11th UN-ECE - GRPE Informal Work Group Meeting on Hydrogen and Fuel Cell Vehicles (H_2FCV).
Location: OICA offices, 4 rue de Berri; Fr-75008 Paris, France
Dates of the meeting: October 12th & 13th 2004
Duration of the meeting: October 12th: 13:00 – 18:00
October 13th 9:00 – 15:00
List of participants: See annex n°1.
- -

Detailed questions and items

1. Agenda and organizational information

- Organizational information

The Chairman welcomed the attending experts.

He thanked the meeting hosts: Mr. G. Van Eegher & Mr. P. Laurent

The Secretariat inquired about and booked diner arrangements.

- Agenda comments & proposals

The Chairman notified the expected meeting durations:

Day 1: 1:00 p.m. to 6:00 p.m. - Day 2: 9:00 a.m. to 3:00 p.m.

- New members

In a short “Tour de table” the experts presented themselves

- Overview of the different agenda items

The group adopted the meeting agenda.

The Secretariat notified the availability of the meeting documents in the room.

Note from the secretariat: In the minutes, the names will only be stated once with the association or company details.

2. PSA Presentation – Swap rack system

- The Chairman gave the floor to Mr. G. Van Eegher, OICA/CCFA/PSA.

With his colleagues he presented the PSA Hydrogen "H_2 Swap rack" project.

- The background of the "Swap Rack" choice was outlined.

PSA and Air Liquide have performed an economic study to make a comparison between cost of H2 fuel delivered by a usual hydrogen station and by our specific swap-rack. Just as a reminder, a swap-rack is a removable compressed hydrogen storage system. When the swap-rack is empty, it is easily removed from the vehicle and replaced by a full one. Then the empty rack is refuelled using existing industrial hydrogen plant. In our study, a small fleet of urban vehicle based in Paris area is taken into account. The existing hydrogen plant is an Air Liquide plant based in the North of France. Swap-rack cost has been broken down into four main parts:

Swap-rack capital cost as 2 or 3 swap-racks per vehicle are needed for logistic reason,
Handling and Maintenance cost,
Transportation cost,
And obviously hydrogen cost.

The comparison shows that for small number of vehicle per refuelling place, it is cost effective to use a swap-rack. For example, with an hypothesis of 0,6 kg hydrogen per vehicle and per day, i.e. around 60 km per day, swap-rack cost is lower than hydrogen station cost if there is less than 250 vehicles per refuelling place. In other words, if the hydrogen station can not supply more than 250 vehicles with 0,6 kg H2 on average, it is worth to use a swap-rack. It is important to notice that cost depends on the number of vehicle per refuelling place. With our swap-rack, fleets can be based on different locations without a noticed increase of the total cost. On the contrary, an additional hydrogen station will dramatically increase hydrogen cost of all hydrogen stations. PSA and Air Liquide believe the swap-rack is a smart solution at early stage of hydrogen society development, when there is still a lack of hydrogen station which might not be cost effective. It may be a nice way to get fleets of hydrogen vehicles on the road using existing hydrogen network without depending on potential non cost-effective hydrogen station.

- Two "Swap Rack" prototypes were exhibited, an old and a new version. PSA's experts further explained the concept and answered the questions of the attendees. The "Swap Rack" includes all the equipment under pressure and the electronic monitoring components. The links between the "Swap Rack" and the vehicle are under low pressure

3. Report 10th informal meeting and 48th GRPE (June 2004)

Documents: TRANS/WP.29/GRPE/48 paras. 33-35
TRANS/WP.29/1016 para 48
Informal document : GRPE-48-17-Rev.1

- The group adopted the Chairman's oral report of the 10th Informal GRPE-H_2FCV WG meeting and acknowledged the 48th GRPE and WP.29 session minutes according to which the group may set up ad hoc Sub-Working Groups (SWGs) in order to address the Road Map to develop Hydrogen / Fuel Cell Vehicle Global Technical Regulation(s) issues - H_2FCVs GTRs. Pending WP.29 and AC.3 political decisions about the GTR options 1 or 3, the draft proposals for new regulations – LH_2 & CGH_2 – remain on the shelf.
- To Mr. M. Koubek, NHTSA/US DOT, inquiring if the 134th WP.29 session might be expected to make a decision, the Chairman agreed about the urgent need for a decision but he rather expected a 135th WP.29 decision.

4. Minutes of the 9th and 10th GRPE-H_2FCV WG meetings

Documents: TRANS/GRPE/xxx Not yet available
Informal document N° GRPE-48-17-Rev.1
9th GRPE-H_2FCV WG Meeting minutes BMVBW, S34/20040526

- The 9th GRPE-H_2FCV WG meeting minutes had been distributed too late for approval by the 10th WG meeting. Circulated since, the group adopted them.
- The 10th GRPE-H_2FCV WG Meeting minutes drafted by Mr. R. Hubert, UN ECE Secretariat, were not available for approval. The WG might consider their adoption during its 12th meeting. The main item of these minutes is the revised version of the "GTR Road Map".

5. Update on national activities (Europe, Japan, USA)

Documents:

Four Year Plan for Hydrogen, Fuel Cell and Alternative Fuel Vehicle Safety Research, NHTSA/US DOT - Website: www.nrd.nhtsa.dot.gov/departments/nrd-11/H2-4yr-plan.pdf

Current Status of Establishment of Safety Regulation for Fuel Cell Vehicles–II, NTSEL-Japan

- The National representatives were invited to present their document:

-- Mr. M. Koubek highlighted NHTSA's 4 year research plan:

Background: A program focused on providing critical safety information on H_2 powered Fuel Cell (H_2FCV) and Internal Combustion Engine Vehicles-ICEV. It is vital to support the launch of the FreedomCAR Program and it is designed to advance the development of FCVs and H_2 fuel infrastructure in order to: reduce dependence on foreign oil, improve vehicle efficiency, reduce vehicle emissions, make FCVs a practical and cost effective choice for large numbers by 2020. NHTSA aims complementing these efforts by conducting risk assessment studies of H_2 fueled vehicles based on test evaluation procedures for safety assessment using suitable performance criteria and it will quantify potential failures that could indicate unsafe conditions. Corollary efforts will address fuel economy and international harmonization of global technical regulations-GTRs- for H_2 vehicles and will analyze potential increases in fleet fuel economy and will also determine the content of regulations pertaining to FCVs and ICE H_2 vehicles.

Problem definition: The aim is to provide a level of safety comparable to that of other vehicles currently in use; the main safety concern being H_2 onboard storage. Additionally, high voltage and auxiliary batteries, the issues of electrical shock, isolation and ignition of surrounding materials must also be studied.

NHTSA Research Plan and Related Activities:

Outside Activities: Review and or participate in the development of applicable industry codes and standards, public outreach, and safety information collection

Vehicle safety research: Powertrain, vehicle fuel container, delivery system performance testing (effectiveness of safety systems, leak detection, fire & road hazards exposures); Refueling system performance testing (leakage, spark / grounding); Fuel vehicle performance testing (crash, leakage, electrical isolation of fuel cell, cooling system and auxiliary batteries, incident management, special crash investigations program, recycling, corporate average fuel economy analysis and evaluation; International Regulations/International Policy and Harmonization (development of performance based GTR for H_2FCVs, UNECE WP.29 forum and GRPE-H_2FCV WG participations, bilateral cooperation agreements with the EU, Canada & Japan on the development of H_2 fueled vehicles, cost weight and lead time impacts of alternative fueled vehicles)

Current Baseline Status of H2 Powered Vehicles and Four-Year research Timeline: crash safety considerations, passenger compartment integrity and crush zone, H_2 fuel safety, potential release of other fuel system fluids and gases, battery and/or electrical damage, fire hazards, testing time lines.

The Chairman thanked Mr. M. Koubek for his very extensive presentation.

Mr. V. Rothe, OICA/VDA/Opel, inquired about a CSA mandate from DOE, Department of Energy, to develop H_2 standards and wondered how it fitted with the 4 year plan.

Mr. M. Koubek agreed there was an urgent need of coordination and he also acknowledged that SAE was preparing an amendment to FMVSS 305. He further committed to investigate the issue and hoped that all these projects would contribute to accelerate progresses.

The Chairman summarized and stressed: 2005 as reference year; 2008 for the GTR completion; 2010 for its adoption and 2020 for US distribution.

The Chairman also emphasized the GRPE-H_2FCV WG required cooperation to reach only general agreements, the SWGs being entrusted with the details. He further inquired if NHTSA would then be flexible enough to modify its plans?

Mr. M. Koubek expected NHTSA to remain as flexible as previously (e.g.: air bag issue influencing a policy change to consider new technologies).

The Chairman confirmed the GRPE-H_2FCV WG was strongly interested by an exchange of information, by cooperation; it indeed sought flexible points of views. The Chairman welcomed feedback from NHTSA's discussions with other bodies and with the manufacturers.

Mr. G. Brusaglino, ISO, noted Safety but also Performance were stated. But, considering table n° 4, Consumption was not clearly stated. He presumed it would certainly be discussed later.

-- Mr. K. Narusawa, NTSEL Japan, presented the "Current Status of Establishment of Safety Regulation for Fuel Cell Vehicles – II:

Background: The establishment of safety regulations was needed for mass production and dissemination. It implied: Development status of Fuel Cell Vehicles (FCVs), Japanese government policies, FCV safety-related issues.

History: Activity outline since February 2001 until April 2003 and further.

Project Purpose: Examine safety regulations and technical standards for vehicle safety and environmental conservation under the aim of introducing FCVs for public use from 2005; establish testing methods, collect data; scope of examination: high-pressure H_2 .

General Concepts for Safety Regulation: criteria for safety system (H_2 safety, High voltage safety), criteria for individual components (fuel container and its attachments), criteria for entire vehicle (conformation to prevent H_2 gas accumulation, H_2 leakage limit in collisions, etc.)

Project Structure: MLIT commission entrusting NTSEL of the project for establishment of Safety Regulation for FCVs; setting up of three WGs (WG1: H_2 safety & Crashworthiness; WG2: High-voltage safety & EMC; WG3: Environment protection and Other).

Plan: The final version of the regulation is being drafted; public comments are soon expected; notification to WTO is being prepared; April 2005: entry into force

Proposed Revisions of Technical Standards on FCVs: Key provisions – 1 & 2 address H_2 safety technical standards on the Fuel system of FCVs Fueled by Compressed H_2 Gas (new); Key provisions – 3 address Measures against fuel leak in frontal/rear-end collisions technical standards on Prevention of Fuel Leak in Collisions (partial revision) and High-voltage safety technical standards on Protection of FCVs from Electric Shock, etc (new); Key provisions – 4 address EMC technical standards (new) and Windshield wipers and defrosters etc. technical standards on Windshield Wipers and Washers of Passenger Cars etc (partial revision) and technical standards on Defrosters (partial revision).

The Chairman thanked Mr. K. Narusawa for his very complete presentation.

The group acknowledged that since October 6th 2004 the draft was just about finalized and that the entry into force remained April 2005.

Furthermore the group noted these were new technical standards for FCVs (e.g.: the PSA Swap Rack project would currently not be accepted due to a lack of technical information).

The group might expect finalized information by end of the year.

-- Europe – platform, framework program, HarmonHy, …

Mr. J.-P. Laguna–Gomez, EC DGE, notified that since January 2004 an EC Technical coordination addressing H_2 had been launched at all levels: Research & Development were sub groups addressing different issues such as Codes, Regulations & Standards (Nov. 10th 2004 meeting expected); the EC Framework programme 5 & 6 project address: City cell, FCtestnet & FUEVA.

Mr. G. Martini and Mr. A. Perujo, EC DG JRC, further explained a project aiming to measure the performances of a vehicle fleet in real urban use (two regions, one in Italy & one in Germany) and to gather H_2 documentation as from basics.

Mr. G. Brusaglino further stated the HarmonHy project aiming to harmonize standards and regulations by identifying gaps and establishing a matrix covering the EU and other areas.

Mr. J. Seissler, ENGVA, pinpointed the funding problems raised by these different projects?

Mr. J.-P. Laguna-Gomez replied the funds were managed by the Framework Programmes. JRC admitted competition in between the projects.

Mr. R. Bauer, OICA/VDA/DC stressed the numerous project overlaps and wondered who inquired about the needs for all these projects?

The Chairman considered this was another issue which was not in the group's mandate. The goal being to seek what was important and to clarify the group's tasks: Proceed towards a harmonized H_2FCV GTR.

Mr. M. Koubek reminded the ongoing discussions between Official Bodies aiming to reach a compromise. For 2005 there should be an agreement on the activities and the required budgets. He welcomed, at least between US and EU, accesses to websites providing information.

The Chairman confirmed it would be useless to set up another group; there were other issues to address.

6. GTR development (sponsor, etc.)

- (Co-) Sponsor(s) must be UN ECE Contracting Parties to the '98 Agreement; the Chairman confirmed that he was, on behalf of Germany, deeply implied and that, at an equivalent level, he hoped the US and Japan would agree to become Co-sponsors.
- Mr. K. Narusawa gave Japan's principle agreement to co-sponsor; an official confirmation should soon be available.
- Mr. M. Koubek notified his administration was waiting for the WP.29/AC.3 Political Decision which should provide an orientation.
- The chairman acknowledged the answers and stated his goals: present an Informal Document at the 49th or maybe at the 50th GRPE. The current Road Map being a good basic document. He noted there would be no time pressure the mandate, in principle, is already in the group's hands.
- Mr. M. Koubek insisted that some time was nevertheless needed to, gather environmental expertise and suggested to remain cautious about other issues (e.g.: Safety). He agreed a document should be tabled for the 50th GRPE.
- The Chairman insisted on the liability of the (co-)sponsors and suggested to further discuss the issue in SWGs rather than in plenary GRPE-H_2FCV WG.
- Mr. M. Koubek expressed the feeling that a plenary GRPE agreement would nevertheless be needed.
- The Chairman suggested the12th GRPE-H_2FCV WG meeting might, prior to the 49th plenary GRPE, resume its discussion. Progresses would then be estimated. A spring meeting might then be convened to clarify the question. Simultaneously, the EU might then have adopted a clear position.

- A "Formal proposal to develop (a) HFCV GTR(s)" should be prepared to obtain AC.3's approval. The issue should be further discussed when addressing other agenda items. Moreover an agreement was not immediately expected about the future way to address a GTR, AC.3 should first provide clarifications.

- <u>One GTR in one final step, one GTR step by step (increasing), modules</u>. The group further discussed the need, considering the SWG results, to draft: a Scope, the GTR organization, the Process towards GRPE, the Timeframe (see the Road Map and the WP.29 report). The WG expected new suggestions and agreed to resume its discussion during its 12th meeting.
- Mr. M. Koubek further inquired about a possible motorcycle, truck or bus issue popping up: Would enough flexibility be possible?
- The Secretariat insisted flexibility was always required and available; all the issues could be addressed in loops.
- Mr. P. Adams, OICA/Bil Sweden/Volvo, feared the exclusion of some potential users before activities even started.
- The Chairman warned, prior to undertaking the GTR(s), to remain cautious about the expected workload if everything was addressed simultaneously.
- Mr. J. Seissler suggested, in principle, to cover, as from start, all options; but, as state of the art, to kick off with Passenger Cars (PCs) & Buses, and to, afterwards, address the other issues.
- Mr. G. Bindl, Technical Services/TÜV Cologne, favored kicking off with PCs and, moreover, suggested preparing, right away, for other vehicles.
- Mr. J. Sato, JASIC, reminded the huge efforts required for PCs only.
- Mr. G. Martini and Mr. A. Perujo inquired about manufacturers' market needs.
- Mr. P. S. Heggen, CLEPA/RAFS, favored kicking off with buses, their fleets would first come in use for obvious environmental public transport reasons.
- Mr. J. Seissler rather favored, for marketing and technical opportunities, kicking off with Light Duty Trucks and Vans which offer enough room to host the H_2 cylinders and to later address PCs.
- Mr. P. Adams suggested simultaneously drafting several GTRs fearing that a GTR structure including everything was bound to loose everyone.
- The Chairman, considering the discussion, suggested keeping in mind all the above stated suggestions and committed discussing them with the expected GTR co-sponsoring delegates: Mr. M. Koubek and Mr. K. Narusawa.

7. Organization of HFCV group and sub groups

The Chairman reminded that the task would require the help of experts from other fields of activities. GRPE had approved the setting up of SWGs. Their amount should be finalized prior to the 49th GRPE session. In the meantime the group acknowledged the following facts:

- The Chairmanships of the SWGs.

  The Chairmanships will depend on the amount of SWGs.
- The Secretariat of:
  - The Plenary GRPE-H_2FCV WG: OICA agreed to insure the function.
  - The GRPE-H_2FCV Sub-Working Group(s) - GRPE-H2FCV-SWGs are expected: to elect a Chairman and a Secretary and to report to the plenary level.
- Documents (numbering) system.

  The numbering of the documents should reflect the issuance date, the origins and should allow their reliable follow up.

  OICA secretariat committed to suggest alternatives.

Note from the secretariat:

UN ECE adopted a new Informal Document numbering (e.g.: GRPE-48-17).

The Informal GRPE-H_2FCV SWGs might consider aligning with a very short acronym: **H_2SWG**.

The different SWGs should be identified (e.g.: If 3 SWGs have been set up, the third SWG acronym could become: **H_2SWG3**.

The Meeting Reference N° should follow the SWG's identification (e.g.: The 1st H_2SWG3 meeting would be recorded: **H_2SWG3-01**.

The Meeting Documents: Three cases could be considered: Unknown / tabled during the meeting; Recorded & circulated prior to the meeting; Official or finalized.

1. Conference Room Paper - **CRP**: A document tabled during a meeting. In principle: It is seen for the first time and is not yet studied by all the attending experts. If requested by the WG, it should be recorded during the meeting (e.g.: The 10th document tabled for the 1st SWG3 meeting: **H_2SWG3-01-CRP-010**).

If amended and or approved, the WG might decide to adopt it as an Informal paper.

2. Informal Paper - **IP**: A recorded document circulated prior to the meeting. It should allow all experts to study it and to state a position during the SWG meeting. If adopted it might become a Working Paper (e.g.: The 2nd IP addressed during the 1st meeting of the 3rd SWG: **H_2SWG3-01–IP-02**).

3. Working Paper – **WP**: An official or finalized SWG document (e.g.: The 5th WP of the 1st H_2SWG3 meeting: **H_2SWG3-01-WP-O5**).

A cover page banner should always reference the document's origin (e.g.: For H_2SWG3-04-WP-06 the banner title: Finalization of H_2SWG3-CRP-010/Rev.05).

Remarks:

All documents with an official status such as Agendas and Meeting Minutes could always be considered as Working Papers.

All documents should always have a title (e.g.: Comments about OICA draft amendment proposal to R101 – Informal Document n° GRPE-46-8 JASIC)

All documents should be dated.

All documents should, if possible, be distributed a week prior to the meetings.

In principle, documents might be recorded or annexed as follow:

The Meeting Agenda: **H_2SWG3-03-WP-01**

A Revised Meeting Agenda: **H_2SWG3-03-WP-01/Rev.1**

If provided, the List of Meeting Documents annexed to a Provisional Annotated Meeting Agenda: **H_2SWG3-03-WP-01-Annex-01**

The Meeting Minutes of the previous meeting: **H_2SWG3-03-WP-02**

The List of Attendees to the previous meeting: **H2SWG3-03-WP-02-Annex-01**

Rationale:

1. Such a system would allow providing a preliminary Agenda to experts requesting a justification document for their travel bookings.
2. A Revised Agenda would allow adding new issues if more WPs or CRPs pop up for official recording and or notification.
3. An updated documents' list would become a historical reminder.
4. An attendees' list would notify the latest personal details.
5. For classification purposes, some documents would always bear the same reference number.

An **alternative suggestion**: If the documents only circulate within the Informal GRPE-H_2FCV WG and or SWGs, an even simpler identification could be suggested:

Identification of the sub-working group n°: WG1

Identification of the document n°: WG1-51

Identification of the year: WG1-51-04

Identification of the document's origin: WG1-51-04 (WG1-06-04)

Identification of the document's subject: Document title

Identification of the issuer: Document title – Issued by (e.g.: Draft Amendment Proposal to Regulation N° 101 EC DGE)

The secretariat welcomes all suggestions.

Outcome: The group might consider resuming its discussion during its 12th meeting.

- Documents in web (EIHP (how long ?), OICA, UN-ECE, IPHE, …)

  Websites:

  www.unece.org/trans/main/wp29/wp29wgs/wp29grpe/grpeage.html

  www.eihp.org

  www.oica.net

  www.iphe.net

Currently the official UN ECE Informal GRPE-H2FCV WG working and informal documents are available on UNECE's website.

Presuming the European Integrated Hydrogen Project – Phase II – EIHP 2 - website does not remain available, the group investigated an OICA alternative.

OICA's public access website might be considered to host the finalized GRPE-H_2FCV WG documents, as it currently does it for the GRPE-WWH-OBD and GRPE-PMP documents.

Furthermore, an OICA restricted access website might be considered to host all the other documents.

Outcome: OICA secretariat committed to investigate both suggestions. The group agreed to resume its discussion during its 12th meeting.

- How many sub groups (linked to the items and dependent on experts)?

  Documents: Informal document n° GRPE-48-17-Rev.1

  Japanese NTSEL presentation document

- Background:

  To address the GTR issues, the Informal GRPE-H_2FCV WG is expected to request expertise from various fields of activities.

  The (co-)sponsor(s) should finalize a concept for the 49th GRPE.

  In principle several SWGs should be set up.

  A preliminary task should consider gathering experience and entrust a restricted amount of SWG experts to swiftly and flexibly achieve, the mandated tasks: deliver technical reports and GTR texts.

  Referring to NTSEL's presentation and WG structures, the group investigated its own needs and also agreed on three SWGs.

The Chairman summarized as follow:

1. Stressed the fact that the Informal GRPE-H_2FCV WG was the SWGs' hub and that its main goal was to achieve harmonization.
2. Noted the EC had entrusted JRC with the SWG3: Environmental issues
3. Acknowledged ISO volunteered to chair SWG2: H_2 Safety/Crashworthiness
4. Expected NHTSA to confirm its GTR co-sponsorship
5. Outlined:
   a. The need for a broader expertise;
   b. The fact SWGs were expected to deliver technical reports, per items, with short overviews and GTR texts according to a unique format with a background on the:
      different aspects and regulatory standards,
      ongoing researches and cooperation opportunities,
      assessment of the situation leading towards a GTR,
      providing an action plan, timing and who does what.
6. Suggested flexibility and open mindedness.
7. Considered, if required, setting up sub-SWGs.
8. Raised the need for SWG chairpersons and secretariats.
9. Confirmed, as from the Road Map item Scope and Content, the tasks were entrusted, as follow, to the SWGs:

To SWG1 – H_2 and Whole vehicle safety:

Road Map item 1.1 On-board storage system safety:

Safety of Container and Components
Lifecycles
Requalification
Performance
Purging Limits
Material Characteristics
Leakage
Damage Tolerance
Fire Protection
Aging
Material Characteristics
Refuelling
Mechanical Properties
Crashworthiness
Fire Safety
Hydrogen System Integrity
    Normal Operation
    Post-Crash
Intentional Hydrogen Releases (e.g. purging, leakage, permeation)
Explosion Protection
Road Hazards Exposure
Emergency Medical Rescue
Controls and Display

To SWG2 – Electrical Safety:

Road map item 1.2 Whole vehicle safety

EMS (Electro-Magnetic-Susceptibility)
Electric-Shock Protection
    Normal Operation
    Post-Crash
EMI (Electro-Magnetic-Integrity)

To SWG3 – Environmental aspects:

Road Map item 1.3 Other aspects including energy and environmental considerations

Pollutant Emissions
Hydrogen and Water Emissions
Fuel Consumption
Recycling
Regeneration: **Was deleted**
FC Disposal / Hazardous Materials
Fuel Quality
Engine Power
Low Temperature: **Was deleted**

OUTCOMES:

As two SWGs might be enough, JRC suggested combining SWG1 & 3: Vehicle safety and environment.

H_2 safety (normal situations), Crash safety, Electric safety, Environmental aspects and EMC may be considered as reviewed as from the Road Map item list

- Sequence of meetings (at the same time/location?)
-

The Chairman acknowledged it was too late to convene the SWGs prior to the 49th GRPE. He nevertheless notified his intention to convene the 12th GRPE-H_2FCV WG meeting prior to the 49th GRPE. He moreover confirmed the Informal GRPE-H_2FCV WG was liable for the project and was thus expected to report to GRPE plenary; therefore it should steer the SWGs and centralize the information.

Mr. U. Gottwick, CLEPA/Bosch, inquired if the SWGs should always start off as if it were aiming for a GTR.

The Chairman replied it indeed depended of WP.29's & AC.3's pending Political Decisions. The GTR structure might nevertheless be taken into account (e.g.: the Container issue reflected the Components' versus the Systems' approach; see also the US programme). He stressed a compromise will have to be reached either for GTR(s) or for other alternatives.

Mr. J. Seissler further insisted on issues the SWGs should keep in mind: Indoor Fueling, Maintenance and Parking; Vehicles in tunnels; etc. He proposed to share ENGVA's very broad experience with the SWGs.

Mr. V. Rothe reminded industry's first aim: Certification.

- (Main) informal group meetings in Geneva in GRPE week?

The Chairman inquired if an Informal GRPE-H_2FCV WG meeting was, in the future, still needed prior to GRPE plenary? Should it meet before or maybe after the SWG meetings?

Mr. M. Koubek insisted on the steering role of the Informal GRPE-H_2FCV WG and its commitment to inform GRPE plenary which granted an added value to the WG.

Outcome: The Chairman committed to inquire with UNECE Secretariat. The group agreed to resume its discussion during its 12th meeting.

- E-mail address list (s)?

OICA Secretariat should be updated by all interested parties and might then be expected to draft a complete E-mail address list and to update it regularly.

- Contact with the other GRs

The contacts should be established by the SWGs when the expertise of the other GRs is required.

- Sub-sub expert working groups (SubESWGs)

An issue to determine by the SWGs. The Chairman reminded that the SubESWGs are expected to provide feedback (e.g.: determine, after thorough inquiry, if harmonization is required or not) which should avoid GTR issues overlapping each other.

8. Informal documents GRPE - 46 – n° 6, 7 and 8

- How to proceed, taking GTR development into account?

The Chairman acknowledged OICA's reminder that the three draft amendment proposals were still pending and that since no one had raised any objections. Moreover OICA confirmed it had not yet answered to JASIC's remarks about Informal Document GRPE-46-8, a finalized OICA position was not yet available. The Chairman noted these informal documents addressed Internal Combustion Engines, ICE, (Inf. doc. n° 6 & 7) and H_2 Consumption (Inf. doc. n ° 8) and that he expected they would remain pending until the Political Decision was notified; the SWGs would then be in a position to address them.

Mr. R. Dey, ISO/CCS, informed the group and provided the Secretariat with the corrected ISO references to improve the three documents:

Informal document n° 6, item 5 should state: ISO 14687: 1999/Cor. 1: 2001 instead of ISO/FDIS 14687;

Informal document n° 7, item 5.2.3.5., should state: ISO 14687: 1999/Cor. 1: 2001 instead of ISO/FDIS 14687;

Informal document n° 8, item 5.4.4., should state: ISO 14687: 1999/Cor. 1: 2001 instead of ISO/EDIS 14687.

- Discussion in responsible sub-group?

The SWGs should seize the opportunity to investigate the issues which could be harmonized versus issues which might not require or request harmonization (e.g.: the SWG entrusted with Pollutant Emissions might conclude that harmonization is in fact impossible).

- Informal Document n° GRPE-46-8 : Technical discussion at agenda item 8.

The discussion about this issue was in fact postponed to agenda item n° 9.

9. Method of measuring H2 consumption

- Who is currently developing test methods, which proposals are known?

-- **OICA** had presented Informal Document n° GRPE-46-8 addressing the certification of tanks, high pressure components and security equipments. The issue remained pending due to circumstances.

The Chairman outlined the current situation in three stages:

- Pre-normative: researching the method,
- Standardization: refining the method,
- Regulatory; requiring the method.

Today the WG tackles an ongoing worldwide investigation and has to consider if all these parameters could be harmonized.

-- Japan prepared technical standards not regulations, a revised fuel measurement method addressing H_2 fuel consumption, which are not mandatory hence a standard not a regulation. The group was informed that the decision dated from a week prior to the meeting. Referring to the Chair's remark, Japan achieved the two first steps: Pre-normative and Standardization and aims the Regulatory stage.

-- **USA / SAE / EPA** although these are not NHTSA liabilities, Mr. M. Koubek notified ongoing work in SAE and EPA frameworks and committed to further inform the group (e.g.: EPA drafted a technical report considering three measurement methods).

Mr. R. Bauer notified a very interesting EPA, Office of Transportation and Air Quality, document: Hydrogen Fuel Cell Vehicle Fuel Economy Testing at the U.S. EPA National Vehicle and Fuel Emissions Laboratory issued by Mr. Carl M. Paulina - Ref.: 2004.01.2900, dated: 10252004; website: www.sae.org). It relates U.S. EPE NVFEL performed H_2FCV economy tests and presented a brief comparison of the three different methods currently under consideration in the SAE J2572 draft standard for determining the H_2 Fuel Economy from chassis dynamometer vehicle testing.

-- ISO TC22/SC21's ongoing work addressed Definitions of Procedures of H_2 and Fuel Cell consumption measurements. As in the FUEVA document, four methods were considered. As previously done by the Informal GRPE-HEV WG chaired by Mrs. B. Lopez, UTAC, Hybrid and Electrical Vehicles, HEVs, were also addressed.

Mr. J. Seissler challenged the accuracy of the Temperature Method.

Mr. K. Narusawa reported that, during the revision of the measurement

method aiming regulations, two methods had been considered and both provided a rather good accuracy: Temperature and Cylinder Mass Methods. The latter appeared as the best alternative.

Mr. R. Dey committed to provide a summary document.

The Chairman inquired about an urgent need for action from this WG? Was an earlier WG meeting required? The question remained pending.

-- **FCTESTNET**: Specific information was not available for the meeting.

Note from the Secretariat:
Website: www.jrc.nl/fctestnet/fct_descr.html
Document: EC European Fuel Cell Hydrogen Projects – 1999-2002; project synopses, pages 80-81 (Ref.: EUR 20718).

FCTESTNET stands for Fuel Cell Testing And Standardisation Network. Its was set up to create a network of research and industrial organizations involved in development and testing of fuel cells (FC), FC systems and FC applications. It should produce proposals for harmonization of test procedures at the level of FC systems down to stacks and cells. Such harmonization is necessary to enable objective comparison of R&D results and evaluation of technological progress in this field, and it should become a valuable tool / input for international standardization bodies working in the FC technology field.

Mr. V. Rothe suggested the harmonization of the different test methods; he considered it as utopian for cycles. He therefore stressed that the SWGs had many different issues to address.

The Chairman confirmed this point of view about cycle harmonization.

Mr. U. Klein, OICA/VDA/FORD, observed that three methods were mostly

considered and it would be a first step to insert them in the EC documents.

The ISO experts confirmed first addressing CGH_2 and later LH_2; they furthermore agreed batteries were not influencing the Hybrid issue.

The Chairman reminded the WG about the GRPE-HEV WG achievements.

Mr. J. Seissler, addressing the Mass Method, notified the US Weight and Standards Institute had assessed the impact accuracy on fuel dispensers; this could be considered as a precedential piece of information to keep in mind.

The Chairman reminded his question about the need for action.

Mr. U. Klein stressed that once the political decision had been made, the WG would need to quickly proceed.

The Chairman once more insisted on the need to exchange information and on the importance of the technical reports expected from the SWGs.

- **FUEVA** stands for Fuel Cell Vehicles Validation.
  Website :
  http://europa.eu.int/comm/research/energy/pdf/efchp_hydrogenprojects.pdf
  Document : EC European Fuel Cell Hydrogen Projects – 1999-2002; project synopses, pages 82-83 (Ref.: EUR 20718).

  It is an EC funded project addressing European Fuel Cell Vehicles Technologies Validation. The coordinator, Mr. M. Schüssler, I.K.A. Germany, notified the group FUEVA was currently preparing a draft amendment proposal of R 101 enhanced with the tasks necessary for FCV approval, in particular Fuel Consumption Measurement.
  The Secretariat circulated the copy of Mr. M. Schüssler's letter; in a nutshell, it may be summarized as follow:

- Objectives: Validate automotive FC technologies in on board configuration and prepare for fleet tests of the most promising technologies. Following up FUERO (Components' evaluation on the bench) it aims validation on board of a vehicle of complete systems in an automotive configuration.
- Challenges: Manufacturers intend to soon commercialize FCVs which initiated a dynamic R. &D. process on FC driven vehicles and their components.
- Project Approach: Active and associate partners address test development procedures for the assessment of FCV performance, fuel consumption and emissions; validation according to the developed test procedures; gather data as basic for further testing.
- Expected Impact: Promote an emerging technology benefiting to the environment and to manufacturers' commitments; address the practical use of the vehicles and the specific development lines of OE/AMEMs; induce diversification use of FC systems; allow technological benchmarking, identify state of the art, avoid bottle-necks in transport applications.
- Results: Common testing procedures according to existing or future standards, define common interfaces for fuel supply from infrastructure, set up a data base; secure assessment for result analysis, etc.
- Outcome: The group might resume its discussion if more information is available for its upcoming meeting.

Conclusion: In fact all research bodies consider the same measurement methods.

- How to harmonize early (how to avoid block situation)?
  The above stated presentations and R. &D. projects are explicit enough.
  The group did not further discuss this issue.

10. Storage safety – component- versus system approach

Documents: TRANS/WP.29/GRPE/2003/14 and 14 Add. 1 (LH_2)
TRANS/WP.29/GRPE/2004/3 (CGH_2)

- **The Component Approach**.
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- The draft proposals for new ECE regulations, LH_2 & CGH_2, were developed as from R. 67: Specific equipment for LPG & R. 110: CNG - Compressed natural gas.

- The Chairman clearly advised that a fundamental discussion should now be launched if the group aimed harmonization. He stressed that a compromise would have to be agreed upon to achieve the expected goals.

- Mr. K. Narusawa confirmed Japan's preference for a Systems Approach & rebutted a Parts Oriented Concept. He recalled his presentation on Japan's: Current Status of Establishment of Safety Regulation for Fuel Cell Vehicles-II. It addressed: the development status of Fuel Cell Vehicles, FCVs; the Japanese government policies & FCV safety-related issues. Its goal is the establishment of safety regulations needed for mass production and dissemination of FCVs.

- Mrs. J. Ortenburger, TÜV South Germany, also expressed reservation about the parts concept. She inquired about the durability and the reliability during the lifetime and expected vehicle manufacturers to confirm these points further than in the development stage.

- The Chairman acknowledged durability could only be tested for new vehicles and inquired about the future when vehicles would be in use.

- Mr. Ch. Pichon, UTAC, inquired about the leakage sensors, shown in NTSEL's presentation, fitted in the container and related parts' areas.

- Mr. A. Bassi, ISO, notified ISO TC22 SG25 and TC107 had based their work on Natural Gas standards and would carry over to H_2 and confirmed each component would undergo tests and would further be tested when assembled in a vehicle.

- Mr. M. Koubek also favored the whole vehicle system focus on component approaches tested if estimated critical and remarked FMVSS 304 stated exceptions for Natural Gas containers however a regulation carry over for H_2 was not expected.

- Mr. J. Seissler confirmed the several step approach: first make sure about the components and then assess when they are assembled.

- Mr. M. Koubek moreover stressed his administration addressed new vehicles but he also brought up the issue of vehicles in use.

- Mr. A. Rijnders, RDW/NL, explained it depended as from which point of view one started. The EC did not have requirements for the assembled systems. The leakage issue was addressed at the component level (e.g.: it is the same EC concept for Mobile Airco systems). In fact, both points of view are very close: if one examines the starting point either as from an assembled system towards the components or as from the components towards an assembled system. He further inquired about what leakage(s) were exactly measured.

- Mr. K. Narusawa explained this limited the parts to test.

- Mr. R. Bauer inquired if quality or safety were discussed? He reminded that regulations tend towards safety. In that case industry could agree with the Japanese approach.

- Mr. A. Bassi raised the issue of the relation between the manufacturers and the component suppliers. He outlined there was a clear process for the

certification of stand alone parts and further when the parts were assembled. He concluded that one always had to comply with the safety provisions.

- Mr. M. Koubek objected that a system could always fail even if excellent parts were used to assemble it.

- Mr. R. Bauer insisted upon the fact that quality had to be insured for customers. He furthermore explained the group addressed homologation issues during which a component could sometimes fail which implied the need for a safety system and not for a better quality component.

- Mr. K. Narusawa stressed the three main points of a regulation: no leakage; prevent accumulation; stop fuel in case of leakage. All this was conceived in a frame addressing as few parts as possible. He explained that for pipes the gas tightness test was applied and he insisted that avoiding accumulation was a manufacturer's design issue. He concluded fuel had to be stopped if a leak appeared.

- Mr. G. Bindl, TÜV Cologne/G, confirmed he could live with the Japanese concept but would examine the sensor unit not linked to an ECU.

- Mrs. J. Ortenburger outlined that the frequency of failures increased with the poor quality of components. Quality being linked to safety could not be denied, she therefore preferred passive safety.

- Mr. A. Rijnders insisted upon the fact that the group should focus on what kind of requirements should be included in the future GTR. He stressed the need to identify what the US understood as "a safe H_2 powered vehicle" in order to avoid endless authority requests for more information as it was the case for the GRPE-Off-Cycle Emissions WG. The goal was not only a safe vehicle but it was also to consider the constituting elements. He therefore concluded that the WG should determine the elements required to be able to draft a GTR.

- The chairman confirmed the need for clear requirements. He inquired if the WG had to expect a fundamental problem due to the difference of certification concepts?

- Mr. M. Koubek remarked his administration was only starting to sort out its research elements but intended to look further in order to allow as much flexibility as possible for manufacturers. The fear of being tried and of courts granting heavy fines obliged.

- Mr. A. Rijnders stressed that when the GTR would be available, it would have to be usable in the different contracting countries, it would not allow any gaps but would offer a common platform used everywhere.

- The Chairman referring to the US's flexibility on safety reminded that regulations do not allow flexibility but that they had to remain open to address future technologies. Performance requirements being in the air, regulations were amended when needed or could be so open that when a new technology appeared, the regulation was only slightly adapted.

- Mr. M. Koubek replied it was up to the manufacturers to choose the means to reach the security level.

- Mr. A. Rijnders highlighted the EC Type Approval Authorities' competition. It implied the need for a clear regulatory frame for manufacturers.

- Mr. Ch. Pichon insisted on the philosophy about how to make use of a GTR. He strongly insisted on the need to align the test procedures & reminded to the group that a GTR was not a certification tool.

- **Fundamental discussion**
-

- The Chairman raised the fundamental question: **What is a GTR?** Was it only a worldwide harmonized test procedure? If so, it would rather be like a standard not like a regulation. Would it include limits / performance requirements to avoid construction requirements?
- Mr. M. Koubek considered a GTR for manufacturers would mean: only one test valid worldwide; it would be a true harmonization.
- Mr. U. Klein noted it was not a Global Whole Vehicle Type Approval but a System level approval. When all the systems were gathered, it constituted a vehicle.
- The Chairman noticed clarification was needed and stressed that it was what the group sought to define.
- Mr. U. Klein referred to the “Doors and hinges” issue which is systems related. He insisted on first concentrating on systems, which is different from a system approach, and then to extend the scope if needed.
- Mr. J. P. Laguna – Gomez acknowledged that if the EC & Japan could agree on common requirements, a compromise between component and system approaches would just about be reached.
- The Chairman thanked the WG for the interesting discussion. He expressed the wish the WG could avoid repeating such a fundamental discussion or the need to address presentations of contradictory position papers. He insisted upon the fact that the (co-)sponsor(s) should clarify the issue. The sub WG could then concentrate on Technical issues and would avoid useless work.

-- Future technologies and step by step development of regulations

An Issue to address by the SWGs.

-- How to reach a compromise?

Pending decisions from WP.29 and AC.3, an issue to address by the SWGs.

11. IPHE – RC&S scoping paper

Document: IPHE-RCS scoping paper Chairman

- The Chairman briefly informed the group about the IPHE activities. Often stated, IPHE was set up in November 2003 by the EC and some 50 countries. Two committees, a steering and an implementation, draft scoping papers of

Regulations, Codes and Standards (RCS). Experts wishing to address IPHE issues should proceed via their national representative.

- The Chairman distributed a document addressing the RCS scoping paper. He notified he would expect, for further processing, comments within a fortnight.
- The IPHE website is: www.iphe.net . On site, the contact person is Mr. Marc Steen (marc.steen@cec.eu.int) Clean Energies, JRC in Petten, NL.

Mr. R. Dey informed the group that the next IPHE Steering Committee was convened in Paris end of January 2005 and that the deadline to introduce comments was end of October 2004 to allow finalization.

The Chairman expected IPHE to provide an interesting overview of most of the ongoing H_2 activities.

Mr. V. Rothe suggested that IPHE should limit its inquiry to the existing activities.

The Chairman insisted the IPHE survey might later be, at a higher level, useful to support GRPE-H_2FCV WG activities

12. Any other business

- ENGVA information about UN round table on: Harmonization of gaseous fuels standards
    - Document: ENGVA / ISO Presentation UNECE website (www.unece.org/trans/main/wp29/wp29/wgs/wp29grpe/grpeinf48.html)

Mr. J. Seissler briefly reminded the background of the ENGVA & ISO round table project already presented to the 46th and 47th GRPE and to the 132nd WP.29. He expected a decision at the 134th WP.29. Moreover the forum was expected to gather all the harmonization stakeholders and would have the opportunity to benchmark the Natural Gas Experience.

The Chairman inquired if Market and Reference fuels were identical for H_2?

Mr. J. Seissler confirmed it at least for the transitional period; however, everything being linked, he acknowledged that this issue should be clarified.

Mr. J.-P. Laguna-Gomez noted that in the case of a 134th WP.29 approval, the event might occur in 2005.

- FUEVA

The issue was already addressed.

- FCTESTNET (RCS workshop)

The issue was not addressed as expected. The FCTESTNET representative was not in a position to attend the meeting. More detailed FCTESTNET information is available in the above stated EU documentation.

- SIAT conference 2005

  Document: website: www.araiindia.com/htlm/siat2005

  Information about the conference can be downloaded as from the above stated website.

  The Chairman informed the group that he had been invited to make a speech informing about the GRPE-H_2FCV WG activities, highlighting the harmonization goals and inducing the future involvement / participation of countries (e.g.: India, China, etc.) to cooperate with GRPE and with WP.29.

13. Further action, time schedule, next meetings

- To do list (who, when)

Many issues were addressed. Many open questions remain. Some principle decisions were made (e.g.: The GTR will, in principle, have three cosponsors. To prepare a clear technical point of view, a GTR structure and a GTR scope will have to be drafted. The SWGs should be organized for January 2005). The SWG kick off is expected in January 2005. The SWG organization and meetings have to be agreed upon (e.g.: convene them at the same place place, one after the other or separately in different locations?). Determine which technical reports will

be quickly required. The Plenary WG drafts will become the SWGs' guidelines. The 12th Informal GRPE-H_2FCV WG meeting should aim achieving progresses to report to GRPE Plenary: Presention of a formal preparatory document for AC.3's information. Notify the setting up of the SWGs and the agreement on the format of the SWGs' reporting. Confirm an aim for efficiency, etc.

- Time schedule and location of next meeting(s)

The 12th GRPE-H2FCV WG meeting has already been convened by UNECE, in Geneva, on Wednesday, January 12th 2005, P.M., prior to the Plenary GRPE.

Informal meeting (Geneva, GRPE, January 2005)
-- Agenda: The Chairman committed to only make a global report to GRPE . The detailed agenda of the GRPE-H_2FCV WG meeting should state the questions and documents distributed to the SWGs. The group committed to resume and finalize these issues.

-- Meetings without interpretation (special room or main room): For practical reasons, meetings without interpretation might be convened prior to the Plenary GRPE. SWG meetings, without interpretation, might be convened in March or April, in Canada.

- Special agenda items for next meetings
  -- demonstration programs (CFCP, CEP, CUTE, …)

  The Chairman considered the need to address the ongoing demonstration programmes (e.g.: Ongoing within IPHE and other EC Technology projects).

  Mrs. C. Padro, LANL/USA, inquired if the presentations should be related to a precise item?

  The Chairman suggested discussing the issue within the SWGs.

Mr. R. Bauer insisted on defining clear tasks as things were only starting. He suggested the WG should follow its own ways to achieve progresses because the aim was to meet the WG's liabilities: achieve its mandate.

The Chairman, in principle agreed, but nevertheless suggested to keep an eye on the others' activities.

Mr. M. Koubek reminded his previous statement and suggested, if possible, sharing this input by sending in further comments prior to the 12th meeting.

The Chairman kindly requested from Japan an updating about the upcoming state of the situation and committed to draft an interesting meeting agenda for the 12th meeting.

Worldwide activities / groups – overview: Nihil.

Hydrogen/FC conferences (events) – overview: Nihil.

The Chairman thanked the participants for their participation and closed the meeting.