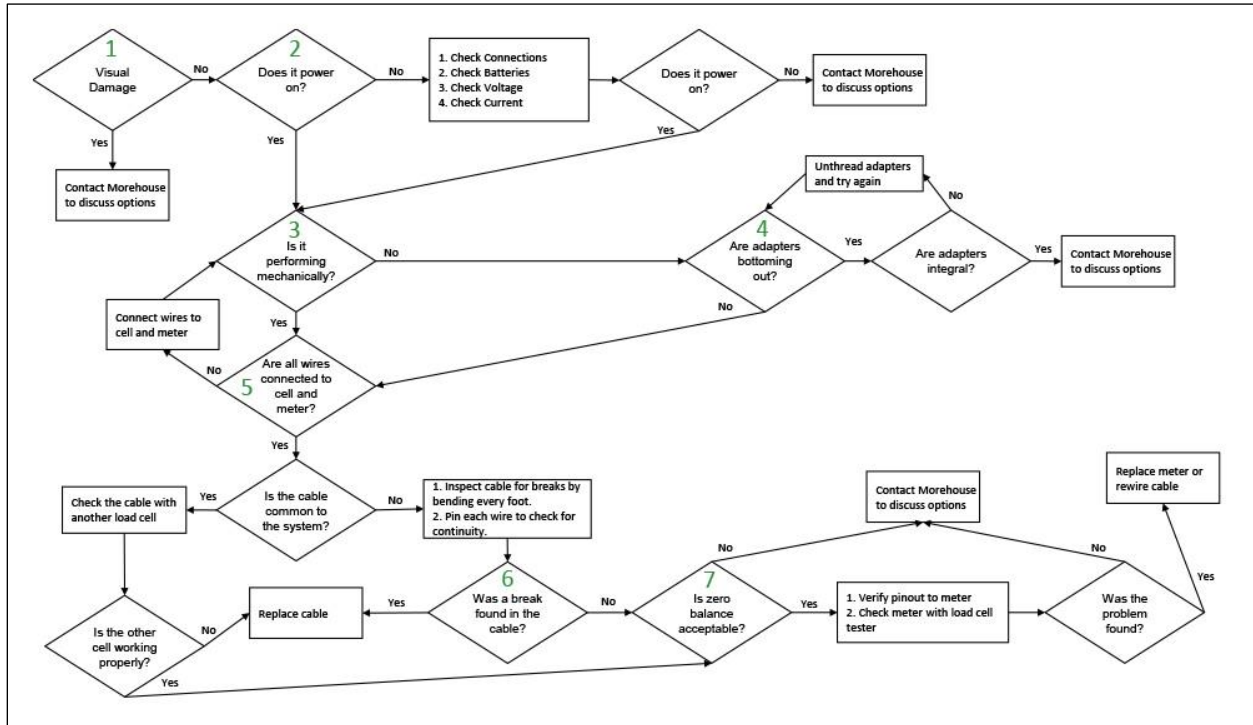




Load Cell Troubleshooting Guidance





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Have you ever wasted hours troubleshooting a nonworking load cell to diagnose the problem?

Morehouse has been in the manufacturing business since 1920 and the calibration business since 1925. Over the decades, we have wasted hours troubleshooting several load cells. Through these efforts and to standardize our work for optimal throughput, we have created this guidance document. We hope it helps make your job easier. Enjoy!

7 Step Process for Troubleshooting a Load Cell

Morehouse technicians have seen many different load cell issues and have lots of experience identifying and fixing the problems. With this experience, we developed a 7 Step Process for Troubleshooting a Load Cell to shorten our calibration lead time (most calibrations are performed in 5-7 business days) and provide better customer service.

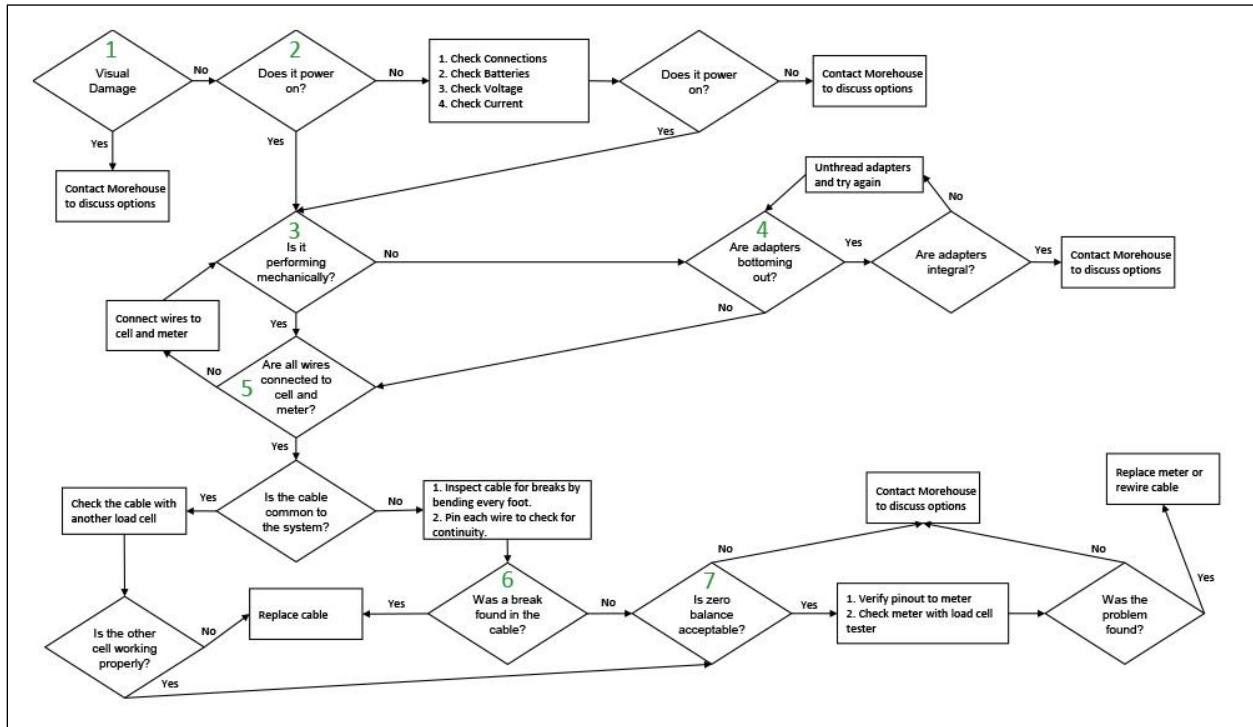


Figure 1: Load Cell Troubleshooting Process

This 7-step process outlined above and explained below can help you save countless hours trying to diagnose the problem with your load cell.



1. Visually inspect the load cell for noticeable damage. If it is damaged, contact Morehouse to discuss options.



Figure 2: Overloaded Load Cell

2. Power on the system. Make sure all connections are made and verify batteries are installed and have enough voltage. Check the voltage and current on the power supply. If it still does not power on, then replace the meter. An inexpensive multimeter like the one pictured below can be used for **Steps 2, 6, and 7.**



Figure 3: Multimeter



3. Check for Mechanical Issues - If everything appears to be working, but the output does not make sense, check for mechanical issues. Some load cells have internal stops that may cause the output to plateau. Do not disassemble the load cell as it will void the manufacturer's warranty and calibration. The best example of this error is that the load cell is very linear to 90 % of capacity. Then either the indicator stops reading, or the output becomes severely diminished. The data will normally show very poor linearity when using 100 % of the range and very good linearity when only using the data set to 90 % of the range. Morehouse can likely fix this error and should be contacted for more information.



This Threaded Adapter should never be removed as it voids the calibration. However, we have noticed several people doing this and if they bottom the thread out into the load cell, it could cause the output to plateau. If the threaded adapter has been removed, the cell will need to be calibrated again.

Figure 4: Threaded Adapter on a Morehouse Shear Web Load Cell

4. Make sure any adapters threaded into the transducer are not bottoming out. If an adapter is bottoming out and is integral, then contact Morehouse to discuss options.

5. Check and make sure the leads (all wires) are properly connected to the load cell and meter. If the cable is common to the system, check another load cell and verify that the other cell is working properly. If the other load cell is not working, then contact Morehouse to discuss options.



Figure 5: Checking for Continuity of the Cable



6. Inspect the cable for breaks. With everything hooked up, proceed to test the cable making a physical bend every foot. Pin each individual connection to check for continuity of the cable. If the problem is intermittent, have someone else bend the cable every foot while performing the continuity check. The bending should help find intermittent problems

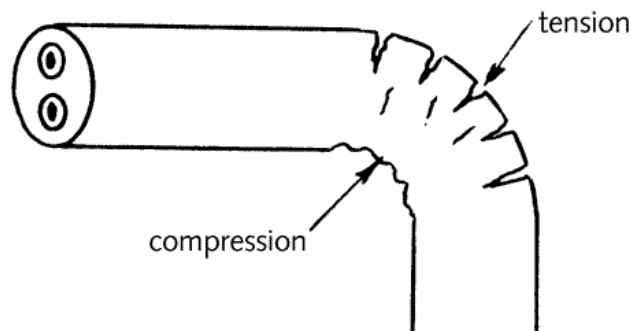


Figure 6: Bend Cable to Check for Breaks

7. Use a load cell tester or another meter to check the load cell's zero balance. If you do not have a load cell tester you can check the bridge resistance with an ordinary multimeter. A typical Morehouse shear web load cell pins (A & D) and (B & C) should read about 350 OHMS \pm 3.5. If one set reads high and another low (ex. (A & D) reads 349 and (B & C) reads 354), then there is a good chance that the load cell was overloaded.

Note: Different load cells use different strain gauges and have different resistance values. It is essential to check with the manufacturer on what they should read and the tolerance.

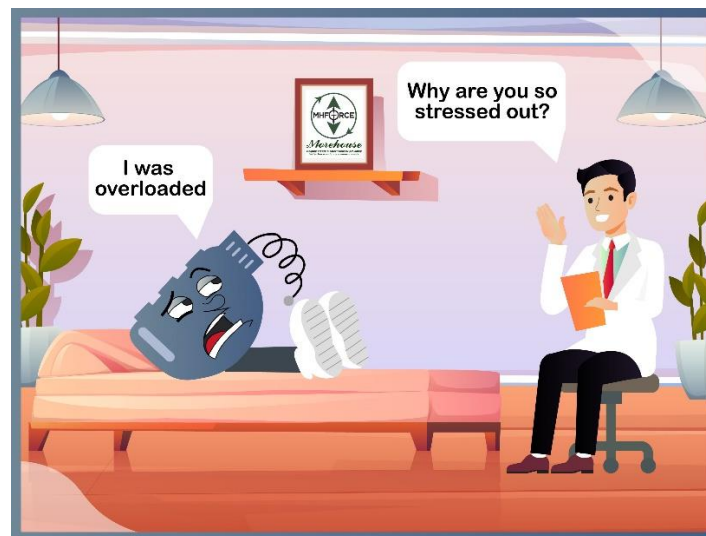


Figure 7: Stressed Out Load Cell



Figure 8: Inside of an overloaded shear web load cell showing a clear beak of the web element

Inside of an overloaded shear web load cell showing a clear beak of the web element

Diagnose with a load cell tester

A Morehouse load cell tester can be used to test for the following:

- Input and Output Resistance
- Resistance difference between sense and excitation leads
- Signal Output
- Shield to Bridge
- Body to Bridge
- Shield to Body
- Linearity

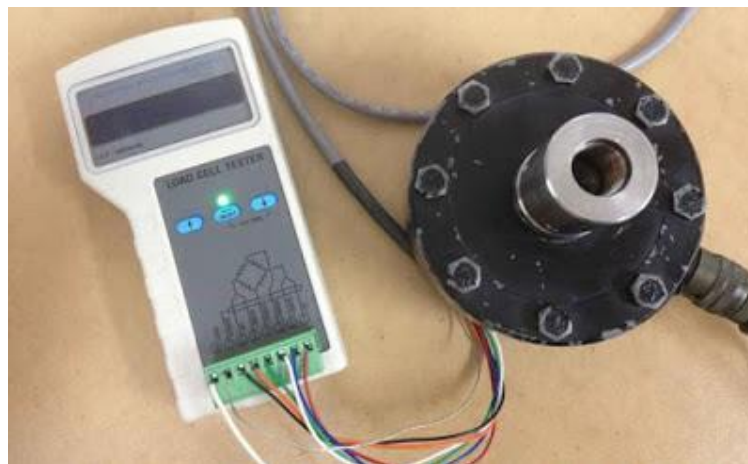


Figure 9: Load Cell Tester

A video showing how the load cell tester works can be found at
<http://www.youtube.com/watch?v=zQNUpe2Bh5Y>

Overloaded load cell

It is important to note that if a load cell has been overloaded, mechanical damage has been done that is not repairable. Overloading causes permanent deformation within the flexural element and gauges, which destroys the carefully balanced processing. While it is possible to electrically re-zero a load cell following overload, it is not recommended because this does nothing to restore the affected performance parameters or the degradation to structural integrity.

Morehouse stocks standard capacity load cells, and most equipment is available in 1 week, with calibration performed using deadweight primary standards. Shorter lead times are available upon request, and Morehouse always aims to provide superior customer support. Visit mhforce.com/load-cells/ for more information on our wide selection of load cells.

Conclusion

Visit www.mhforce.com for additional guidance on adapters, uncertainty, calibration techniques, and more.

Your time is valuable. Morehouse thanks you for taking the time to read this document. We wish you the very best and are always here to help!

About Morehouse Instrument Company

Our purpose is to create a safer world by helping companies improve their force and torque measurements. We have several other technical papers, guidance documents, and blogs that can add to your knowledge base. To learn more and stay up to date on future documents and training, subscribe to our newsletter and follow us on social media.

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