Meeting Number 4
Geneva 08 June 2009

H2SGE-04-WP-02

UN ECE - INFORMAL GRPE WORKING GROUP
HYDROGEN FUEL CELL VEHICLES
H_2FCV SUBWORKING GROUP ENVIRONMENT (SGE)
4th MEETING - MINUTES

UNECE, Palais des Nations, Geneva, Room No.5 (10:00-12:30)

Executive Summary

The SGE considered the status of the technical reports under elaboration for each of the previously agreed list of environmental topics.
These technical reports will include a conclusion on the need and possibility for world-wide harmonisation of each topic, which could then lead to an overall conclusion about the detail of work towards a Hydrogen gtr in the Environmental field.
Individual members were assigned the responsibility to prepare reports. The group agreed to work towards a finalisation of the technical reports by the end of September and the preparation of a summary report by mid-October for submission as an informal paper to GRPE at its January 2010 session.

Detailed Report

1. STATUS OF THE WORK

Mr Narusawa (Japan; technical secretary of the HFCV-SGS – safety subgroup) gave a report on the subgroup activities. Despite the numerous items which still need to be clarified, he deemed possible to keep up with the scheduled deadline to finalise a Hydrogen and Fuel Cell Vehicle gtr by Sept 2010. For the time being, the gtr shall only address passenger vehicles and it is concerned with 3 areas:

1. H2 storage – an OICA and ISO proposal was submitted on this issue
2. Electrical systems – an ad-hoc group created to tackle this issue – and
3. H2 systems.

Further details can be found in annex.

A. Perujo (chairman of the subgroup environment –SGE) presented the status of the work of the HFCV-SGE subgroup, he addressed the previous work done by the group, listed the five documents circulated and the comments received.

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2a. RECEIVED DOCUMENTS REVIEW

The following five documents were circulated:

1. **H2SGE-04-IP-01**: Note addressing aspects considered by the Subgroup Environment and given the structure of the technical reports in support of the harmonisation process.
2. **H2SGE-04-IP-02.2**: Energy and Operation Performance of Hydrogen (H2) fuelled Vehicles. Rev. 1 of the draft report: Fuel consumption, External Electrical Consumption and Maximum speed measurement.
3. **H2SGE-04-IP-03**: H2 Reference Fuel and Reference Gases.
4. **H2SGE-04-IP-04** (former 09-04-06-HFCV-SGE-TR-pollutantemissions): Draft Technical Report -Pollutant Emissions of Hydrogen (H2) Fuelled Vehicles by Mr Albus
5. **H2SGE-04-IP-05** (former 09-04-06-HFCV-SGE-TR-carbondioxideemissions): Draft Technical Report -Carbon dioxide (CO2) Emissions of Hydrogen (H2) Fuelled Vehicles

In particular, the Chairman presented the comments received by Mr Klein (OICA, Ford Europe) and by Japan and asked for further comments.

Comments by Mr Klein:

1. H2 & H2O should not become regulated emissions,
2. Neither should fuel quality.
3. Wherever possible it should be purse the adoption of standards as we do today in some ECE Regulations/EC Directives.
4. Regarding top speed measurement we might have to update the ECE R68; however, in his understanding this regulations is not mandatory in Europe for homologation purposes.

Mr Brusaglino agreed with Mr Klein's comments, adding that:

1. The group should use existing standards and regulation as much as possible as starting point of its activities
2. Harmonisation of these standards should be pursued in a second stage.

Mr Albus underlined the difference between market fuel quality (FQ) and reference FQ. While the former is outside the GRPE competence and should not be evaluated, the latter is part of the mandate and should be addressed by the group, since it is a necessary step towards getting comparable measurements and results.

The Chairman shared Mr Albus' opinions and concluded that the reference fuel is an item to be defined by the group.

Comments by Japan:

1. **H2SGE-IP-01**: Table 1 includes "H2 & H2O emissions" as an area that GTR should address for different vehicles. We would like to know the reason(s) for measuring H2 and

H2O emissions from FCV. Also, it is desirable that such reason(s) be contained in the TR (report).

2. **H2SGE-IP-02:**
   i. For fuel consumption, SAE J2572 standard exists: Recommended practice for measuring the fuel consumption and range of fuel cell powered electric and hybrid electric vehicles using compressed gaseous hydrogen (Revised October 2008).
   ii. For hydrogen fuel quality, SAE J2719 standard exists: Information Report on the Development of a Hydrogen Quality Guideline for Fuel Cell Vehicles.
   iii. The second correction was made to ISO14687 in March 2008 (ISO 14687 Cor.2:2008).
   iv. ISO/TS 14687-2 is currently being reviewed for international standardization in 2011.
   v. Table 1 contains ISO WD23274-2. However, FCHEV is not included in the scope of this standard.
3. **H2SGE-IP-03:**
   i. Once the technology to produce and assure the quality of hydrogen fuel containing the minute amount of impurities as specified in the fuel standards is established and such reference fuel is made available, it will be possible to evaluate the effect of impurities on individual vehicles and thus be helpful in the development of FCV.
   ii. Regarding the FCV fuel consumption measurement, the Weight Method, Pressure Method, and Flow Method, as specified in ISO and SAE standards, are currently considered practical. The reliability of the accuracy of these fuel consumption measurement methods was verified by JARI at the time of developing ISO23828.
   iii. While the Hydrogen Balance Method and Oxygen Balance Method will be useful once they are put into practice, there are technical issues to be addressed. The Hydrogen Balance Method needs to take into account water inside the equipment of fuel cell system, and an issue with the water balance measurement accuracy is predicted. As for the Oxygen Balance Method, JARI conducted a verification experiment in the past but reported that the sufficient accuracy (within 1%) was not achieved.

Following a discussion on these comments, the group agreed that:

1. **H2 emissions** do **not** need **to be addressed**, since they do not represent and environmental problem.
2. **Water emissions** may, on the contrary, represent an environmental problem (as it was later on explained by Mr Albus) but the advice will be **"not need to be addressed for the time being"** , since the number of concerned vehicle is not large enough as to justify a regulatory intervention.

These conclusions shall appear in the technical reports on this issue.

2b. DOCUMENTS´STATUS OVERVIEW

The Chairman presented the current status of the table listing all the items tackled by the group, the papers in preparation, with their status, responsibility and schedule. See details in H2SGE-04-IP-01.01

Mr Albus pointed out that the SGE has to be taken into account the activities done in parallel by:

1. GRB which has already started working on noise derived by hybrid propulsion systems;

2. EC which is further developing the framework directive on H2 and Fuel Cell Vehicles. Mr Pekar already expressed his intention to work very closely with SGE to develop common outcome. We need to contact him to avoid double work and confusion; this would be for benefit for both.

The Chairman agreed with the need to avoid double work and confusion, since this would be for the benefit for all the groups. He expressed his intention to contact Mr Pekar to evaluate how activities could be combined (The chairman has already done so).

2c. DETAILED DISCUSSION ON SPECIFIC ISSUES

- Fuel Quality (reference),

Mr Albus underlined the need for a reference, both for consumption measurements and for emissions measurements. He deemed important to clarify the differences between the ISO and the SAE standards:

1. SAE J2572 reg. fuel consumption standards
2. SAE J2719 reg. hybrid fuel quality standards.

The Chairman asked Mr Busaligno for his collaboration, who agreed with the need to evaluated the differences and to pursue harmonisation.
Mr Narusawa said that the quality is not so important for ICE-H2 as for FC, being the latter very sensitive to contaminants.
The Chairman pointed out that, since the relation between the quality of fuel introduced and the resulting emissions cannot be disregarded, it is very important to define a reference fuel. Therefore, the **fuel quality reference** item shall stay on the agenda as an **item to be tackled** by the group. The group shall first define it, finalise a technical report in this issue; at a later stage shall be concluded whether a gtr is need or not.
The conclusion was accepted by the group without any comment.

- Hybrid Fuel Cell Vehicles definition,

After a short clarification between Mr Albus and Mr Brusaligno, it was concluded that the description given by Mr Brusaglino in the technical report (H2SGE-04-IP-02.2) were **in line with the definition given in UN-ECE R.83 and R.101.**

- Concerning the gtr deadline of 2010,

Mr Yuntang (China) expressed concern on its feasibility.

As explained by Mr Albus and confirmed by the Chairman, the gtr will first address safety issues only and at a later stage (following the outcome of the technical reports) it will be decided on whether introducing some environmental aspects as well. **Environmental items** which could be **possibly introduced in a gtr** are: the **fuel consumption** and, **maybe, the reference fuel quality**.
Therefore the **gtr deadline of 2010 applies only to safety issues.**

Several issues were discussed in detail and the outcome is reported herewith:

- **Water emission**s,
  Mr Albus gave a presentation on this issue (details in annex 09-06-07-HFCV-SGE-TR-H20) explaining that:

    - Water steam (vapour) emissions are
      - relevant for climate change (GHG)

    - Water fluid emissions are
      - partly vaporised later (see above)
      - relevant for traffic safety, because of wet streets and ice in winter

He would appreciate data on emission for Fuel Cells.
He concluded that due to a very limited number of Fuel Cell vehicles foreseeable for the next years, there is no need for regulatory activities on this issue for the time being. This should be, however, underlined in the report, explaining the situation and giving a short justification.

The conclusions of the presentation were agreed by the group without any comment.

3. WAY FORWARD

The Chairman concluded with an outlook on the way forward and suggested schedule and responsibility. **Next steps**:

1. Finalising the **technical reports**. In particular volunteers to work on the items not yet tackled would be welcomed. Exchange will be via email.
   Target date: **mid-Sept 09**
2. Concluding the work in a **final report** to be edited by a restricted group. The document should investigate the possibility of harmonization of environmentally related requirements and to propose actions in those cases where harmonization might not be possible. In a structured way the final document will collate the technical reports and present conclusion on the basis of the findings. Exchange will be via email.
   Target date: **mid-October 09**.
3. **Meeting** of the group to discuss and agree on the final report..
   Target date: **end October 09**.
   Possible meeting locations could be: in Ispra, Paris or Brussels.
4. Submitting the above final report as an **informal document to GRPE in Jan 2010**; not enough time for a working document.

Mr Albus underlined the need:
- To check schedule of GRB regulatory activities on noise
- To check schedule of EC regulatory activities on H2 an FC vehicles.

The proposed scheduled was accepted by the group without further comments.

The Chairman asked members to reflect on their participation in the editing groups and, in particular, asked Mr Albus, Mr Narusawa and OICA for support in finalising the technical reports because of their consolidated experience on the subject.

The Chairman thanked the SGE members for their contributions and closed the meeting.