

MASTER THESIS

Correlation between battery testing cycles, used in standards and real data

Research domain

Clean Powertrains

Topic

Context: Currently, the commercialization of EV, HEV and PHEV cars has been accelerated, responding to the global concerns of CO2 reduction and energy security.

Lithium batteries are expected to be one of the most promising secondary batteries for the propulsion of electric vehicles. In the light of rapidly diffusing hybrid electric vehicles and emerging battery and plug-in hybrid electric vehicles, testing profiles are defined in the standards, such as IEC 61982.

The battery performance testing is typically specified, in accordance to the Freedom CAR battery test manual; this consists of a static capacity test with a low discharge rate and the Hybrid Pulse Power Characterization (HPPC) test with a short duration, high discharge rate, to simulate peak loading observed during the SAE J1634 driving cycle, combined with a stabilization phase.

As the standards are made on basic test methodology for general versatility, this project is aimed to correlate the real driving and charging behavior to the standards. The driving behavior is expected to be changed to a more predictive and assertive driving style, while the charging behavior is relatively unknown, seen over a longer time.

In this project there is the opportunity to follow-up five plug-in hybrid electric vehicles and to analyse the driving and charging behavior. The project will be an analysis of typical driving and charging behavior. In a second step it will compare how this cycle is matching or deviating from the standard battery cycles being used in the standards. Recommendation following the analysis could lead to modification or optimization of the battery test cycle for electric road vehicles. Logged are various parameters such as the driving distance, used energy driving pure electric and overall, the charging time and charging quantity, the ambient temperature,...

Project input:

5 PHEV Prius driven on Belgian road with data access of standard data acquisition system

Project work packages:

- Analysis of the current used standards
- Field test data analysis
- Correlation to battery load (for EV and Hybrid)
- Correlation to the battery load as described in the standards and corresponding ideal driving cycle (for EV and Hybrid)
- Conclusion

Profile

Master of (Applied) Engineering: Electronics and Power systems

Term

Q3 2010 Q1-2011

Supervisor

miguel.dhaens@flandersdrive.be