

Proposal for amendments to ECE/TRANS/WP.29/GRVA/2024/24

The document ECE/TRANS/WP.29/GRVA/2024/24 proposes a text for a new regulation on Acceleration Control for Pedal Error (ACPE) prepared by a dedicated informal working group under chairmanship of Japan. This informal document proposes amendments to the draft regulation text. The changes compared to document GRVA/2024/24 are indicated in bold for new and strikethrough for deleted characters.

I. Proposal for amendments to document .../GRVA/2024/24

Insert a new section 0., to read:

“0. Introduction

Collisions caused by unintended acceleration resulting from a driver applying the accelerator pedal instead of the brake pedal have been seen to increase in recent years. The issue is particularly prevalent in vehicles with automatic transmission, including electric and hybrid vehicles, and is a more notable occurrence for the elderly. This Regulation provides internationally harmonised technical provisions for Accelerator Control for Pedal Error systems (ACPE), which aim to mitigate the consequences of such incidents.

ACPE limits the effect of an accelerator pedal application by the driver, and therefore it is important that systems only intervene in cases of genuine error. It is challenging to determine from accident data when misapplication of the accelerator pedal has occurred and therefore to define the characteristics of such incidents. Therefore, this initial phase of the Regulation has focused on those scenarios where it is most unambiguous that an error has occurred (i.e. when the vehicle is stationary and there is a clear obstruction present in the driving direction) and is closely aligned to the Japan New Car Assessment Program (JNCAP) protocol already established for assessing such systems.

The ACPE system must also be designed to accommodate any potential conflict with other systems, including Advanced Emergency Braking Systems (AEBS - as regulated under UN Regulation No.152), whose purpose is to brake the vehicle when an imminent forward collision is detected. AEBS must provide a means for the driver to interrupt the system, for example by kick-down of the accelerator control. ACPE could misinterpret such a kick-down as a pedal confusion, resulting in a conflict between the two systems. This potential regulatory conflict is avoided in this initial phase of the Regulation by only considering the scenario of a stationary subject vehicle.

Some vehicle designs intended for very specific uses may jeopardise the functioning robustness of ACPE, for instance when some necessary equipment or design prevents the fitment of sensors in the required location. An example of such configuration is a vehicle adapted at the rear for wheelchair access. Where justified, and to the extent necessary, the Type Approval Authority may exempt such vehicles from some or all of

the requirements, e.g. exemption from compliance with requirements in the rearward direction.

Statistics have shown that majority of pedal error incidents occur in M1 category vehicles, so in the initial phase of the Regulation the development of requirements has focussed on these vehicles. However, incidents are also seen to occur in other categories of vehicle, and the technology as regulated here may also be beneficial for those vehicles. For that reason, it is permitted to approve vehicles other than category M1 at a manufacturer's request.

As ACPE is a driver assistance system, it is appropriate to provide a means of deactivation for those drivers who do not wish to use the system, or for situations where the vehicle is operated in a manner or environment likely to cause improper intervention of ACPE. A novel concept has been introduced in this regulation whereby long-term deactivation is permitted without continuous warning, but the vehicle user must be periodically informed that the system is available and deactivated. This is to reaffirm the choice of the driver or to ensure that other users of the vehicle (for example when it changes ownership or if it is used by multiple drivers) are made aware of the status of the ACPE.

The accident data shows that pedal misapplication scenarios can vary widely from those which have been included for testing ACPE under this version of the Regulation. Therefore, a second phase is looking to expand the situations where ACPE can provide benefit. These considerations will cover requirements and test procedures to address 'moving-off' and moving vehicle scenarios (including addressing vehicles which 'creep' when the brake control is released), pedestrian scenarios, and the inclusion of category N1 vehicles.

Equally, the regulation could be updated in a subsequent phase to accommodate secondary collisions and higher speed, both when technical feasibility is confirmed."

Insert a new paragraph 5.1.6.1., to read:

"5.1.6.1. In the case of vehicles that do not exceed 8 km/h without ACPE in the test scenarios but for which a speed reduction of 30% cannot be achieved due to a low engine power to test mass ratio, the speed reduction shall be of at least 15%."

Paragraph 5.3.2., amend to read:

"5.3.2. There shall not be an appreciable time interval between each ACPE self-check and subsequently there shall not be a delay in illuminating the warning signal, in the case of an electrically detectable failure. However, if the vehicle speed is greater than 10 km/h at the time a failure is detected, the warning signal may be suppressed until the next time the vehicle speed is below 10 km/h."

Delete paragraph 5.3.4:

~~"5.3.4. If the vehicle speed is greater than 10 km/h at the time a failure is detected, the warning signal shall be given not later than the next time the vehicle speed is below 10 km/h."~~

Paragraph 6.2., remove the square brackets and keep the text, to read:

{6.2. Instrumentation

6.2.1. The speed of the vehicle shall be measured with an accuracy of +/- 0.1 km/h.

6.2.2. The position of the vehicle shall be measured with an accuracy of +/- 0.03 m.

6.2.3. The accelerator control force (if applicable) shall be measured with an accuracy of +/- 1 N.

- 6.2.4. The accelerator control position shall be measured with an accuracy of +/- 1%. Alternatively, at the choice of the manufacturer, this measurement may be taken from the vehicle's own position sensor.
- 6.2.5. Measurements shall be recorded at a frequency of at least 100 Hz.†”

Paragraph 6.2 to 6.5, renumber as paragraphs 6.3 to 6.6.

Paragraph 6.5. (former), amend to read:

“6.5. If this is deemed justified, the Technical Service may test in any test condition within the conditions specified in paragraph 5.1. during the tests as described in paragraph ~~6.4.~~ **6.5.**”

II. Justification

1. The document ECE/TRANS/WP.29/GRVA/2024/24 proposes a preliminary draft new regulation on Accelerator Control for Pedal Error (ACPE) systems, as requested by GRVA at their 18th session (January 2024) with the understanding that the text would still to be improved by the informal working group (IWG) at the 19th session of GRVA. This informal document proposes amendments to the draft regulation as requested by GRVA, and following an in-depth revision by the IWG.
2. Section 0 (Introduction): The IWG found it necessary to insert an Introduction into the regulatory text to help the Type Approval Authorities and technical services understand the spirit of the regulation, the use cases it tries to solve, the aims it tries to achieve, the technical limitations that can border the interventions of the ACPE and the dilemmas faced by the IWG when elaborating the text. It can also explain the decisions made by the IWG for particular solutions (e.g. pass/fail criteria, test procedure, scope, etc.). Finally, the Introduction gives an idea of what could be the evolution of the regulation itself.
3. Paragraph 5.1.6.1.:
 - a. A significant proportion of vehicles currently in production cannot fulfil the performance requirements as proposed in the text of document ECE/TRANS/WP.29/GRVA/2024/24. This is mainly due to the remaining power needed for idling (implying a certain creeping speed). The vehicles having a low power-to-mass ratio are the most affected, whether they are empty or laden.
 - b. The proposed text permits adapt the pass/fail criterion for those vehicles.
4. Paragraphs 5.3.2. and 5.3.4.: This amendment aims to resolve contradiction between paragraphs 5.3.2. and 5.3.4. (current) and to incorporate the option for the warning signal to illuminate only when under vehicle speed of 10 km/h (when a failure is detected over 10 km/h) into paragraph 5.3.2.
5. Paragraphs 6.2. to 6.2.5.: The IWG had a consensus on the benefits of the text as it improves the testing in practice.
6. Paragraph 6.5. (former): Need to adapt the reference to paragraph 6.4 to the new numbering.