RDW

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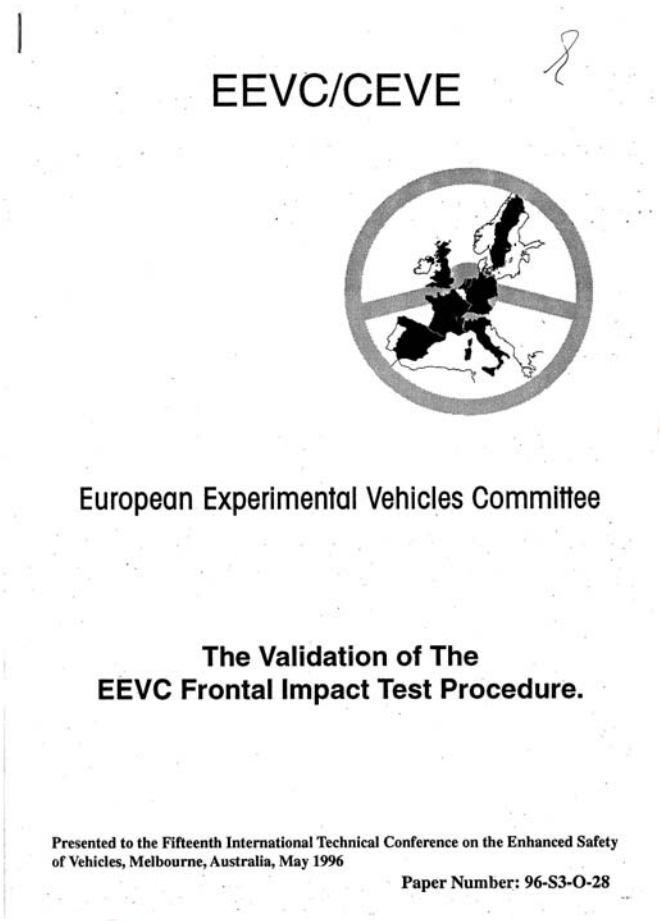
UNECE Reg.94 - Past, Present & Future

Presentation by the expert from The Netherlands to provide a broader view on frontal impact protection

Main conclusions of EEVC research that lead to UNECE R94


EEVC/CEVE

European Experimental Vehicles Committee

The Validation of The EEVC Frontal Impact Test Procedure.

Presented to the Fifteenth International Technical Conference on the Enhanced Safety of Vehicles, Melbourne, Australia, May 1996

Paper Number: 96-S3-O-28

The test parameters which best replicated the baseline 50km/h 50% overlap car to car impact were as follows:

- the most appropriate design of deformable barrier worked out to be the one now specified in UNECE R94, hereafter called EEVC barrier.
- the overlap which gave results most similar to a 50 percent , 50km/h car to car impact was 40 percent of the car's width.
- the test speed to replicate the 50km/h 50% overlap baseline test should be between 55km/h and 60 km/h, but closer to the former. It was agreed that the most appropriate test speed to replicate the baseline tests was 56km/h.

Background for the baseline *car to car impact* at *50km/h and 50% overlap*

• Various accidents studies suggested that the appropriate overlap lay in the range of 40 to 60 percent, for the baseline test was selected 50 percent overlap as a good compromise.

• The value of 50km/h for the baseline test was selected for pragmatic reasons.
However the used accident data showed that to address an adequate proportion of fatal and serious injuries the test should replicate rather a car to car impact speed of 60km/h or greater.

Early remarks on the EEVC Barrier

• During the validation phase it was already found that in some cases stiff members penetrated the deformable EEVC barrier .

• This was generally not considered to be of major importance because one of the main advantages of a deformable face is the removal of the initial very high inertial force generated when the stiff members of the car structure impacts a rigid wall without any deformable face.

Use of EEVC barrier from 1996 to 2008

• The baseline test has lead to an EEVC test procedure and in 1996 this EEVC test procedure has been introduced in UNECE- and in EC-legislation with EEVC's recommended impact speed of 56km/h.

• However, Euro NCAP adopted also the EEVC test procedure in 1996, but with an increased impact speed of 64km/h !

• The first Euro NCAP phases showed many cases where the structural integrity of the passenger compartments was seriously compromised.

• Following Euro NCAP phases with new car models, replacing the ones already tested, clearly showed big improvements on structural integrity as well as on occupant ratings.
It was demonstrated that the severe Euro NCAP demands were feasible.

Role of vehicle mass in UNECE R94 test procedure

- The UNECE R94 testprocedure is a crash against a fixed barrier.
- So the generated kinetic energy is related to the mass of the test vehicle.
- Therefore lighter vehicles are tested with less initial kinetic energy than the heavier ones.
- However, **in reality both light and heavy vehicles meet the same collission partners**.
- Now, again we find ourselves on a point of taking decisions for an introduction of a more realistic frontal impact.
- The Netherlands would like to **avoid non-validated calculation methods to guarantee a minimum test severity** needed in case of using a fixed (PDB) barrier.
- The Netherlands would like a **guaranteed amount of initial kinetic energy provided by the collission partner**.

Netherlands' research on a moving PDB

• Inf. Document No. GRSP-42-32 already reported about a moving PDB to car test (**45/45 km/h, barrier 1500 kg, Astra 1400 kg, 50% overlap**) that generated roughly the same kinetic energy compared with the fixed PDB test (**60 km/h, Astra 1400 kg, 50% overlap**) and lead to simular results.

•However, **replicating a car to car test of 45/45 km/h is thought to be in contradiction of EEVC's recommendation for a baseline test**.

Netherlands' research on a moving PDB (II)

•Netherlands is of the opinion that complementary research is needed, therefore TNO was asked to further explore the moving PDB procedure .

• The chosen test severity in the continued research is the following: 56/56 km/h, moving PDB to car, 50% overlap. As representative of a lighter car the Euro NCAP 5 star car FIAT 500 has been chosen.

• **Doing so the following tests will be taken into consideration:**

TNO test: FIAT 500 to moving PDB, 56/56 km/h, 50% overlap,

ADAC test: FIAT 500 to an Audi Q7, 56/56 km/h, 50% overlap,

Euro NCAP: FIAT 500 to static EEVC barrier, 64/0 km/h, 40% overlap.

Netherlands' research on a moving PDB (III)

• The (moving) PDB test has the potential to also assess (to a certain extent) compatibility.

• The Netherlands is of the opinion that an additonal full width test is necessary to overcome possible misuse of the (moving) PDB barrier.

• A full width test seems also useful as restraint test.

Thank You