

Strain Gauges: Present and Future

Applications of Electronics

Objectives:

- Analyze series-parallel DC circuits
- Build and take measurements in series-parallel DC Circuits
- Use innovative and critical thinking to analyze a problem.

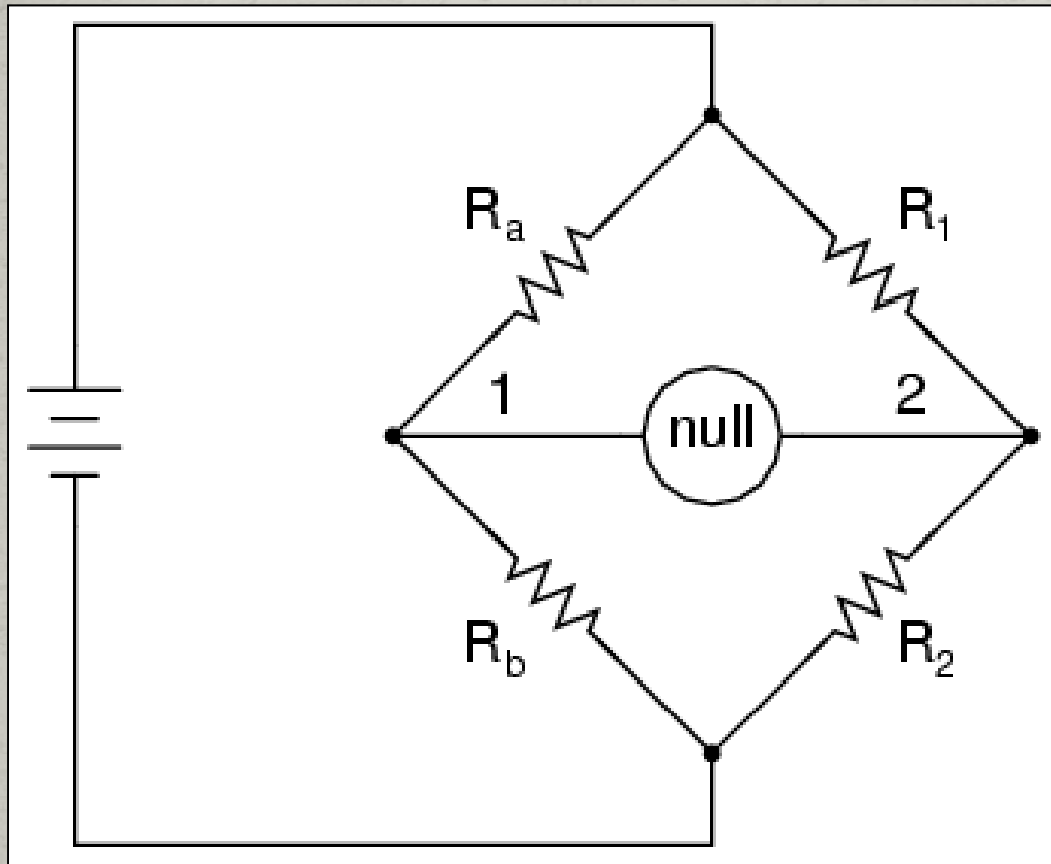
In this module, we'll answer the following questions:

- How do you “redraw” the Wheatstone Bridge circuit to recognize the series-parallel relationship among the resistors?
- How is a strain gauge used in a Wheatstone Bridge?
- How does the elastomer strain gauge work?
- How can you apply the elastomer strain gauge to a structure?
- What tests and evaluations would you need to do to show that the elastomer strain gauge is accurate and reliable?

What is a strain gauge?

- [Strain Gauge video](#)

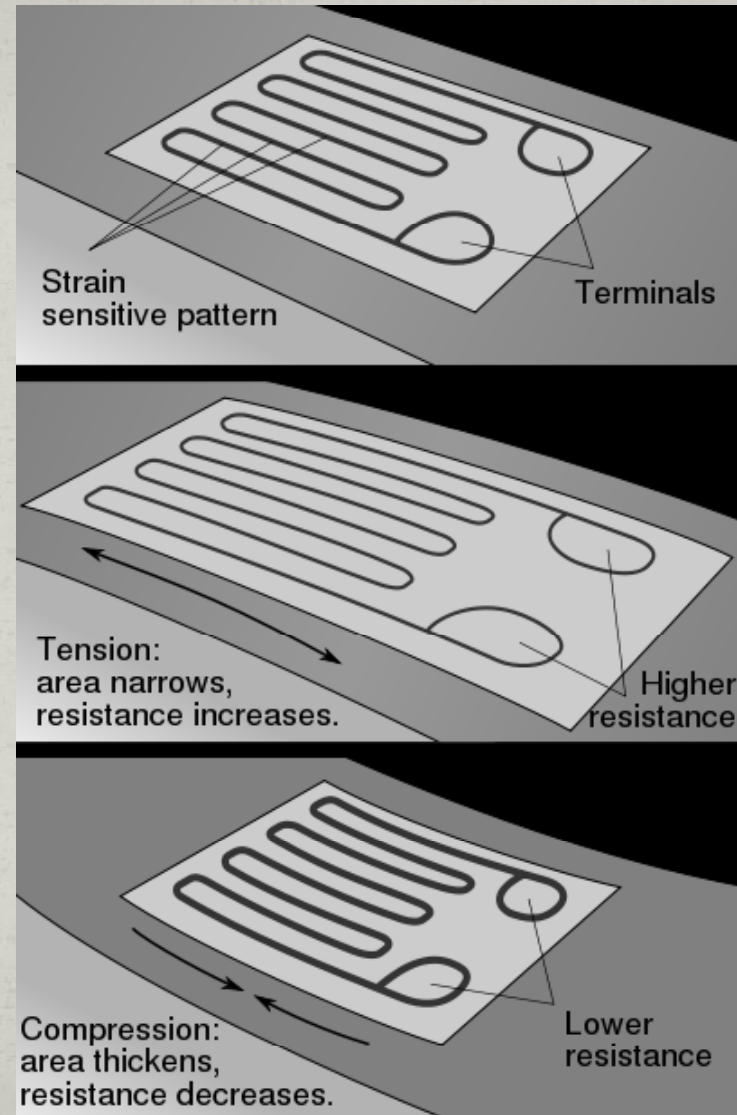
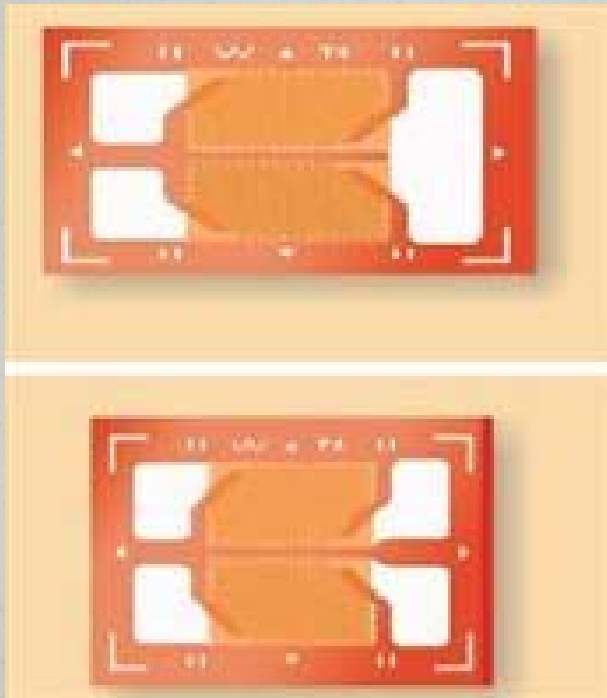
Back to Series-Parallel Circuits: The Wheatstone Bridge



- Voltage output is zero when the bridge is “balanced”
- $R_a/R_b = R_1/R_2$

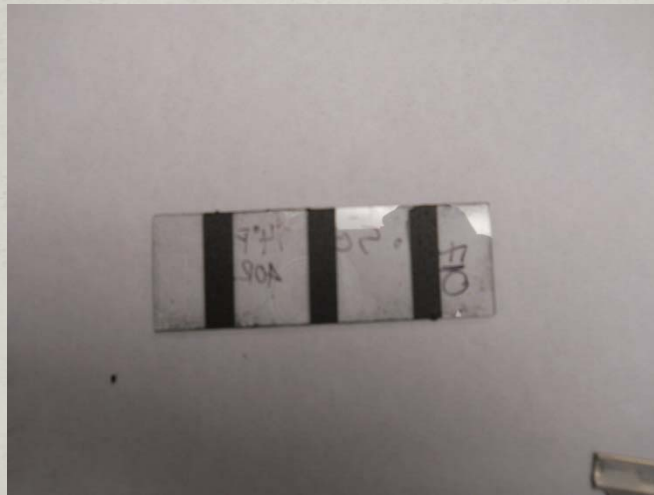
Foil Strain Gauge

- One leg of the Wheatstone Bridge



Elastomer Strain Gauge

- Graphene particles in Latex
- Resistance varies with strain (displacement)



Some things to consider:

- *Concept of operation*
- *Application examples from the literature*
- *How does it compare with a foil strain gauge in terms of ease of use, reliability, and durability?*
- *What tests would you do to “demonstrate” that elastomer strain gauge is a viable product?*