Meeting Minutes

Re: Battery Condition Monitoring Workgroup Teleconference

Date: June 5, 2001

LIST OF PARTICIPANTS:

Michael Cox, *Midtronics*
Gary DesGroseilliers, *MIT*
Thomas Dougherty, *Johnson Controls*
James Geraci, *MIT*
Henry Huang, *Ford*
Thomas Keim, *MIT*
Michael Mullin, *General Motors*
Paul Nicastri, *Ford*
Thirumalai Palanisamy, *Honeywell*

AGENDA

- Tom Dougherty ➔
- Agreement Topics and Status ➔
- Future Meetings ➔

TOM DOUGHERTY

Tom Dougherty gave an update on the battery discharge performance parameters and terms that he had discussed with TRW. This presentation consisted mostly of a well-organized overview and explanation of the first 8 parameters necessary to characterize the battery's initial state. A copy of his presentation materials can be found on the workgroup's web page ➔.

DISCUSSION:

Mullin..... raised the question of where the temperature measurements might be taken. He was also concerned about if the battery parameters could be used with different battery structures. Dougherty responded that test procedures have not been finalized, so he did not yet know where the temperature might be taken. Because of experimental work already done, Dougherty believes that the parameters are general enough to be useful with various battery structures.

Cox ..... agrees with Dougherty that deliverable energy charge acceptance and state of health are the proper terms to be talking about.

Keim..... indicated that the term "internal resistance" should not be used in this application because it has another well-understood meaning. Instead, he thinks the term should reflect that it is the "initial" internal resistance of the battery. Keim was also concerned about the meaning of the "Thermal Time Constant" parameter. Dougherty explained

that it would be the result of a still air experiment, and that extra sensors would need to be used to tell the system about the air speed around the battery. Dougherty continued to say that the number that they are using for "Thermal Time Constant" is being used because it helps simplify the model. Dougherty concluded by saying that he would go back and think about if the "Thermal Time Constant" parameter really provides enough information to be useful.

Conclusion..... there was a general agreement on the definition of the battery discharge performance parameters as defined in Dougherty's presentation

AGREEMENT TOPICS AND STATUS:

The status of topics under discussion by the BCM workgroup is summarized in the table below

	Topic	Status
1.	BCM Workgroup "Statement-of-Purpose" and "Guidelines for Participants"	Accepted without change
2.	Battery discharge performance parameters to be encoded in 5-bits each, referred to as "Word-1"	Under discussion
3.	Charging and life information of the battery would be encoded in separate set of parameters, "Word-2"	Under discussion
4.	"Words" will be provided on a label or electronically coded chip.	Under discussion
5.	Battery discharge performance parameters will include:	
	Nominal capacity	Possible change in definition from 20-hour rate to a shorter period of time is still under consideration
	Peukert's slope	Need to know slope
	Charged voltage	TRW agreed to use open circuit voltage.
	OCV/SOC slope	TRW agreed to use OCV/SOC slope as an indicator of acid concentration of a fully discharged and fully charged battery
	Internal resistance	Need to come up with different name for this parameter
	Ionic/electronic ratio	Proposal to determine both internal resistance and kinetic resistance from a single experiment by fitting an equation with current and log (current) terms
	Kinetics	Accepted
	Thermal time constant	Reconsidering if, as specified, it is a useful piece of information.
6.	Battery terminal standard should include 4 pins, two for power and two for sensing. The application of the sensing pins (e.g., temperature, disconnect, battery condition monitoring) will be determined later.	Accepted

FUTURE MEETINGS:

The next meeting will be a face-to-face meeting on Friday, June 22, 2001, at Johnson Control's office in Plymouth, Michigan, from about 10:00 a.m. until 3:00 p.m., including lunch. The morning session will be devoted to a discussion of measurement techniques for the battery discharge performance parameters. After lunch, Tom Dougherty will give his recommendation for a separate set of parameters to characterize age and condition effects.

Please note that directions to the meeting location will be provided a few days before the event. Also, if registration exceeds the room capacity at the Johnson Control office, we will attempt to move the meeting to a nearby conference facility. In any case, we are planning to provide audio conferencing for people who are not able to attend the event but we will probably not use NetMeeting. I would like to encourage everyone making a presentation in Plymouth to post a copy of their document on the web page prior to the event so that the teleconference participants can follow.