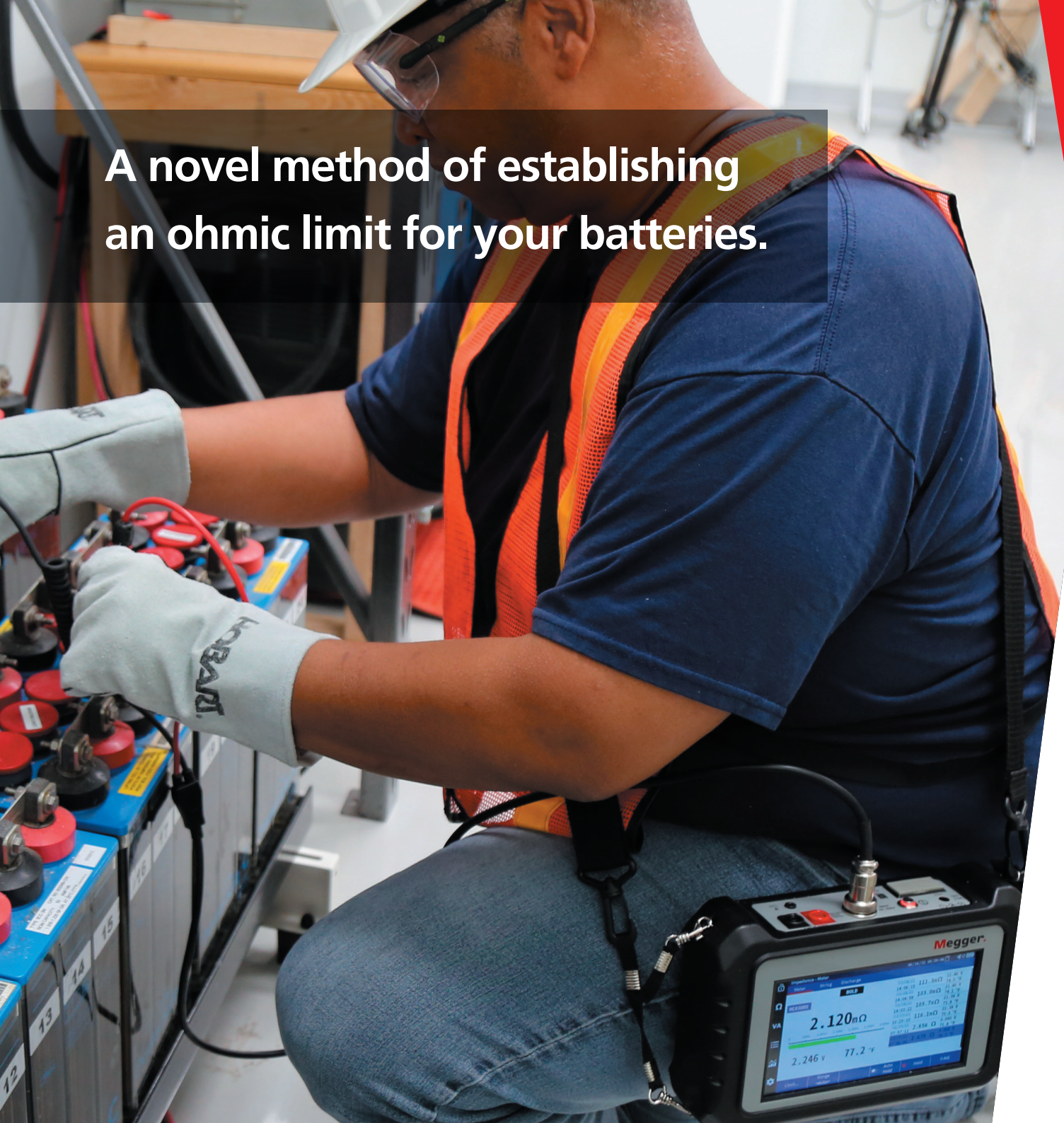

A novel method of establishing an ohmic limit for your batteries.

Megger

CASE STUDY

The solution to determining an ohmic battery limit

The solution to determining an ohmic battery limit

Background:

Standards will recommend setting an ohmic limit as a 50 % change in baseline. This is an estimate. In this case study, an 'Ohmic Discharge' was used to establish a more accurate ohmic limit.

A testing company was testing VRLA batteries in a substation. They wanted a more accurate method to locate suspected bad batteries. A quick test was needed that would indicate potential problem cells. These would then be replaced and returned to the manufacturer. The manufacturer would then test them. If they tested good, then they would be returned to the testing company and the testing company would get charged. It was therefore essential that the ohmic limit be accurate.

Investigation:

The BITE5 was used in conjunction with a discharge tester. The BITE5 allowed the operator to record not only the voltage of each cell throughout the discharge, but also the impedance of each cell throughout the discharge test.

When examining the cell voltage discharge data, it was easy to see batteries that were falling below 80 % of their rated voltage during a capacity test.

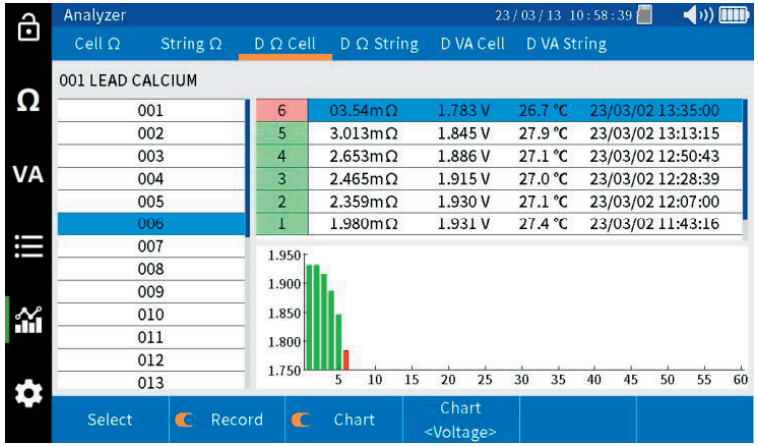

Figure 2: *Figure 2: Low voltage cell*

Figure 1: *BITE5 (above) and TORKEL900 (below)*

From examining the cell impedance discharge data, it can be seen how the ohmic value changed during the discharge test.

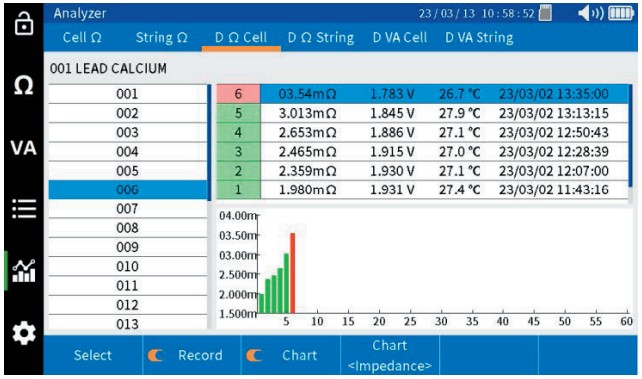

Figure 3: *High impedance cell*

In fact, the reason the voltage drops off rapidly is due to the increase in impedance, which occurs due to plate sulfation.

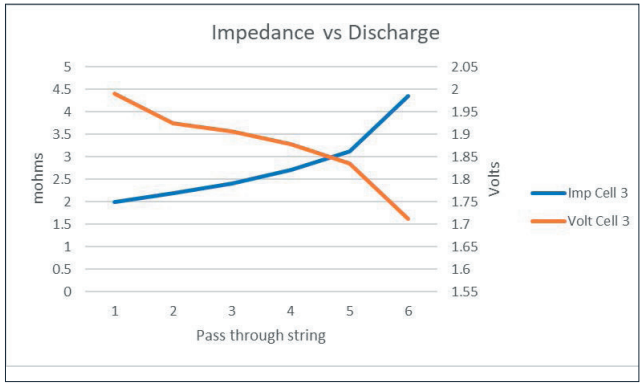

Figure 4: *Discharge vs impedance*

Using this data, an actual impedance limit can be identified that correlated with the cell capacity. This limit was then set into the BITE5. The remaining batteries were then tested. When the impedance surpassed this limit, a failure indication was displayed. Testing with other equipment confirmed these cells were indeed bad.

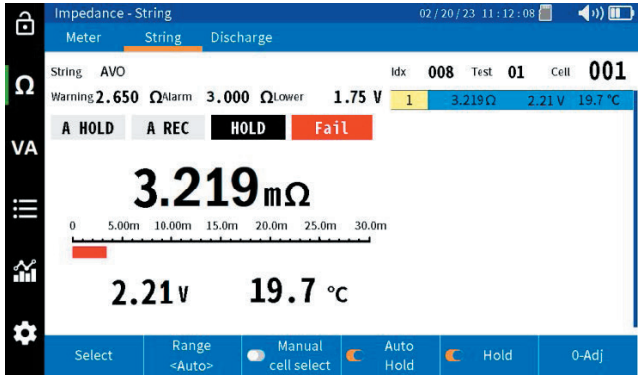

Figure 5: *Failed cell*

This type of test can now be performed on other model batteries, allowing more accurate limits to be established. Once the limits are established a simple quick impedance test is now performed to identify poor cells, with a high reliability.

Takeaways:

Battery cell impedance measurements are quick and simple to measure. However, determining an accurate ohmic limit is difficult, can take many tests, and can be determined over time. Adopting limits from battery manufacturer or test equipment manufacturers is not recommended. There are too many unknowns using these limits. Different model test equipment may have been used to establish the limit. There is also no way to know the condition of the battery when the limit was established.

The ohmic discharge allows a simple one-time measurement technique that will establish an accurate ohmic limit. This limit can now be used to perform a quick ohmic test to locate poor cells with high accuracy.

The solution to determining an ohmic battery limit

Savings and values:

In the past, ohmic testing was used only to identify a potential problem. Once identified, further testing needs to be done to determine if the cell is truly bad. Using this technique avoids the need for further testing since it provides a higher reliability. This saves time and money.

Product reference(s):

The BITE5 is a simple to use handheld battery analyzer. It performs battery impedance testing as well as supporting battery discharge testing. It can test cells up to 200 V DC. This makes it ideal for both lead acid and lithium-ion applications.

Its large touch screen display allows for viewing of all test data and historical string data. A high capacity removable micro-SD card provides all the storage required to maintain all historical data.

The BITE5 records ripple voltage, ripple current and float current.

The BITE5 also measures and records DC voltages up to 1000 V DC and 600 V AC.

Figure 6: *BITE5*

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