

STOP LAMP ILLUMINATION

Transmitted by the experts from the European Association of Automotive Suppliers (CLEPA) and from the International Organization of Motor Vehicle Manufacturers (OICA)

For some time GRRF discussed the technical requirements relating to when a signal should be generated which would be used to illuminate the stop lamps in particular the application associated with the operation of endurance brakes. At the 57th GRRF industry presented informal document No. GRRF-57-34 in an attempt to move the discussion forward. This document proposed that vehicles with electric control transmission would generate the signal to illuminate the stop lamps when the endurance brake produced a vehicle deceleration of $\geq 0.7\text{m/s}^2$. For vehicles having a different specification of braking system the option remained that operation of the endurance brake may generate the signal to illuminate the stop lamps. Vehicles with electric control transmission are those which are commonly known as having electronic braking systems and include a data bus communication system connecting the braking system with the rest of the vehicle control systems. Additionally due to the brake force distribution system utilised on these vehicles calibration of the braking system with the actual tyre used on the vehicle is standard practice therefore an accurate speed measurement is available from which vehicle deceleration can be determined. Vehicles having a different specification of braking system, including those with ABS do not have the same interfaces or calibration requirements.

At the 59th GRRF Japan introduced informal document No. GRRF-59-11 which proposed that ABS equipped vehicles should also be able to generate the stop lamp illumination signal at the deceleration values defined in GRRF-57-34. During discussion there was some sympathy for this approach although it was pointed out that there were cost and vehicle specification implications. It was agreed that industry should consider the proposal with the objective of re-discussing the subject at the 60th GRRF.

As requested industry have considered the content of GRRF-59-11 and have come to the conclusion that while it is possible for an ABS equipped vehicle to provide deceleration information there are significant cost, vehicle and brake system specification implications as follows:

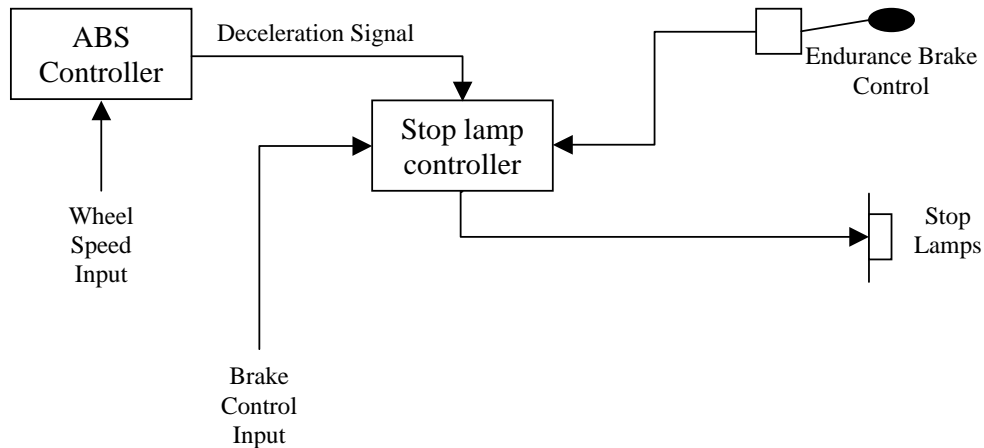
Tyre size calibration – to allow the vehicle manufacturer to offer a range of tyre sizes for a given vehicle the ABS is capable of fulfilling the prescribed anti-lock performance with a range of tyre sizes which can vary by +/-25% on a nominal design value. The result is that an ABS can be installed on the vehicle without any calibration therefore a speed calculation would not be accurate hence the deceleration value would also not be accurate. This would mean the threshold at which the deceleration signal would be generated would have to take account of this tolerance.

ABS Tyre size calibration – should tyre size calibration be necessary all anti-lock braking systems would require modification to realise such a function.

ABS Deceleration Output - anti-lock braking systems on motor vehicles may have no or limited auxiliary outputs, as a result each system would require a specific output dedicated to providing a deceleration signal or alternatively an interface with a vehicle data bus.

Vehicle Deceleration – the ABS could only determine vehicle deceleration as the system does not know what is generating that deceleration which may be service brake, secondary brake, endurance brake, natural engine retardation or uphill deceleration. Therefore the vehicle must be aware of when the endurance brake is activated and only illuminate the stop lamps when the endurance brake is activated and the deceleration threshold has been exceeded.

Vehicle Interfaces – in the case of EBS equipped vehicles interfaces between the braking system, endurance brake and the vehicle control system already exist therefore defining a deceleration requirement for such vehicles requires minimal change. However, ABS vehicles do not have this interface therefore they would require modification to include an interface system as illustrated below:



Conclusions:

While it is possible to realise the functionality defined in informal document No. GRRF-59-11 on an ABS equipped vehicle this cannot be realised without significant change to the ABS and the vehicle control system. Investigations have concluded that the additional cost per vehicle would be approximately €200.

The conclusion of industry is that the application of a deceleration threshold for generation of a signal to illuminate the stop lamps is not justified on ABS equipped vehicles. This is supported by the fact that the application of the current requirements where illumination of the stop lamps when the endurance brake is operated is optional and there is no evidence that this has lead to a reduction in road safety or a problem operating these vehicles.
