

Transmitted by the experts from Spain

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agenda item 3.1)

Proposal for draft amendments to Regulation No. 107 (M2 and M3 vehicles)

A. PROPOSAL

Annex 3

Pragraph 7.7.8.4.1. amend to read:

7.7.8.4.1. In the case of seats facing in the same direction, the distance... , not be less than:

	H
Class I, A and B	650 mm
Class II	680 mm
Class III	730 mm

Annex 4

Figure 12 (table), amend to read:

	H
Class I, A and B	650 mm
Class II	680 mm
Class III	730 mm

B. JUSTIFICATION

A study titled “Analysis of Coaches Rows Seats Distance Influence on the Passengers Comfort and Safety” has been presented at ESV-2009. The paper has been sent to GRSG secretariat to be incorporated as informal document for the group. This study shows improvements in passengers comfort and safety when the seat spacing increases 5 cm with respect the current minimum spacing (according to Regulation No. 107).

The safety of passengers has been evaluated with a tests series replicating the two dynamic tests of Regulation 80. To asses the passenger’s safety, both injury criteria from UNECE Regulation No. 80 and UNECE Regulation No. 94 have been used with the Hybrid-III dummy. Table below shows the comparison of the injury criteria variation when the seat pitch is increased by 5 cm, for both seat belt configurations (two point and three point belts).

		Criterion	3 Rows (Bealted)	2 Rows (Unbealted)	2 Rows (Bealted)			Criterion	3 Rows (Bealted)	2 Rows (Unbealted)	2 Rows (Bealted)
3 Points seat belt	R 80	Head HIC _{36ms}	+	-	+	2 Points seat belt	R 80	Head HIC _{36ms}	=	-	-
		Thorax AcRes	=	-	-			Thorax AcRes	=	=	+
		Femur Fz	+	-	+			Femur Fz	+	-	+
	R 94	Head AcRes 3ms	+	-	+		R 94	Head AcRes 3ms	+	+	-
		Neck Fx	+	+	-			Neck Fx	-	-	-
		Neck Fz	+	-	=			Neck Fz	+	=	-
		Neck My	=	-	+			Neck My	+	-	-
		Thorax V * C	-	+	=			Thorax V * C	=	=	+
		Thorax Def	-	+	=			Thorax Def	=	=	+
		Knee slider	+	-	+			Knee slider	+	=	+
Total		6+; 2=; 2-	3+; 0=; 7-	5+; 3=; 2-	Total		5+; 4=; 1-	1+; 5=; 4-	5+; 0=; 5-		

To increase the comfort of passengers in coaches, paper authors have recommended establishing new seat spacing 50 mm higher than current one, i. e 730 mm.

This comfort improvement will provide a better passenger positioning on the seats and therefore a better safety belt routing and belt restrain performance in case of a collision.

The effect of this new seat spacing in the passenger’s safety for the seats fitting 3 point belts is:

- If the safety belts are used the passenger protection is improved.
- If the safety belt is not used, the passenger protection will be slight lower. Currently safety belts usage is mandatory in Europe by Directive 2003/20/EC.

The effect of this new seat spacing in the passenger’s safety for the seats fitting 2 point belts remains equivalent.

In summary, the balance of all tested configurations shows safety benefits to the passengers with the proposed seat spacing.

The benefits of safety belts in roll-over accidents (which have largest influence in coach safety) are not affected by this change.

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