

### Information about sleeping coaches

1. Based on the WP.29 demand GRSG started to discuss the question of sleeping coaches, which are equipped with beds or seats convertible into beds or seats inclinable into laying position. This discussion was based on the informal document GRSG-88-16 presented by EC. The chairman of GRSG asked the experts and delegates to collect information about these kinds of buses and seats/beds.
2. The Danish delegate mentioned on the WP.29 discussion that more than 300 sleeping coaches are in service in Denmark, Netherlands, Belgium and Germany. On the Beijing 2004 Motor Show 3 or 4 sleeping coaches were presented and almost every bigger Chinese bus manufacturer has this category in its product plan. (There were 6 prospectus, data sheets available about this kind of buses, which contained more than 20 variant of sleeping coaches) It would be useful to know the number of these buses and their distribution around the world.
3. The available information show that the sleeping coaches are:
  - mainly 12 m long, or longer vehicles
  - high vehicles (HD or DD coaches) where the overall height is above 3,6 m (see Fig.1. and Fig.2.)

It is interesting to mention that the side windows are divided in height in HD coaches, probably to protect and hide the passengers laying on the upper bed.



*Fig.1. Chinese 12 m long HD sleeping coaches*



*Fig.2. Danish DD sleeping coach (SETRA S328 DT) having a frontal collision in Germany, January, 2004 (3 fatalities, 41 injuries, most of them serious)*



*Fig.3. One gangway version with beds*



*Fig.4. Two gangways version with beds*

4. Different seat/bed arrangements are used:
- One gangway version (two seats/beds on both sides, see Fig.3)
  - Two gangways version (three rows of seats/beds, see Fig.4.)
  - Two stories bed arrangement (two levels, one above the other, see Fig.3 and Fig.4)
  - One level sleeping seats (see Fig.5)

The seats/beds are generally in forward facing arrangements (the feet ahead, the head behind, related to the driving direction)



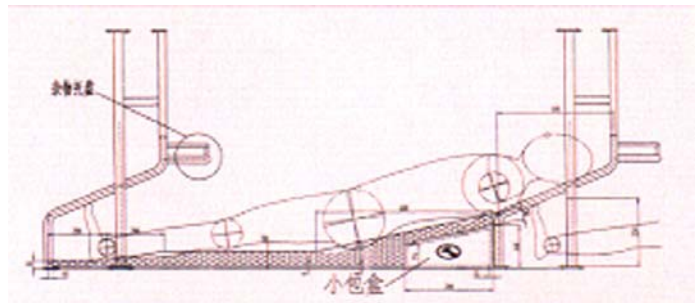
*Fig.5. Seats inclinable into laying position.*

5. The passenger capacity of these kind of coaches has wide variant. The Chinese data sheets indicate 21-42; 24-44; 28-44; 20-49-1; 16-40-1; 29-53-1. Probably the first figures give the number of beds in case of sleeping coach arrangement, the second figures are the number of seats in traditional arrangement.



*Fig.6. Two levels bed arrangement with two gangways*

6. The constructions of the seats/beds are also different, no one typical design, even for the same purpose. Fig.4., Fig.6, and Fig.7. show different bed solutions for the two gangways/two stories bed arrangement.



*Fig.7. Certain bed construction and position of passenger when laying*

7. The ECE general safety bus regulation R.107/Rev.1. is not appropriate in its existing form to approve this type of buses. There are two options:
- a) to exclude this type of buses from the scope of R.107/Rev.1. and pass on their approval to national level
  - b) to reconsider R.107/Rev.1. for the approval of these buses, too.
8. If GRSG decides to cover these buses with the scope of R.107/Rev.1, the following subjects should be reconsidered in this regulation:
- Main text, definitions
  - Annex 3
    - Passenger capacity and belonging questions
    - Stability test
    - Emergency windows
    - Access to service doors and emergency exits
    - Gangways
    - Passenger seats and belonging questions

- Beds for passengers (new subject)
  - Use of safety belt on beds and transformable seats (new subject)
  - Access to upper level beds (new subject)
  - Handrails and handholds
  - Appendix: static lateral stability calculation
- Annex 4 (figures)
  - Annex 5 (strength of superstructure)
  - Annex 7 passenger capacity of sleeping coaches may cause misunderstanding using the limit value 22 passengers between small and large buses.
9. The sleeping coach problem was raised by Denmark on the WP.29 session, when the general questions of bus frontal collision was discussed. Referring on 3 severe frontal collisions of this type of buses (one is mentioned on Fig.2.) he underlined the special attention to these buses when working on this subject. R.80 (bus seats and their anchorages) also should be reconsidered in the light of these information.

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