

**Report of the 8th meeting of the informal group on
“Behaviour of M2 & M3 general construction in case of Fire Event (BMFE)”**
(<https://wiki.unece.org/display/trans/GRSG-BMFE-08>)

Date:	Start	2020, March 4 th	09:00 hrs
	End	2020, March 5 th	17:00 hrs

Venue: **Golf d'Arcangues**
Chemin de Jaureguiborda
64200 Arcangues
France

1. Welcome and Roll call

‘Tour de table’ done

2. Adoption of the agenda (BMFE-08-01 Rev 1)

Agenda adopted

3. Validation of the minutes of the last meeting (BMFE-07-09)

Minutes adopted without further comments

4. Accidentology & statistics: revision of the accidentology collection table (BMFE-08-04)

- **Format review [Chair]**

- The Chair mentioned that the table has been extended with the further comments received during the previous session.

- **Additional inputs [All experts]**

- For the moment, only additional data from France have been updated, extending the time slot from 2016 to 2020.. As the expert from Spain (INSIA) wasn't able to attend the meeting, he promised to give some additional feedback within 2 weeks from the meeting.

➔ Point kept at the agenda for the next session, waiting for inputs from Spain regarding additional data + proposal for classification regarding severity of fire events.

5. Regulation No.107

5.1. Combination of fire detection and fire suppression warnings (BMFE-08-XX)

- **Opportunity to separate provisions for temperature checks at different spots [OICA]**

- The group decided to keep the point on the agenda even though for the moment we have no further information from OICA

➔ Point removed from the agenda for the next session in absence of new inputs from OICA.

5.2. Minimum performance level for fire detection (BMFE-08-06)

- Review on the draft wording proposal with temperature as base requirement, keeping the opportunity for alternative solutions [Secretary]
 - The document was presented and it was discussed that this wording will be ok. The group agreed on the addition as proposed in document BMFE-08-06, to get new paragraphs 4.4 and 5 in respectively Appendix 1 and Appendix 3. Also the reference temperature is added in Annex 3 paragraph 7.5.1.5.1, as to be declared by the manufacturer. This reference temperature is a more technology neutral solution than the excess of temperature.

Conclusion:

- These new paragraphs are also added in the document for the forthcoming GRSG session to amend Regulation 107 accordingly (See BMFE-08-11e UNECE 107 Amendment for GRSG rev.2).
- The group decided to keep the item on the agenda for the next BMFE meeting as we expect maybe more input from the expert from Spain, committed to check internally a potential way to test the alarm system

5.3. Optimization of luminous trajectories and functionalities (flashing lights for ex.)

- **Group expects new inputs [Spain]**
 - If during an emergency the functionalities of the alarm system can be improved by adding flashing lights or other solutions to help evacuate the passengers,

Conclusion:

- we might get new input from the expert from Spain in the coming weeks or for the next session of BMFE. The group decided to keep this point on the agenda.

5.4. Smokes extraction systems

- **Group expects new inputs [All experts]**
 - During this session no additional information was given. No such systems are available.

Conclusion:

- The group decided to remove this point from the agenda for the next BMFE session. If necessary we can put it on again.

5.5. Automated emergency exits (BMFE-08-07)

- **Consensus to be formalized [CLCCR]**
 - For CLCCR manufacturers the automatic opening of the doors is not possible, or allowed. After an internal risk analysis it was clear that if you don't know if it is safe to open the

doors, you can't open them automatically due to traffic etc. The risk is too high to let the passengers of the bus. After a very constructive discussion of the experts it was becoming clear that a risk analysis should be done in order to detect the different possible situations. For a city bus, the stops are well known, for a coach they are not. So the driver must have a possibility in case of fire in the engine compartment to go to a safe place to stop and then let the passengers out. Key point is to evacuate the passengers in a safe way.

- The document provided during the session by CLCCR was reviewed and modified. Experts had the possibility to review it for the 2nd day of the meeting. On the 2nd day the group came to a consensus about the wording and the changes have already been put into the document BMFE-08-11e that will be shown in the next GRSG session.
- Group concluded that as a first step, a centralized dedicated mean to open the exits in case of fire shall be provided to the driver in its compartment. 2 points have to be further discussed within the group as following steps : the opportunity to address extra situations in addition to fire events + the opportunity to address automatic activation in case of no reaction as expected from the driver.

- **New proposal for automatic breaking systems [France]**

- The automatic breaking of the glass as proposed by France implicates that the hammer would be removed from the regulation or both solutions to be provided. If you break the glass it still needs to be pushed out. In the discussion it was mentioned that if the glass is removed too soon if the engine is burning or the tyres are burning, and smoking, smoke will come into the bus, and that is just what we want to avoid in order to evacuate the passengers without smoke.

Conclusion:

- The driver will have the possibility in case of a fire alarm activation to push any of the door controls to open all the doors. If the driver pushes again the doors won't close again. The emergency lighting will also activate when the alarm system activates.
- If it must be automatic or not will have to be coming out of a risk assessment.
- Window breaking for smoke extraction is depending on where the smoke is coming from
- The group decided to keep this item on the agenda because also other situations than fire can be triggering an alarm. A risk analysis will be done by the industry, Sweden will check the available data to contribute to this risk analysis and new documents are to be provided for the next session (Aguila will also further check the automatic window breaking).
- Any additional views from the experts have to be provided regarding the 2 following steps to be discussed : other situations & automatic activation.
- France will bring additional data to the group for the next session based on the comments made in session.

5.6. Full scale test (BMFE-08-XX)

- Synthesis of the project status [Aguila]

- No data was available at this session of BMFE.
- Aguila will provide more data during the next session. What would be the influence with an extra sound alarm, they will also do a risk analysis.

6. Regulation No.118

6.1. Comparison matrix between transport modes (BMFE-08-09)

- Analysis on costs/benefits ratio [Bast]

- The expert from BASt gave a presentation about the cost/benefit ratio based on numbers only for Germany. He mentioned that safety always must come first, but at what cost? If the ratio is higher than 1 it is ok, if it is lower than 1 we should look for other solutions. If a bus is mentioned then we speak about M2/M3 coaches. The bus price is the sales price to the customer. The bus price-cost-ratio is the production cost. For the cost assumptions the typical price of the bus mentioned in the presentation is probably lower than 500k€, it will be more in the range of 350k€-400k€. The 20% ratio bus cost to bus price might also be a bit too high. 150% increase of material price for new material (according to new toxicity requirements) will probably be too high, but for this study it is maintained at this level. The annual bus fire casualties are related to interior smoke, smoke from the engine and tyre smoke. The first results presented in slide 8 are without discounting, this means that no interest grades are taken into account. The excel sheet can also be consulted to see where the numbers come from. In slide 9 the efficiency is assumed to be 100%. This means that when you have 2 the same buses, in an accident in none of the buses no injuries will follow with the measures taken.

Conclusion:

- Based on the assumptions from BMFE-06 and BMFE-07 the benefit/cost ratio is < 1, which is not efficient.
- The value is very sensitive to assumptions and efficiency.
- For a robust benefit/cost ratio, valid numbers should be agreed on,
- A discrimination material per material could be added in order to focus on specific materials for which this BCR could be higher than 1.

6.2. Smoke toxicity development of a simplified method for interior materials used (BMFE-08-XX)

- **Status of study progress : Adapted balance between flame spread / smoke toxicity / smoke density. Identification of the materials and toxic components, performance of relevant tests [BAM]**

The expert from BAM was not in the meeting and the expert from BASt did not give the presentation. He will ask the expert from BAM to make a short summary of the presentation, this will be put on the UNECE website. The time plan for the study has some delay due to problems with the test lab. Tests were to start in October 2019 but they are performed now. More information will be available for the next meeting.

Regarding the timing forecasted :

1. Identifying the materials at stake : already done
2. Identifying the toxic components : already done
3. Performing the relevant tests (Oct 19) : in progress
4. Defining an assessment method (April 2020) : forthcoming
5. Defining recommendations (ca. Nov 2020) : forthcoming

Conclusion:

- We will keep this point on the agenda of the next meeting , waiting from study status from BAM
- **Alternative proposal for evaluation [XX]**
No such proposal has been made

6.3. Experimental study on full scale test (BMFE-08-15)

- **Outstanding synthesis presentation [XX]**

The expert from Efector gave a presentation about a test performed by NIST, the National Institute for Standards and Technology in the US. The test is about a failure in the wheel bearing and the spread of smoke and fire that occurs after the failure. Reference studies: Motorcoach Tire Fires Passenger Compartment Penetration , Tenability , Mitigation, and Material Performance and Experimental study of tenability during a full scale motorcoach tire fire. The bus tested is not foreseen from a complete interior, so flame and smoke spread might be different and even worse with a full interior. It takes about 10 minutes from the tyre ignition to getting flames inside the bus. The tenability conditions are shown in slide 15, with first the heat of the fire at 8:05min that will be unbearable for passengers with light clothing. So the heat of the fire is the thermally

untenable condition after the fire penetration.

Out of the discussion after the presentation came that this is tested according to FMVSS, which is only interior testing, horizontal burning rate. In Europe we must test according to R118 which is more severe. Aguilal showed a video from a previous BMFE session of smoke evacuation out of a bus interior, this shows similar results of the smoke first getting into the interior

Conclusion:

The group decided to remove this point from the agenda of the next meeting.

6.4. Flammability performance

- **Group expects new inputs on the relevancy of the current requirements [All experts]**

The group decided to keep this point on the agenda.

The expert from OICA found an error in the translation from annex 7 paragraph 2.3. In English 2,10mm square is mentioned and in French it is 2,10mm². The French text needs to be adapted.

Conclusion:

The chair will inform the GRSG secretary about the mistake and probably an informal document will have to be send to GRSG for the next session.

7. Informal documents preparation for GRSG 118th session (BMFE-08-11 / BMFE-08-12)

7.1. Regulation UNECE n°107 (BMFE-08-11)

Document BMFE-08-11 contains several amendments.

- The reference temperature has been added in appendices 1 and 3. The addition was already proposed in document BMFE-08-06, to get new paragraphs 4.4 and 5 in respectively Appendix 1 and Appendix 3. Also the reference temperature is added in Annex 3 paragraph 7.5.1.5.1, as to be declared by the manufacturer. This reference temperature is a more technology neutral solution than the excess of temperature. The driver will have the possibility in case of a fire alarm activation to push any of the door controls to open all the doors. If the driver pushes again the doors won't close again. The emergency lighting will also activate when the alarm system activates. In annex 3 a new paragraph 7.19 will be inserted regarding the safety information. Justifications will have to be set as described in the previous meetings. Transitional provisions also need to be added according to the guidelines of revision 3 of the 58 Agreement.
- A final version referenced BMFE-08-11 rev2 has been built in session and will be provided to GRSG including transitional provisions and justifications.

7.2. Regulation UNECE n°118

Document BMFE-08-12 contains several amendments:

In this document a new proposal for the adhesive agents is put in annex 2, point 5.1. A list should be provided. Under no.5 Part I: Burning behaviour for components used in the interior 2 new paragraphs are inserted: 5.2.4.1 and 5.2.4.2 explaining that if a material in combination with an adhesive agent is known together (both are fulfilling the requirements) then it is ok (5.2.4.1). In the case where a material and an adhesive agent is not known together (adhesive agent not declared), then the combination must be tested. Justifications will have to be set as described in the previous meetings. Transitional provisions also need to be added according to the guidelines of revision 3 of the 58 Agreement.

- A final version referenced BMFE-08-12 rev1 has been built in session and will be provided to GRSG including transitional provisions and justifications.

8. Next steps and meetings

8.1. 9th meeting (TBD)

BMFE-09 :

23-24 June in Paris (French Ministry) starting 23rd June at 10:30hrs and ending the 24th June around 16:00hrs.

BMFE-10 :

2-3 September in Berlin or at BASt (TBC) starting 2nd September at 10:30hrs and ending the 3rd September around 16:00hrs.

9. A.O.B.

None