

<b>WLTP DHC subgroup</b>	
<b>Title</b>	Minutes of 9th Meeting
<b>Working Paper Number</b>	WLTP-DHC-09-10

## **MINUTES OF 9<sup>th</sup> WLTP-DHC MEETING**

1. This note records the discussions and outcomes of the ninth WLTP-DHC meeting, held on 6<sup>th</sup> and 7<sup>th</sup> July 2011 in Stockholm.

### **Draft World Harmonised Drive Cycle Development**

2. OICA asked whether a filtered, unified driving database had been agreed between the chair, JRC, Mr Steven and Ms Ericsson. This had not yet been agreed, but the chair agreed to inform the group when it was agreed and to upload the database to CIRCA. It was not expected that the characteristics of the agreed database would be significantly different to the driving databases that each party currently held.
3. Mr Haniu presented document DHC-09-02. OICA noted that the idling sections were not selected from evenly distributed increments in the idling frequency distribution. It was explained that the duration of each selected idle period had been increased by the same percentage in order to match the required total idling duration to match the idle/driving ratio in the database. Concerns were expressed regarding the resultant duration of the longest idling period. It was agreed that validation 1 would proceed with the current idling periods, but that Mr Steven would provide an alternative proposal for idling periods for consideration following validation 1.
4. The vice chair noted that the relatively long initial idle period might impact on the effectiveness of the cycle at encouraging rapid catalyst light off. It was agreed that the impact of the length of the initial idle period on emissions during the cold start, Low speed phase should be investigated during validation 1.
5. The draft Extra High speed phase was discussed at length. Mr Steven expressed the view that the use of incomplete (as well as complete) short trips from the Extra High speed database reduced the significance of acceleration periods in the unified distribution, resulting in a less dynamic cycle than expected. Mr Steven presented a comparison of the characteristics of the draft cycle with those of the EU driving database. He noted in particular that the Extra High speed phase corresponded to only the 10<sup>th</sup> percentile of data in the EU database in terms of *velocity x positive acceleration*, *positive acceleration* and *maximum acceleration*. He showed an alternative Extra High speed phase based on a complete short trip, rather than constructed from partial short trips, and noted that this matched EU relative positive acceleration and acceleration data better, but gave a worse  $X^2$  relative to the unified speed-acceleration distribution. Mr Haniu

confirmed that both the  $\chi^2$  and relative positive acceleration and cruising ratio for this alternative phase were a worse match with the unified distribution than the Japanese proposal. OICA and Mr Steven noted that this was in part due to the definitions of acceleration and cruising used in Japan's analysis.

6. OICA and Belgium expressed concerns about the EU public acceptance of an Extra High speed phase with a relatively low "ramp" acceleration and short period at cruise speed. It was agreed that proposals for an alternative Extra High speed phase should be submitted by 21<sup>st</sup> July along, with an explanation of the methodology used to develop them, and a Teleconference would be held on 27<sup>th</sup> July to discuss these proposals and agree the Extra High speed phase profile. In order to ensure that they are working from a consistent dataset Mr Steven, JRC and Japan will share the parameters of the unified distributions from which they are working as soon as possible.

### **Gear Shift Points**

7. Japan presented their analysis and proposal for gearshift points based on the driving database (document DHC-09-03). They proposed fixed gearshift points based on vehicle speed and acceleration in the cycle. Mr Steven commented that the conclusion that gearshift point was independent of the number of gear ratios was influenced by the vast majority of the 157 vehicles in the database having 5-speed gearboxes. Mr Haniu noted that the gearshift points for the 4-speed and 6-speed gearboxes were well within the 5-speed gearshift ranges. Mr Steven also noted that the proposed Light Duty Commercial Vehicle gearshift points were at lower speeds than for passenger cars and that this was not representative for higher power to mass ratio goods vehicles.
8. Clutch disengagement points on decelerations were based on typical vehicle speeds at 1000rpm in the gear selected, with the remainder of the deceleration being completed with the clutch disengaged.
9. OICA noted that at certain points in the cycle with the proposed gearshift points vehicles were required to accelerate in second gear from very low vehicle speed. This would necessitate slipping the clutch in most cases which would adversely effect repeatability. The vice chair noted that this would be reviewed based on experience in validation 1 and that "troughs" in the cycle trace could be "lopped" (increased to a slightly higher speed) if necessary.
10. It was agreed that alternative gearshift point proposals were welcome and that these could be trialled alongside the Japanese proposal in validation phase 1.
11. Japan proposed that, in the absence of data, first gear should be selected 5 seconds prior to pull-away for consistency with existing test cycles. OICA felt that this was not representative. It was agreed that an alternative proposal would be welcome, but that the 5 second period would be retained until such a proposal had been considered.

### **Comments from India**

12. Mr Ichikawa noted that comments had been received from India on the documents and draft cycle and would be circulated to the group. The vice chair noted India's comments related in particular to the ability of low power vehicles to follow the cycle, these vehicles may need to be exempted from Medium and High phases, and potentially require an alternative Low speed phase. India also requested that their gear shift data be considered in developing gearshift points (they commented that gearshift behaviour differed in India due to the prevalence of 4-speed gearboxes).

### **Mode Construction**

13. Japan presented a proposal for discussion on the sequence of phases (document DHC-09-04). OICA members noted that the duration of the full sequence was extremely long and queried whether pre-conditioning on both High & Extra-High speed phases was necessary. The vice chair queried whether the second Medium speed phase (following hot start Low speed phase) was necessary. It was noted that this might be of value for testing hybrid vehicles, but was unnecessary for conventional vehicles. The vice chair recalled the conclusion of the 7<sup>th</sup> DHC meeting that OICA, JRC and JARI should develop a proposal for the test sequence during validation 1 and that, whilst the DHC group should make recommendations for test sequence, DTP would need to agree any proposal. It was agreed that alternative proposals for test sequence were welcome.

### **Validation 1 Test Programme**

14. Mr Ichikawa informed the group that JRC planned to test 4 vehicles (a 4x4 SUV, a Hybrid, a Light Duty Commercial Vehicle and a <100cm<sup>3</sup> passenger car) and that Japan plan to test a kei car, a kei commercial vehicle, a passenger car and a high power to mass passenger car. A proposed 5-day test sequence was presented. The objectives of validation 1 would be to examine cycle drivability; tyre slip; practicality and influence of gearshift and clutch engagement points; test driver opinions; and initial data on CO<sub>2</sub> and air pollutant emissions. It was also noted that influence of initial idle period on air pollutant emissions needed to be investigated (as discussed in paragraph 4).
15. Austria noted that the Technical University of Vienna intended to participate in validation 1. OICA informed that group that ACEA members would test 2 4x4 SUVs, 2 Hybrids, a Light Duty Commercial Vehicle, 2 high power passenger cars and 2 low power passenger cars. They asked where within the programme checking the implications of the cycle for evaporative emissions and OBD testing would be considered, Mr Ichikawa responded that this will be considered in validation phase 2.

### **Next Steps & AoB**

16. It was agreed that alternative Extra High speed phase proposals should be submitted by the 21<sup>st</sup> July and would be discussed by teleconference on 27<sup>th</sup> July. (later the date is changed to 26<sup>th</sup> July) Validation phase 1 will commence immediately after the teleconference. The next meeting of the group was scheduled for October. OICA requested that the meeting be hosted by JRC in Ispra, Mr Ichikawa agreed to discuss this with JRC.

17. Mr Ichikawa informed the group that Japanese manufacturers would not be working Thursday or Friday during the July-September period to smooth demand on electricity suppliers.

18. The vice chairman noted that this would be his last (face to face) meeting as vice chair and that he would withdraw from this role from the end of the month.

### **Summary of Actions & Open Issues**

**Action 1, Chair:** Agree unified database with Mr Steven, JRC and Ms Ericsson, inform group when this was done and upload unified distribution to CIRCA.

**Action 2, OICA:** Alternative proposals for distribution of idling periods to be submitted and considered after validation 1.

**Action 3, validation 1 participants:** Impact of initial idling duration on cold start, Low speed phase air pollutant emissions to be investigated during validation 1.

**Action 4, Mr Steven:** Alternative Extra High speed phase proposals to be provided by 21<sup>st</sup> July along with an explanation of the methodology used to derive them.

**Action 5, Mr Steven:** Alternative gearshift proposal to be submitted by end of July for evaluation during validation 1.

**Action 6, OICA:** To consider an alternative proposal on neutral and first gear selection points at 0 km/h

**Action 7, Japan:** To consider whether areas of microtransience/noise on the speed trace should be smoothed prior to the start of validation 1.

**Chris Parkin - DHC sub-group vice chair**