

**Sleeping coaches – general views on the subject from Denmark
and rough ideas on how to proceed**

A. BACKGROUND

At the April 2006 session GRSG discussed sleeping coaches. This paper outlines the possible ways of addressing the safety issues that were brought up during the spring session.

B. GENERAL VIEWS

1) If the sleeping coach disappears as an alternative for long-distance transport, then many people will choose to drive their own car instead, e.g. when driving from Northern Europe to go skiing in the Alps. This will increase the injury risk by a factor 10 or so since coaches are much safer than cars.

2) The optimal solution from a safety point of view would be a form of belt-type restraint system that could be used by passengers lying down in the horizontal position. Such a system would provide protection both in case of collision and in case of roll-over.

However, we would have serious doubts on whether in practice a more complicated and possibly less comfortable belt arrangement would be used by the passengers. It is difficult enough to make the passengers in ordinary coaches use the seat belts.

C. ROUGH IDEAS ON HOW TO PROCEED

3) Safety in the event of a collision could be obtained by requiring a safety partition in the front of each berth. No biomechanical measurements are available but we expect safety partitions to be clearly better than no safety partitions.

4) Safety in the event of roll-over could be achieved by requiring the side windows to be made from laminated glass in order to keep the passengers inside the coach.

5) Safety in case of fire:

(a) The centre gangway should be permitted to be more narrow (300 mm) than normally allowed when the seats are converted into sleeping berths in order to provide some extra space for the sleeping passengers, but only on the condition that:

(b) All windows next to the sleeping berths are either hinged or fitted with tear-off lists in order to make it possible for the passengers to use them as emergency exits.

6) Stability should be ensured by performing the 28-degrees static tilt-test required in Regulation No. 107 with all berths in the sleeping position, i.e. in the position that will give the coach the highest centre of gravity and where, therefore, the coach is most prone to roll-over.

In Denmark's point of view, it is possible, based on the ideas outlined above, to obtain a satisfactory level of passive safety in a sleeping coach without a (belt-type) restraint system.