

**Outline Proposal for a New 1958 Agreement Regulation on Advanced Emergency
Braking Systems.**

Transmitted by the expert from the European Commission

Background At the 145th session of WP29, the representative from the European Union gave a presentation on the new European Commission proposal for a Regulation on the general safety of vehicles (see document WP29-145-8). A feature of this proposal is the introduction of advanced safety technologies in future vehicles. One of these technologies, Electronic Stability Control, is at an advanced stage, both in terms of the technology and in terms of regulatory standards. Other technologies such as Advanced Emergency Braking Systems and Lane Departure Warning Systems are starting to appear on new vehicles and preliminary studies have shown that there may be justification in making such systems mandatory on some vehicle categories as part of the proposed Regulation.

Clearly, before mandatory installation requirements for such systems can be implemented it is necessary to agree technical performance standards for such systems. The European Commission prefers that such technical standards should, where possible, be agreed at UNECE level to ensure a wide harmonisation of standards and thus reduce potential costs to manufacturers. This document outlines a proposal for a UNECE Regulation under the 1958 Agreement covering **Advanced Emergency Braking Systems (AEBS)**.

Technical and Research Details. Braking technology has increased rapidly in recent years. The widespread introduction of anti-lock braking systems (ABS) has provided the building blocks for a wide variety of braking control systems. Additional hardware that allows brake pressure to be increased above pedal demand as well as to be reduced, combined with additional software control algorithms and sensors allow traction control (TC), electronic brake force distribution (EBD), brake assist (BA) and electronic stability control (ESC) functions to be added.

In parallel to the development of braking technologies, sensors have been developed that are capable of detecting physical obstacles, other vehicles or pedestrians around the vehicle. Many luxury, mid-size and small cars are now fitted with an adaptive cruise control (ACC) system that is capable of measuring and maintaining a driver-preset headway to the vehicle ahead by automatic modulation of the engine control, and if required, automatically applying brakes up to a maximum deceleration of 0.3g (as per ISO standard). If no vehicle is ahead, the vehicle maintains the desired “set-speed”.

Theoretically, a vehicle equipped with modern braking technology and adaptive cruise control is equipped with the basic building blocks for a simple (braking only – no steering) collision avoidance system that would be capable of detecting when a collision is likely to occur and applying emergency braking to avoid it. More advanced and/or multiple sensors are likely to be required as well as considerable further development before full collision avoidance systems (other than low speed systems) are available in production. However, collision mitigation systems are already on the market, providing limited automated braking capability and some systems are available that can automatically avoid collisions in low speed traffic.

In 2006 the European Commission commenced a project to explore the costs and benefits of such systems. This project was managed by TRL and carried out in participation with a stakeholder group which included EU Member State and industry representatives. The project was completed in 2008 and the final report is available on <http://ec.europa.eu/enterprise/automotive/projects/index.htm>. On the basis of this report, the Commission proposes initially to mandate these systems for heavy duty vehicles only (i.e. M2, N2, M3, N3); however it is possible that such systems may be mandated on cars at later date and in the meantime it may be beneficial to develop a standard which also applies to such systems, where fitted on light vehicles.

Possible Outline Requirements. Based on the recommendations of the TRL report, an outline of the likely technical content and areas of discussion regarding a regulation on AEBS is given below.

1. Scope and field of application. The regulation would describe performance requirements for AEBS. The requirements would concentrate on the specific AEBS features, and as far as possible all the basic braking system requirements would cross-refer to Regulations 13 or 13H. As mentioned above, vehicles of categories M2, N2, M3 and N3 are seen as priorities; however vehicles in categories M1 and N1 could also be included. It is recognised that some of the requirements appropriate for large vehicles may differ from those which are appropriate for smaller vehicles. However, the requirements relating to the sensing systems may be similar for all classes of vehicle. Hence the working group will need to decide whether one regulation is appropriate for all vehicles or whether a separate regulation is preferable for light duty vehicles.

2. Functional requirements. These might include:

- the conditions for activation (time to collision) . Some current systems are designed only to mitigate collisions; however the greatest benefits would be achieved from systems that can prevent collisions altogether.

-effective speed range

-road geometry over which system is effective (capability of dealing with bends)

3. HMI requirements (e.g, the need for a driver pre-warning).

4. Sensor requirements

- **detection capability** (e.g. pedestrians?)

-**environmental protection** (heat, damp, snow, sand, etc.)

-**electromagnetic compatibility** (including permitted frequency ranges, where applicable)

Timescale. The European Commission proposal envisages that new heavy duty vehicle types should be fitted with such systems from October 2013. This means that, ideally, any new regulation should come into force by October 2011, which would require agreement by the November 2010 WP29. In order to support the development of this Regulation, the Commission is prepared to offer research and testing resources.
