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## SHARP 2025 Project: Call for Evidence

### Introduction:

Motorcyclists are among the most vulnerable road users in Great Britain. Helmets play an important role in reducing the severity of motorcyclist head injuries during collisions. The Safety Helmet Assessment and Rating Programme ([SHARP](#)), launched by the Department for Transport (DfT) in 2007, is a consumer information scheme that provides information about the relative safety of motorcycle helmets and advice on helmet selection for riders.

Since the SHARP scheme was launched, there has been new knowledge and understanding of the factors involved in motorcyclist injuries, including a focus on the risks associated with rotational forces experienced during real-world helmet impacts. This has led to important changes across several international motorcycle helmet test and assessment standards and regulations. These include the 6<sup>th</sup> series of amendments to the UN ECE Regulation 22 for type-approval of motorcycle helmets.

To ensure the SHARP scheme remains up to date, the DfT is carrying out a research project to review and upgrade the current test and rating protocols of the scheme. This informal call for evidence, seeks input from key stakeholders to identify the evidence base for key factors associated with motorcyclist collision data, motorcyclist helmet impact mechanisms, head injury criteria and test approaches.

### How to respond:

We encourage stakeholders to respond so we can base the SHARP helmet rating scheme on the best available evidence and establish motorcycle helmet test and assessment protocols that are relevant, reproducible and cost-effective.

This call for evidence seeks to gather both relevant peer-reviewed published and publicly available 'grey' literature to form the evidence base for later review. When responding, please state whether you are responding as an individual or representing the views of an organisation. Please send your response as a list of publications with links included, relating these to each 'call for evidence' question.

Responses should be emailed directly to [pmartin@trl.co.uk](mailto:pmartin@trl.co.uk) prior to 29<sup>th</sup> October 2021.

### Call for evidence questions:

1. What evidence exists to establish the best-practices in motorcycle helmet impact testing protocols when considering representativeness, reproducibility and cost-effectiveness?

Consider:

- Drop test assembly construction: twin wire, rail, headform carriage design
- Neck anchorage: free fall, rigid arm, flexible
- Headform: moments of inertia, coefficient of friction, anthropometry
- Anvils: flat, kerbstone, spherical, angled anvil (15°, 45°, other angles), surfaces
- Impact locations: helmet impact locations from data/reconstructions
- Impact velocity/energy: helmet impact velocities from reconstructions
- Multiple helmet impacts: effects of testing a single helmet multiple times

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2. What evidence exists to establish the best-practices in head injury risk assessment protocols? Consider:
    - Linear injury criteria/thresholds: peak linear acceleration, HIC
    - Rotational injury criteria/thresholds: peak rotational velocity/acceleration, BrIC
    - Combined kinematic injury criteria/thresholds: GAMBIT, HIP, BITS
    - FEA based approaches/thresholds: strain, strain rate, CSDM
    - Combining individual tests outcomes: weighting approaches
  3. What evidence exists to establish the best-practices in motorcycle helmet retention testing protocols and assessment criteria? Consider:
    - Dynamic retention system and stability tests: mass, velocity, criteria
    - Helmet fit: rider anthropometry, assessing closeness of fit
  4. What evidence exists to establish the best-practices in motorcycle helmet comfort testing protocols and assessment criteria? Consider:
    - Visor fogging
    - Environmental ingress
    - Noise/vibration
    - Aerodynamic load
    - Ventilation/thermal comfort
    - Helmet mass