<u>Informal document No.</u> **GRSG-92-18** (92nd GRSG, 16-20 April 2007 agenda item 2.3.)

Fire safety in buses

<u>Note</u>: The text reproduced below was prepared by the experts from Norway and Sweden in order to inform about the progress of the project "Fire Safety in Buses".

Fire safety in buses

Aim

The aim of the project is to get a knowledge basis about fire safety in buses and fire properties of material used in modern buses and coaches.

Completed tasks

- · Statistical survey of bus fires in Norway and Sweden
- · Survey and fire tests of interior materials in buses



Bus fires statistical review

- 1.0 1.5 % of buses in Norway and Sweden are involved in a fire incident every year
- · Highest risk of severe fire starting in engine compartment







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Material fire tests

- A number of modern bus interior materials have been tested in state-of-the-art small-scale fire tests
- · Evaluation of:
 - Horizontal flame spread
 - Ignition and heat release
 - Flame spread behaviour
 - Smoke production
 - Toxic/irritant gas generation



Products tested

- Wall panels (Y1-2)
- Plastic panels (Y3-4)
- Insulation (Y5-6)
- · Curtains (Y7-8)
- Wall surface (Y9-11)
- Floors (G1-2)



Products taken from M3 vehicles of Classes I, II and III.

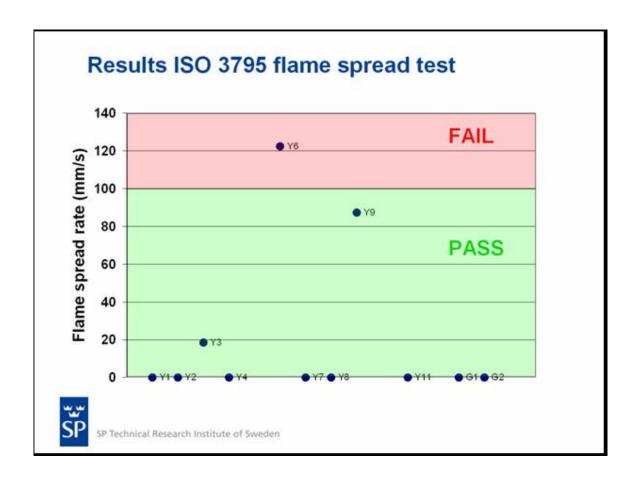


Horizontal flame spread

- Test of horizontal flame spread (ISO 3795)
- Burning rate of 100 mm/minute is the main fire safety requirement for vehicle interior materials







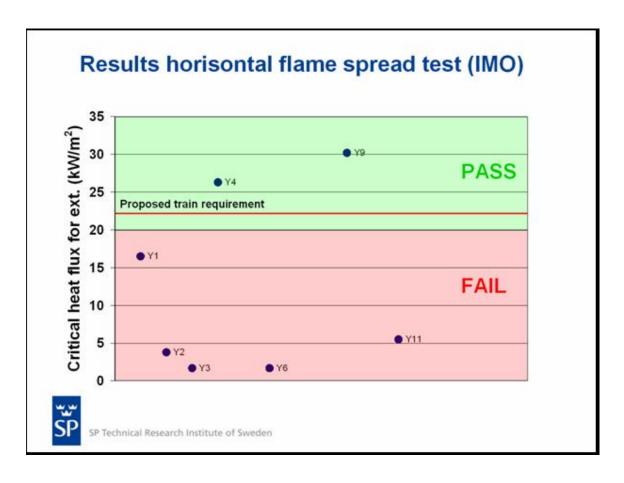
Flame spread

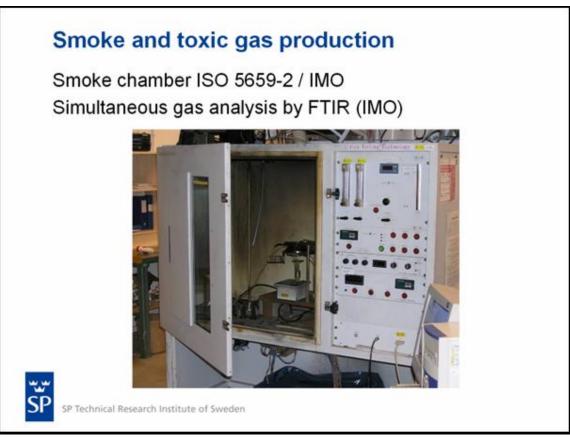
- Horizontal flame spread test for surface linings (ISO 5658, International Maritime Organisation, IMO)
- · European harmonised flooring test

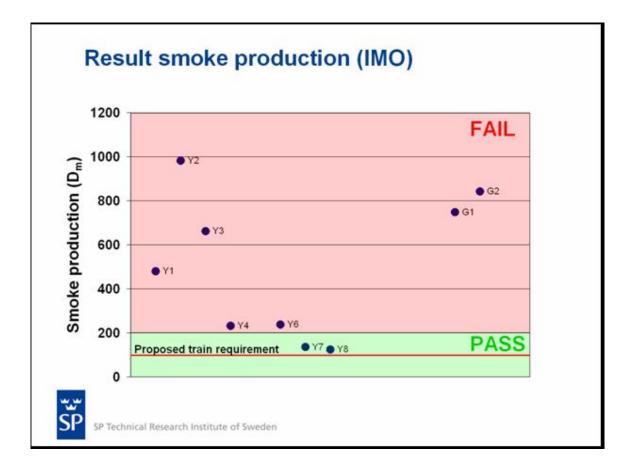












Conclusions

- The flame spread test (ISO 3795) is not enough to represent common types of bus fire.
- The present fire safety requirements imply a low level of fire safety for bus passengers.
- Materials approved for vehicles are not necessarily allowed in other applications.

The fire safety level can be improved with materials that:

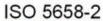
- resist fire for a longer period of time,
- produce less smoke.

It will result in more time for evacuation, easier evacuation and more time to extinguish the fire.



Proposal for change of ECE-regulation 118

- Use similar fire safety approach as for passenger trains and ships.
- · Establish requirements on:
 - Flame spread from a strong initial fire.
 - Smoke production.





ISO 5659-2



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