

**SIXTEENTH MEETING OF THE GRPE INFORMAL WORKING GROUP  
ON HEAVY DUTY HYBRIDS (HDH)**

**Geneva, 07 January 2014**

**MINUTES OF THE MEETING**

Venue: Palais des Nations, Geneva

Chairman: Petter Åsman (Sweden)

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**1.- WELCOME AND INTRODUCTION**

The Chairman welcomed the participants.

**2.- ADOPTION OF THE DRAFT AGENDA**

(Working paper HDH-16-02e)

The draft agenda was adopted.

**3.- DRAFT MINUTES OF THE FOURTEENTH MEETING**

(Working paper HDH-15-11e)

The draft minutes of the 15<sup>th</sup> meeting were approved.

**4.- CONTRIBUTIONS FROM STAKEHOLDERS**

**4.1 US EPA**

(Working paper HDH-16-03e)

Mr. Olechiw presented EPA's memorandum on the HDH progress. He expressed EPA's continued support for the HDH work program, but indicated that there are a number of open issues that are causing concern for the USA. These open issues would need to be thoroughly addressed before adoption of the gtr, which would require some amount of time for review and validation. The issues include management of OEM specific models, validation procedures, final selection of drive cycle including emission test results, validation test programs, and HCU requirements.

The chairman thanked EPA for their continued support and agreed that timing for solving the open issues was tight. However, some of the open issues were already close to completion, and therefore there was still a good chance to meet the demanding time schedule.

As regards OEM specific models, EPA asked for laying down criteria for their approval in the gtr. The secretary responded that very general criteria could be included in the gtr, but the details for approval should be managed in the regional transposition of the gtr. This proposal was accepted by the group.

## **4.2 EU-COM**

(Working paper HDH-16-07e)

On behalf of the European Commission, the chairman presented working paper HDH-16-07. The EU COM supports the development of the HDH procedure and intends to introduce it as part of the Euro VI package in EU legislation or in ECE R 49. The legal situation for introducing the HDH procedure would need further investigation and amendments to other parts of the Euro VI package, such as the PEMS procedure. EU COM therefore proposes to allow for some flexibility to CPs in the gtr on how to use the HDH procedure in their regional legislation. This also includes giving responsibility to CPs to administer the model library.

## **5.- HDH WORK PROGRAM**

(Working paper HDH-16-05e)

The secretary presented a summary of the 15<sup>th</sup> meeting and an overview of the topics for this meeting.

### **5.1 Model structure & component library**

(Working paper HDH-16-04e)

Mr. Silberholz briefly summarized that the new version v0.5 of the simulation model was released. Feedback from stakeholders is expected within the next weeks, and work on minor issues and improvements is in progress.

Apart from minor modifications, the work on the simulation models is completed.

### **5.2 Status of validation test program 2**

(Working paper HDH-16-04e)

(Working paper HDH-16-06e)

Mr. Silberholz gave a brief overview of the model verification (page 4 of working document HDH-16-04). Validation results from all three vehicles are expected by the end of March 2014.

Dr. Perujo presented working paper HDH-16-06. He reported that the state of validation and the level of agreement between the model and the experimental values were very different among the three vehicles tested. It was therefore decided to run further tests with the MAN and Iveco vehicles. In-house testing with the MAN vehicle is foreseen for January 2014, testing with the Iveco vehicle at JRC should be completed by the end of February 2014.

Dr. Perujo concluded that the June 2014 deadline for completing the development of the gtr could be met.

EPA would like to get access to the detailed results of the validation test programs. It was agreed that the validation process had to be as transparent as possible. The chairman asked OICA to provide the data to EPA in advance of the next HDH meeting.

Mr. Six reported about good progress on the drive cycle development. The universities and Japan had agreed on a common position on the minicycle method. However, implementation of the new basis for cycle calculation is still ongoing. Another meeting between the universities and Japan is planned during the February 2014 drafting group meeting so that the final solution can be presented at the 17<sup>th</sup> HDH meeting for approval.

The definition of rated power is needed for calculation of the test cycle. Mr.Six presented several options on page 6 of working paper HDH-16-04 for further consideration. The major open issues of the procedure are shown on page 7.

### **5.3 Definition of cycle power/work**

No conclusion could be reached on this topic. While Japan and OICA support system work, other CPs have not yet finalized their position. Especially EU COM and some EU CPs raised reservations.

It was agreed to call for a special meeting between EU stakeholders and OICA in January/February 2014 in order to have a consolidated position ready for the 17<sup>th</sup> HDH meeting.

### **5.4 Open issues**

The secretary summarized the open issues that still need to be resolved, as follows:

- WHVC road gradients
- Cold start
- HILS verification criteria
- HILS testing
- Hybrid system family concept
- Cycle work (system vs. engine)
- Definition of rated power
- Approval system for OEM models
- Status and evaluation of validation test program 2
- Hardware control functions to be tested in HILS (hybrid master ECU, HCU)

## **6.- DEVELOPMENT OF THE GTR**

### **6.1 Report from the drafting group**

The drafting group held several web meetings between October and December 2013 and had a face-to-face meeting on 18/12/2013. As an outcome of these meetings, informal document GRPE-68-12 was developed. It includes text finalized by December 2013, and will be presented to GRPE 68 for consideration.

### **6.2 Annex 8 (HILS)**

A substantial part of the HILS procedure has already been completed, which is very well reflected in document GRPE-68-12. The drafting group will arrange for further meetings in January and February 2014 to complete annex 8 as far as possible for the formal document to be submitted to GRPE by 07 March 2014.

### **6.3 Annex 9 (powertrain method)**

Annex 9 is in a less developed stage. Since both procedures may be used optionally, it is essential that their results coincide within certain boundaries. The universities will work on the alignment between the 2 procedures. It is anticipated that annex 9 will not be fully completed by 07 March 2014.

## **7.- ROAD MAP AND PROJECT PLANNING**

(Working paper HDH-16-05e)

Mr. Narusawa indicated that the WHDC (gtr n° 4) will be introduced in Japan in 2016. At the same time, Japan would like to update their current HILS procedure with the gtr version. In order to meet the Japanese timetable, WP.29 adoption according to the original time schedule in November 2014 would be highly preferred.

Mr. Olechiw indicated that a 6 month extension of the mandate was acceptable to the USA. The secretary agreed with EPA that road verification as an option to chassis verification could not be completed within the current timeline, and suggested to drop this issue from the working list. Dr. Eberhardt (D) asked if it was possible at all to meet the demanding time schedule.

The chairman concluded that it was not necessary to take a final decision on the extension of the mandate at this meeting. But GRPE should be informed about the unresolved issues and the possible risk of not being able to meet the timeline.

Based on the discussion, the group agreed on the following:

The formal document for GRPE 69 will be based on informal document GRPE-68-12. It will include the drafting progress and those items of the open issues list in 5.4 resolved by 01/03/2014. An informal document will be submitted to GRPE 69 by 15/05/2014, which will include the drafting progress after March 2014 and the remainder of the open issues list to complement the formal document submitted in March 2014. After adoption of both documents by GRPE 69, a consolidated document will be provided to WP.29 for approval. The technical report can only be submitted as an informal document to GRPE 69, since the work program will not be completed by March 2014.

The road map is shown on page 8 of working paper HDH-16-05.

## **8.- NEXT MEETINGS**

The next HDH meetings will take place, as follows

- 17<sup>th</sup> HDH meeting: 08 and 09 April 2014, Madrid
- 18<sup>th</sup> HDH meeting: 03 June 2014, Geneva

The next meetings of the drafting group will take place, as follows

- 9<sup>th</sup> HDH-DG meeting: 27 January 2014 (web meeting)
- 10<sup>th</sup> HDH-DG meeting: 18 and 19 February 2014, Tokyo
- 11<sup>th</sup> HDH-DG meeting: 03 March 2014 (web meeting)
- 12<sup>th</sup> HDH-DG meeting: 10 and 11 April 2014, Madrid

## **9.- SUMMARY AND CONCLUSIONS**

Chairman and secretary summarized the meeting as follows:

- Model version 0.5 was released and some comments received; still minor improvements necessary
- Chassis dyno testing will not be included in this gtr amendment

- Evaluation of validation test program 2 will continue until April 2014; EPA asked for a transparent validation process incl. availability of detailed test results
- As regards the drive cycle, institutes and JASIC have agreed on the fixed slope minicycle approach; implementation is ongoing with final approval foreseen at the 17<sup>th</sup> HDH meeting
- Definition of rated power for a hybrid system is still under discussion
- US EPA raised concerns with the timeline of the current mandate, while Japan supported November 2014 WP.29 adoption in order to have time for transposition into the post-JP09 regulation planned for 2016; EU COM also supported November 2014 adoption, but indicated that further discussion is needed on EU implementation
- Approval procedure for OEM specific models must be defined more clearly
- Discussion on hardware control functions (master ECU, HCU) will continue
- While Japan and OICA support total system work as basis for emissions calculation, other CPs have not finalized their position yet. EU-COM and some EU CPs raised reservations; discussion among EU CPs will follow.
- Provided that the ongoing activities deliver according to the expectations, the group expects that the timeline can still be met
- Due to the open issues listed in paragraph 5.4, there remains a risk that the work program will not be finalized in time

#### **10.- OTHER BUSINESS**

None.

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