



HDH Procedures

Michael Olechiw

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Outline

- Simulink model maintenance
- Powertrain procedure
- Validating HILS procedure with NOx and CO2 emission results.
- Validation data

Who Maintain Simulink Models?

- It is not clear how the Simulink models will be maintained and modified to keep up future hybrid architecture.
- What level of validation will be required?
- Who will approve the validation data?
 - Will each governing body have the ability to review the validation data and result before giving a certification in there country?

Powertrain Testing to Validate HILS Model

- EPA is requesting that the GTR allows the powertrain procedure to be used instead of the HILS procedure or to validate the HILS procedure.
- This is consistent with the Japanese regulations as shown in presentation HDH-05-07e given by Mr. Osaki in March of 2011.



Validating HILS Procedure with Emission Results

- In addition to validating the HILS model with vehicle speed, engine speed, engine torque, RESS power and Fuel Economy the EPA would like to see NOx emissions compared between the engine results and the chassis or powertrain results.
- NOx emission are sensitive to ambient and intake temperatures, air flow over aftertreatment and accessories
 - EPA recommends that the engine be tested with the cycle created by HILS model in the same cell as the powertrain is tested with the transmission, RESS and power electronics in hardware.
 - To accomplish this the manufacturers could do powertrain testing along with the engine testing that is already planned, or manufacturers could create engine cycle from HILS model for EPA to test in our lab in September.



Validation Phase 2 Data

- EPA is requesting access to:
 - Summary results showing how the SILS, HILS, chassis, powertrain and engine results compare for vehicle speed, engine speed, engine torque, RESS power, CO2 emissions and NOx emissions.
 - Second-by-second data for all not proprietary signals
 - Access to vehicle and interface models used to create the engine cycle.