TWELFTH MEETING OF THE GRPE INFORMAL GROUP ON HEAVY DUTY HYBRIDS (HDH)

Geneva, 15 January 2013

MINUTES OF THE MEETING

Venue: Palais des Nations, Geneva
Chairman: Petter Åsman (Sweden)

1.- WELCOME AND INTRODUCTION

The Chairman welcomed the participants.

2.- ADOPTION OF THE DRAFT AGENDA
(Working paper HDH-12-02e)

The draft agenda was adopted.

3.- DRAFT MINUTES OF THE ELEVENTH MEETING
(Working paper HDH-11-09e)

The draft minutes of the 11th meeting were approved.

4.- INSTALLATION OF DRAFTING GROUP

The Chairman proposed to the meeting to establish a drafting group in the near future in order to draft the regulatory text for the gtr. He offered to chair the drafting group. Due to the high workload expected, a technical secretary should be installed for the extensive editing work of the gtr. Apart from face-to-face meetings, web meetings are foreseen in order to cope with the tight time schedule.

The Chairman's proposal was agreed.

The secretary suggested that the Japanese regulation (Kokujikan n° 281) should be taken as basis for the gtr. Mr. Dekker (NL)) agreed in principle, but reminded the group that a different structure might be needed for the gtr. The chairman concluded that the starting point could be the Japanese regulation but also gtr n° 4, and outcome from the research would need to be considered for the drafting.

Mr. Martinez (EU-COM) informed that his unit has asked for the budget for the technical secretary. The final response is expected to be available by March 2013. The secretary asked for an earlier response.

Contracting parties are asked to nominate experts for the drafting group and communicate the names to Chairman and secretary by the end of January 2013.

5.- CONTRIBUTIONS FROM STAKEHOLDERS

5.1 Korea
(Working paper HDH-12-05e)

Working paper HDH-12-05e was uploaded to the HDH website, but not presented by Korea at the meeting. The secretary drew the attention to the summary slide (page 16), in which Korea indicated to adopt the HILS approach as the second step in the national fuel economy regulation.

5.2 Comments on HDH work program

No input has been received.

6.- HDH VALIDATION TEST PROGRAMS

6.1 Presentation by research institutes on validation test program 1
(Working paper HDH-12-03e)

Working paper HDH-12-03e is a joint presentation of the three institutes tasked with conducting validation test program 1.

Mr. Six started the presentation with a general overview of the progress achieved. Development of the driver models for the different approaches (WHVC and WHDHC) has been finished. Inclusion of non-electric components has been largely finalized, and the development of the thermal models will be completed within the next two weeks. From meetings with OEMs (see page 7), it was reported that a fully vehicle independent approach does not seem to be feasible, and that some OEMs considered that a SILS approach would be preferred over HILS. Most commonly used powerpack components are already included in the component library with a planetary gearbox model added recently. The component list will be checked, if vehicles for validation test program 2 are identified.

Mr. Silberholz continued with the description of the thermal models (task 1.6). Details of task 1.6 are shown on pages 9 to 17. The thermal model for the aftertreatment system (ATS) has been finished, the models for the coolant and lube oil circuit will be finished by the end of January, and the models for battery and electric motor will be finished within the next week and validated by the end of January.

Investigation into the different drive cycle options (WHVC vs. WHDHC) is an important part of validation test program 1. The results are shown on pages 18 to 34 for the serial hybrid. The two options only lead to comparable positive traction work, if the WHVC is accompanied with slopes. Even then, the power distribution over rotational speed at the wheel hub is different between the two options, as shown on page 27. Using the WHTC as basis leads to highly fluctuating torque signals that may cause ECU errors, as already indicated by Japan at the 11th HDH meeting. In order to solve the problem, curve smoothing is necessary. Curve smoothing was demonstrated to have no significant impact on the positive work (page 31) nor on the power distribution (page 32).

The major focus of Task 2 is currently the restructuring of the models, which is a prerequisite for setting up the data bus system needed for the component library. The results are shown on pages 37 to 44. The restructuring requires two types of interfaces (page 39). The physical interface is related to how different components are connected together, physically. The signal interface is related to control/sensor signals needed for the ECU. The proposed

solution is the port based approach shown on pages 40 to 42. This approach allows easy interchanging of components including integration of OEM subsystems.

6.2 Discussion

Mr. Narusawa (JP) emphasized that the HILS approach is better suited to a vehicle based procedure (WHVC). Many problems would need to be solved for a powerpack based approach. Modification of the WHVC with slopes is supported by Japan.

Mr. Dekker (NL) mentioned that the WHVC had been developed on a broad basis of vehicle data including the power trace. He suggested to check on how the WHTC was finally designed from the WHVC data. This might resolve the discrepancy between the WHVC and powerpack approach reported by the institutes. It was agreed that Mr. Dekker and the secretary consult with Mr. Steven, responsible then for the development of the WHTC.

Mr. Olechiw (USA) asked why multiple ECUs are a problem. He added that USA would not accept the use of SILS in the gtr, but only HILS. This was supported by JP, NL and the Chairman. It was consequently agreed that SILS was not an option for the gtr.

6.3 Planning of validation test program 2
(Working paper HDH-12-04e)

Mr. Hygrell (OICA) expressed OICA's support for the validation test program 1 by giving input for the interface signal list and the component list, and to validation test program 2 by providing at least two vehicles, one serial and one parallel hybrid. He requested to accept SILS for the OEM in-house validation phase due to timing and cost issues.

USA and NL insisted that a real HILS validation must be conducted during validation test program 2. USA requested from OICA that modules be provided to the USEPA, along with the description of the Input/Output (I/O) signals such that the EPA could attempt to conduct HILS simulation in their test lab. OICA agreed to respond to the request as to whether it was possible to provide the modules and I/O, and if not why.

In order to not delay the validation test program, the Chairman suggested to accept the OICA proposal, but to conduct a HILS validation later during the program. This proposal was agreed by the group.

7.- ASSESSMENT OF POWERPACK TESTING

No discussion took place.

8.- ASSESSMENT OF CHASSIS DYNO TESTING

No discussion took place.

9.- ROAD MAP AND PROJECT PLANNING
(Working paper HDH-12-06e)

The secretary presented working paper HDH-12-06. The secretary had proposed at the 11th meeting to submit the final report at the 67th GRPE in January 2014, which consequently would delay GRPE adoption to June 2014. The updated roadmap, which is shown on page 7 and had been agreed at the 11th HDH meeting, was confirmed by the larger group of this meeting, and will be reported to GRPE 65 for approval.

The secretary suggested to hold the 15th HDH meeting during the week of 21 October 2013. The proposal was agreed. The secretary will ask the ICCT for confirmation.

10.- NEXT MEETINGS

The next HDH meetings will take place, as follows

- 13th HDH meeting: 21 and 22 March 2013, Borlänge, Sweden
- 14th HDH meeting: 04 June 2013, Geneva
- 15th HDH meeting: 24 and 25 October 2013, San Francisco, USA

Members of the drafting group (HDH-DG) are asked to plan, as follows

- 1st HDH-DG meeting: 19 and 20 March 2013, Borlänge
- xth HDH-DG meeting: 22 and 23 October 2013, San Francisco

11.- SUMMARY AND CONCLUSIONS

Chairman and secretary summarized the meeting as follows:

- Validation test program 1 is underway on schedule
- The decision on drive cycle options (WHVC vs. WHDHC) is still open
- Establishment of the drafting group was agreed; nomination of experts should be communicated to Chairman and secretary by the end of January 2013
- EU-COM is asked to provide budget for hiring a technical secretary for the drafting group
- It was agreed that the gtr was going to be based on HILS; SILS would not be an option for the gtr
- Mr. Dekker and the secretary are asked consult with Mr. Steven on the development of the WHTC
- OICA confirmed the availability of at least 2 vehicles for validation test program 2
- OICA's proposal to use SILS for the initial validation was agreed, but HILS validation would need to be conducted at a later stage of validation test program 2
- The revised roadmap and project planning were agreed; the secretary will prepare an informal document for the 65th GRPE
- Discussion on chassis dyno and powerpack testing will continue on the basis of input from ongoing programs at the Contracting Parties

12.- OTHER BUSINESS

The Chairman briefly presented informal documents GRPE-65-12 and GRPE 65-13 dealing with vehicle propulsion system definitions (VPSD). It was agreed that the HDH IWG would closely cooperate with the IWG-VPSD.