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English version

Proposals for the braking of electrical vehicles

Propositions pour le freinage des véhicules électriques

Vorschläge für das Bremsen elektrisch angetriebener Fahrzeuge

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1 Benefit of regenerative braking on electrical vehicles and induced problems

The traction batteries, currently available give to electrical vehicles low practical ranges, in the scale of 50 to 100 km, which limits their use mainly to urban. The urban drives offer a high potential of regenerative braking during deceleration phases : the ratio regenerative energy to supplied energy on the traction wheels may exceed 50 %.

On the other hand, the applied techniques for the electrical traction naturally allow a running of, not only as an engine, but also as a generator for reducing the speed of the vehicle. Then, an increase of range is reached, that can be up to 25 % after taking into account all the yields of the system (engine, generator, charge and discharge of batteries).

The regenerative braking has moreover the advantage to smoothly reduce the wear of brake linings of conventional braking system. This remains to day, according to the technology state of the art, demanded to ensure the reducing of speed and the stopping of the vehicle whatever the conditions of use : important decelerations or failure of the regenerative braking.

But the co-existence of both devices may lead to security problems :

- particular proportion of braking effect between axles, the regenerative braking being only applied to wheel drive;

- control of the regenerative braking possibly separated from the conventional brake pedal;

- possibility for the regenerative braking to be influenced by the state of charge or the temperature of the traction battery, then not constant in time;

- failure of the regenerative braking according to multiple modes considering its complexity.

As a consequence, it seems convenient to propose suggestions to adjust Directive 71/320 to the case of electrical vehicles fitted with a regenerative electrical braking system in order to guarantee the user's safety.

The following proposals come from a european working group CEN/TC301/WG2 made of braking and electrical vehicle specialists.