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Battery Analyses Report

M/V NO SUCH VESSEL

ACME Shipping

01/01/2001

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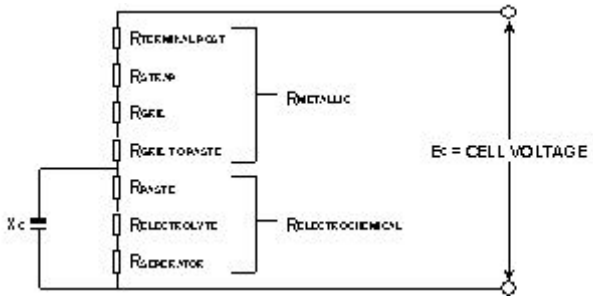
Introduction

Batteries store electrical energy. The storage effect is based on chemical processes which are well documented, but at the same time are not precisely defined. For example, the voltage on a fully charged cell can vary between 2.19-2.35V, which gives every cell its own character.
Measuring the specific gravity of the acid can indicate the level of charge in the battery but not its actual condition or its capacity to deliver energy. Most modern batteries are now the sealed (vented) gel type maintenance free variety.
The total conductance path through a cell includes the metallic or ohmic path, as well as the path that is involved electrochemically and can be illustrated as follows: -



Rmetallic : is the ohmic path and includes the resistance of the terminal posts, the strap, the grid structure and the grid to paste connection.
Relectrochemical : is the electrochemical path and includes tthe paste, electrolyte and separators.

The capacitor C is the result of all the parallel plates with a dielectric between them and is represented by Xc its impedance value.

Looking closer at the equivalent circuit, it is obvious that the capacitive reactance (Xc) effectively shunts Re (the electrochemical path) masking the changes that may take place in this part of the path.

The resistance of the internal circuit path is what influences the capacity performance of a cell, and is, therefore, the important parameter that needs to be measured.

As a rule of thumb Ri (internal resistance) is inversely proportional to battery capacity.

Considerations

The purpose of this report is to build a record of the conditions of each battery found onboard. The initial test will form the baseline which all subsequent tests will be referenced to, thereby the batteries condition / capacity can be accurately monitored. Measurements of Ri and battery voltage are taken at one year intervals under identical conditions and are then compared to the baseline reference values. When Ri has increased more than 35% the battery should be replaced.

The initial baseline reference values will be calculated according to the following parameters: -

- Readings to be taken at full charge - to ensure this
  - If lead acid - take electrolyte SG readings
  - If other type (or sealed battery) - charge for sufficient period.
  - If not fully charged - refer to table 2 below.
- Battery charging level to be noted
- Battery load to be noted (if possible)
- Visible examination of battery condition to be recorded
- Ambient temperature to be measured
- Internal resistance to be measured and assessment made according to guidelines in table 1

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AH (Ampere Hour)	Cell	6V Battery	12V Battery
1Ah	25mOhm	75mOhm	150mOhm
10Ah	8mOhm	25mOhm	50mOhm
100Ah	1.6mOhm	5mOhm	10mOhm
1000Ah	0.12mOhm	0.36mOhm	0.72mOhm

Table 1 : Ri versus battery capacity

Discharge	0%	20%	40%	60%	80%	100%
Ri	10mOhm	11mOhm	12mOhm	15mOhm	30mOhm	120mOhm

Table 2 : Typical Ri values of a 100Ah 12V battery being discharged

Advisory Note & Disclaimer

An in depth Battery Analyses was carried out as instructed using the Infratek 23 DC Battery Tester. The survey covered all batteries found onboard the vessel outlined in the following report, with any observations specified on the attached individual report sheets

This report outlines battery conditions found on the day of the survey which are detailed very clearly in the battery analyses report sheet.

It is recommended that this report be analysed by a qualified member of your staff, in order for your company to undertake any necessary remedial action. This report is for advisory purposes only and Marine Thermographic Services will not assume any liability for any decisions or actions taken by you as a result of this report.

This report does not purport to set forth all hazards, impending failures or existent problems nor to indicate that other such hazards, impending failures or existent problems do not exist. By issuing this report, neither Marine Thermographic Services nor any of its employees make any warranty, expressed or implied, concerning the contents of this report. Furthermore, neither Marine Thermographic Services nor any of its employees shall be liable in any manner for personal injury or property damage or loss of any kind arising from or connected with this thermal imaging survey or failure to inspect.

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Report Date: - 01/01/2001

Battery ID	**EMERGENCY BATTERIES 200 AH**
Battery Location	**BATTERY ROOM AFT BRIDGE DECK**
Battery Charge Level	**5 AMPS**
Battery Load Level	**40 AMPS**
Visible Condition	**GOOD**
Ambient Temperature	**24**
Measured Internal Resistance Value	**13.4 m Ohm FOR EACH 12 VOLT SECTION**

Estimated Battery Condition

GOOD	**GOOD**	**FAIR**		**FAIL**	

Identification Image :

Comments & Recommendations:

BATTERIES ARE IN GOOD CONDITION

Engineer: - Jim Scott