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July 2013

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S Tong, S Helman, C Fowler, E Delmonte, R Hutchins

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Comparison of Safety Requirements in Quadricycles and Cars

Vehicles entering service in the EU are 'type-approved' to ensure that they meet minimum environmental and safety standards. The process is controlled for category M1 vehicles (cars) by framework Directive 70/156/EEC and for two and three wheeled vehicles by framework Directive 2002/24/EC. These framework Directives refer to a series of requirements on different topics. There are fewer of these topics for two and three wheeled vehicles than for M1 vehicles, and the requirements are less onerous overall. However, 'quadricycles' are an exception because they come within the scope of type-approval for two and three wheeled vehicles despite being equipped with four wheels. Despite a sometimes 'car-like' appearance these vehicles are still approved to the less onerous requirements for two and three wheeled vehicles. This report documents a desk-top study to assess the ease with which bodied quadricycles and tricycles could meet the same requirements as normal cars. The study involved two main tasks:

- An initial review and risk assessment of all safety-related Directives applicable to passenger cars, quadricycles and tricycles;
- A more detailed review of the Directives where the greatest difference in safety performance requirements was identified and it was considered technically difficult for quadricycles to meet the higher standard.

The main findings of the work were as follows:

- Many of the quadricycle manufacturers are providing significantly higher levels of safety than the minimum that legislation requires of them, particularly with regard to crash safety. Available test results show that some vehicles have been close to passing an M1 frontal or side impact test.
- The M1 Directive requirements that would be most difficult to meet for tricycles and quadricycles are anticipated to be those associated with the frontal and lateral impact tests.

These are also thought to be the requirements where there would be the greatest risk if no changes are made.

Author B J Hardy, J A Carroll and M Pitcher

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Package Order 001/4/45/12 - Traffic Officer Vehicle Conspicuity

The Highways Agency's Traffic Officer Service often work in high-risk situations, attending incidents on the HA's motorway and trunk road network. An essential part of their equipment for incident management is their conspicuously-marked vehicles. This project sought to identify whether parking the vehicle in 'fend off' or parallel orientations and the use of amber or red and amber beacons influenced the behaviour of motorists approaching the incident. An instrumented Traffic Officer Vehicle was based at a TOS Outstation, attending incidents and recording video and distance measurements of passing vehicles. A second work package reviewed the literature regarding impacts such as those sustained by parked TOVs hit by errant vehicles and the subsequent behaviour of the impacted vehicle. This was used to inform an extensive set of impact computer modelling simulations, with the impacted vehicle replicating a TOV. An additional work package gives an overview of the potential benefits of vehicle-mounted CCTV

systems. Recommendations are made for parking orientation, beacon use, and incident procedures.

Author M Palmer, B Lawton, J Manning and C Reeves

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Motorcycle manoeuvres review - phase 2 and phase 3 report

The current practical motorcycle test in Great Britain is modular, with the first of two modules testing candidates' control of their motorcycle in an off-road area during a series of low and higher speed manoeuvres. Concerns about the accessibility and safety of the module 1 test led the Road Safety Minister (in June 2010) to announce a review exploring the feasibility of a single event, on-road practical motorcycle test. TRL was commissioned to carry out research to support the review. The research proceeded in three consecutive phases; the first of these phases is described in Tong, Helman, Fowler, Delmonte and Hutchins (2013), and the second and third are described in this report: 1. Phase 1 (Tong et al., 2013) trialled the manoeuvres off-road so that the initial feasibility, safety and fairness of the manoeuvres could be assessed without exposing learner riders to potential risks on real roads. Test-ready learner riders rode through the proposed set of manoeuvres under mock-test conditions. They also completed the existing module 1 manoeuvres for direct comparison. 2. Phase 2 built on the findings from Phase 1 by piloting the revised manoeuvres on-road with experienced riders, so that a decision could be made on whether to proceed with Phase 3 (on-road trialling with learner riders). 3. Phase 3 trialled the manoeuvres on-road with learner riders.

Author S Tong, S Helman, C Fowler, E Delmonte, R Hutchins

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Motorcycle manoeuvres review phase 2 & 3 technical appendix

Technical Appendix to PPR659.

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Motorcycle manoeuvres review: the feasibility and safety implications of carrying out modified module 1 test manoeuvres on-road. Phase 1 - off-road trials with learner riders

The current practical motorcycle test in Great Britain is modular, with the first of two modules testing candidates' ability to control their motorcycle in an off-road area during a series of low and higher speed manoeuvres. Concerns have been expressed about the accessibility of the module 1 test (especially for candidates who are not within easy reach of one of the 56 test centres, or one of a number of casual sites, equipped with an off-road manoeuvring area) and also the safety of some of the current module 1 manoeuvres. In June 2010, the Road Safety Minister announced a review of the practical motorcycle test, with the aim of

devising a single-event test that is carried out on the road as far as possible. This study assesses the feasibility and safety of carrying out a revised set of manoeuvres on-road. Off-road locations were 'mocked up' to resemble real roads (the centre line and kerb lines were marked to create a 'mock road' environment) and current learners were recruited to ride through the existing module 1 manoeuvres and a revised set of manoeuvres proposed for on-road testing. Direct comparisons were drawn between the two sets of manoeuvres. Off-road locations were used to minimise the safety risks. Further Phases of research are considered necessary (trials on live roads using experienced riders first—Phase 2—and then using learner riders—Phase 3).

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