

Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Dangerous Goods

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Item 5 (a) of the provisional agenda

Proposals for amendments to annexes A and B of ADR:

Construction and approval of vehicles

Re-generative endurance braking

Transmitted by the Government of the Netherlands

I. Introduction

1. In the May 2023 session of WP.15 (113th session) the Netherlands forwarded informal document INF.6 to raise awareness of developments on endurance braking for vehicles with re-generative braking, in principle for electric or hybrid driven vehicles. OICA gave much welcomed detailed information on the topic in informal document INF.16.
2. For the time being it was decided to embrace the new technology with the option to come back to the topic.
3. However, as explained by OICA, there are in principle two systems that can be distinguished, one with a route-planning system, anticipating the state of charge of the battery for descents ahead and one without this system. It is felt that ADR vehicles should be state-of-art and be equipped with such a route planning system, that would limit the need to use the (service) friction brakes to a minimum.

II. Proposal

4. Delete the wording “(Deleted)” in subsection 9.2.3.2 and in informal document INF.3 and introduce new text in exiting subsection 9.2.3.2 to read (new text is in bold):

“9.2.3.2 **Re-generative endurance braking**

Vehicles with re-generative braking equipment shall be equipped with a system that controls the state of charge of the battery before a descent using methods such as a global navigation satellite system combined with a topography model and an intelligent battery management system.”

5. Introduce a new line in the table of 9.2.1.1 to read:

Technical specification		EX/II	EX/III	AT	FL	
9.2.3.2	Re-generative endurance braking	X	X	X ^y	X	^y Applicable to motor vehicles with a maximum mass exceeding 16 tons or authorized to tow a trailer with a maximum mass exceeding 10 tons first registered after 31 March 2026

III. Justification

Concerning the proposal

6. The wording “methods such as a global navigation satellite system combined with a topography model and an intelligent battery management system.” is a direct copy paste from UN Regulation No.13, paragraph 5.1.2.4.3.1.

7. In the past detailed requirements concerning braking have been transferred from what is now Chapter 9.2 to Annex 5 of UN Regulation No. 13. The provision for re-generative braking could also be regulated in Annex 5. However, over many years the requirements in Annex 5 feel to be obscured leading to possible unwanted situations when dealing with ADR Chapter 9.2 as well as UN Regulation No. 105. For this reason, the proposal is made to include this provision in Chapter 9.2 of ADR that will be transposed in UN Regulation No.105 in due time.

Historic background

8. In ADR, endurance braking was introduced after an accident with failing (service) friction brakes and lack of braking performance of the engine. In UN Regulation No. 13 two levels of endurance braking were included, Type II, for a 6% descent over 7 km, where (service) friction brakes were allowed to be used and Type IIA for a 7% descent over 7 km where the friction brakes were not allowed to be used (hydraulic or electric retarder of engine brake function). Type IIA was selected for ADR vehicles with an increased performance up from a maximum of 26 tons vehicle mass to up to 44 tons. In case of transport units consisting of a drawing vehicle and trailer the performance of 44 tons is to be performed by the drawing vehicle.

Re-generative braking

9. Re-generative braking transforms mechanical energy developed keeping the transport unit at a constant speed of 30 km/h on the descent of 7% for 7 km into electricity. This energy can later be used for traction or other purposes. This energy is stored in the battery or possibly in the future in a super-capacitor. When the battery or super-capacitor is fully charged the braking performance in this way stops. The solution after this is to transform the electrical energy in heat in a (water cooled) resistor or use the (service) friction brakes.

10. The adaption of UN Regulation No. 13 for re-generative braking gives two options for Type IIA endurance braking. One where a route planning function would ensure sufficient battery capacity for the descent ahead and a second option without this route planning function to be tested with a battery with a state of charge to allow the electrical energy to be stored in the battery, and one test with the (service) friction brakes. In conjunction with the later test the “hot” performance of the (service) friction brakes has been improved.

11. The discussion in WP.15 on endurance braking has resulted in a re-visit of the provisions concerning re-generative endurance braking in the GRVA group of WP.29. Some shortcomings were spotted and addressed to strengthen the UN Regulation No. 13. This shows the positive interaction between WP.29 and WP.15.
