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

Geneva, 05 June 2012

MINUTES OF THE MEETING

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

1.- WELCOME AND INTRODUCTION

The Chairman welcomed the participants.

2.- ADOPTION OF THE DRAFT AGENDA
(Working paper HDH-10-02)

The draft agenda was adopted.

3.- DRAFT MINUTES OF THE NINTH MEETING
(Working paper HDH-09-14)

The draft minutes of the 9th meeting were approved.

4.- CONTRIBUTIONS FROM CONTRACTING PARTIES ON HD HYBRID AND GHG ACTIVITIES

None.

5.- ROAD MAP AND PROJECT PLANNING
(Working paper HDH-10-07)

The secretary presented working paper HDH-10-07 with the modified roadmap agreed at the 9th HDH meeting shown on page 12. As a consequence of splitting HDH validation into a validation phase 1 (software simulation) and a validation phase 2 (vehicle testing), which can not be run in parallel, GRPE adoption will move from June 2013 to January 2014.

WP.29 adoption will most likely be delayed until November 2014, but efforts will be made to keep to the original June 2014 adoption date.

Paper HDH-10-07 also includes a summary of the HDH research program on pages 5 to 9.

The major discussion items for the 10th meeting are listed on page 11. As regards the budget for validation test program 1, OICA/ACEA agreed to cover task 1. Mr. Martinez (EU Commission) offered to check out the possibility to take over the budget for tasks 2 and 3 (134 k€). In parallel, the secretary will contact industry partners, such as EMA.

It was confirmed that vehicle and/or engine manufactures will indicate their possibilities to submit vehicles and/or engines for validation test program 2 at the 11th HDH meeting.

6.- PRESENTATIONS BY RESEARCH INSTITUTES

6.1 TU Graz

(Working paper HDH-10-05)

Prof. Hausberger (TU Graz) summarized the work program of the Institute for Internal Combustion Engines and Thermodynamics (IVT) at the TU Graz. He started with an overview of the work done.

The summary of the possible HDH test cycles are shown on page 7. In principal, there are three options:

- Option A: pre-transmission approach (closest to WHTC engine cycle)
- Option B: post-transmission approach (wheel-hub method)
- Option C: vehicle based approach (original Japanese HILS method)

Prof. Hausberger offered to make an Excel tool available to the HDH group to test the different approaches. An analysis of the options is given on page 10, but in principal all options will likely work. This needs to be investigated within validation test program 1.

It is proposed to not include PTO loads into the proposed HILS method for pollutant emission testing (page 13). Using PTO load within the framework of a CO_2 regulation was investigated on the basis of the air conditioning system of a city bus (page 14). Possible options are listed on page 15.

The method to calculate the WHVC weighting factors is shown on page 18 for city buses. Since the EU HDV CO_2 test cycles are still under development, the method described for city buses will be applied to calculate the corresponding weighting factors for each HDV class. This work is included in the actual project and should be finalized by the end of 2012.

6.2 Chalmers University of Technology

(Working paper HDH-10-04)

Prof. Fredriksson summarized the work program of the Department of Signals and Systems (DSS) at Chalmers University of Technology, Göteborg.

He reported that non-electric hybrid powertrain topologies fit well into the same categories as for electric hybrid powertrains, and that the mathematical models for flywheel, accumulator and pump/motor have similar model structures as in the Japanese regulation. Parameters have been specified for flywheel, accumulator, pump/motor and CVT. IOs have been identified, but need standardization. Component testing for obtaining model parameters needs to be defined in a potential HDH regulation.

Implementation of some models in MATLAB/Simulink has been done. Examples are shown on pages 32 and 33.

6.3 Proposal for Validation Test Program 1

(Working paper HDH-10-06)

Prof. Hausberger (TU Graz) presented the joint proposal of the three institutes for validation test program 1. As agreed at the 9th HDH meeting, the proposal is based on the ECU

simulated as software in the loop, and includes the work necessary to produce a HILS simulation tool which meets the demands identified in first phase of the HDH project. The proposal covers the following tasks:

- Task 1: Adaptation of the Japanese HILS simulator for a serial hybrid powertrain
- Task 2: Adaptation of the HDH-HILS simulator for a parallel hybrid
- Task 3: Reporting on the test procedure and writing a user manual for the software

In order to accommodate with the time schedule of the roadmap (see Para 5), validation test program 1 is intended to start no later than June 2012. The final report is planned to be published 12 months after the project start, but the necessary input for validation test program 2 would be available earlier. Mr. Martinez asked, if an overlap between validation test programs 1 and 2 was possible. Prof. Hausberger responded that in principal results from validation test program 1 would be needed before the start of validation test program 2. Since the results for the serial hybrid would be available before completion of validation test program 1, serial hybrid vehicle testing could also start before.

7.- ASSESSMENT OF POWERPACK TESTING

No discussion took place.

8.- ASSESSMENT OF CHASSIS DYNO TESTING

No discussion took place.

9.- NEXT MEETINGS

The next HDH meetings will take place, as follows

- 11th HDH meeting: 10 to 12 October 2012, Ottawa
- 12th HDH meeting: 15 January 2013, Geneva (to be confirmed)
- Invitations have been received for the13th HDH meeting (March 2013) by Sweden, and for 15th HDH meeting (October 2013, San Francisco) by the ICCT

10.- SUMMARY AND CONCLUSIONS

Chairman and secretary summarized the meeting as follows:

- The first part of the HDH work program has been successfully finished
- Validation test program 1 on the basis of a real heavy duty hybrid software based simulation has been agreed; OICA will take over budget for task 1, sponsors for tasks 2 and 3 are being looked for
- The Japanese HILS method is a good basis for electric and non-electric hybrids
- The three HDH test cycle options will be investigated in validation test program 1
- Further consideration of JASIC alternative proposal will be done by Japan
- The revised roadmap and project planning has been agreed
- Vehicle manufacturers are asked to submit vehicles for validation test program 2
- Discussion on chassis dyno and powerpack testing will continue on the basis of input from ongoing programs at the Contracting Parties

11.- OTHER BUSINESS

None.