ furniture is available from manufacturers but there appears to be little information available on the effects on a human body of a direct impact.</p>
<p><b>Results:</b></p>	<p>Manufacturers claim reduced incidence of serious injury to riders impacting on some types of ‘flexible’ signing but casualty data based evidence is lacking. In high-speed rural locations the installation of flexible markers and chevron signs on the outside of bends appears to significantly reduce the risk of very serious injury for PTW riders compared with more traditional ‘solid’ signing.</p>
<p><b>Key Effective Conclusions:</b></p>	<p>‘Frangible’ street furniture is designed to perform its function when struck by a vehicle rather than a PTW rider. Therefore its effectiveness in relation to reducing PTW injuries in urban areas is likely to be limited.</p> <p>There may be benefits to PTW riders with ‘flexible’ equipment but conclusive research is lacking. The approach of ‘softening’ street furniture has the support of rider groups and could provide reduced risk of serious injury to the PTW rider subject to the specific design and location of countermeasures.</p> <p>The beneficial effects are likely to be greatest in high speed situations, mostly in rural, rather than urban, areas.</p> <p>For some types of sign, there may be maintenance/vandalism issues in some locations within urban areas.</p>

<b>Projects for Comparison:</b>	Motorcycle Friendly Crash Barriers (BP6 004).
<b>Justification:</b>	<p>The approach is worthy of further research as there appear to be advantages at identified PTW collision blackspots.</p> <p>There appears to be potential to meet the eSUM objective for WP3, BP6 for reduction in risk of injury in a collision through the use of 'flexible' street furniture.</p>