

King Fahd University of Petroleum and Minerals

University Diploma Program
Electronic Equipment Maintenance
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EET-027, Experiment # 8

Strain Gauge Measurement by Applying Displacement using Strain Indicator

Objectives:

Measuring strain when the strip end is displaced in the strain gauge micrometer device.

Apparatus:

Strain gauge

Straining gauge micrometer

Different Weights 1 kg, 2k, 5 kg.

Strain Indicator

Theory:

The strain gauge is a transducer employing electrical resistance variation to sense the strain produced by a force or weight. It is a very versatile detector for measuring weight, pressure, mechanical force, or displacement.

The Model P-3500 Strain Indicator is a portable, battery-powered instrument with unique features for use in stress analysis testing, and for use with strain gage based transducers. In use, the operator follows a logical sequence of setup steps by activating color-coded push-button controls to prepare the instrument for making accurate and reliable measurements. The P-3500 also incorporates a highly stable DC amplifier, precisely regulated bridge excitation supply, and precisely settable gage factor controls.

Static measurements are displayed directly on the indicator's readout with 1 micro-strain resolution. The instrument will accept full-, half-, or quarter-bridge strain gage inputs, and all required bridge completion components for 120, 350 and 1000 ohm gages are built in.

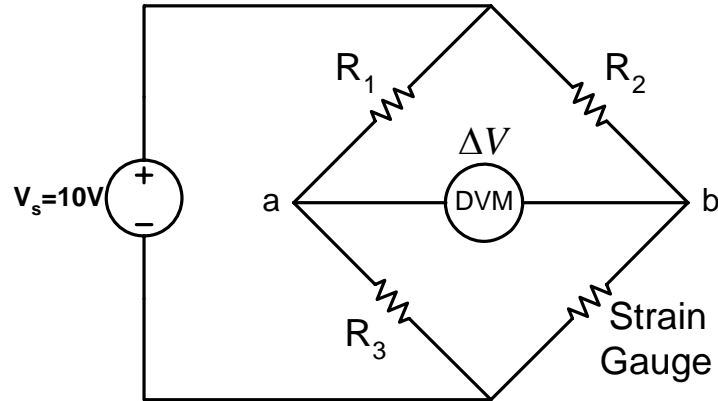
7. Depress the CAL push button and verify calibration of the instrument.
8. Select the XI or XI 0 MUL T position as required.
9. Depress the RUN push button. Displace the end of strip and record the reading of strain in the table 1.
10. Plot the graph of Strain versus Resultant Displacement and find the slope of the graph and find strain at displacement of 0.115 inch from graph.

Table 1

S. No.	Displacement (inch)	Resultant Displacement (x-a) (inch)	Strain (micro-strain)
1	a =		0
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

2. Measuring Differential Voltage of Full Bridge Circuit when Strip is displaced:

1. Connect strain gauge with the bridge circuit as shown the following figure. Set the power supply to 10 Volts and all three resistances are 120 ohms.



2. Find the voltage difference (ΔV) across nodes “a” and “b” using digital volt-meter (DVM) without any displacement and record the value in the table 2.
3. Apply some displacement using micrometer and find the voltage difference (ΔV) using digital volt-meter (DVM) and record the values in the following table 2.
4. Plot the graph of differential voltage versus Resultant Displacement and find the slope of the graph and find the differential voltage at displacement of 0.115 inch from graph.

Table 1

S. No.	Displacement (inch)	Resultant Displacement (x-a) (inch)	Differential Voltage (Volts)
1	a =		0
2			
3			
4			
5			
6			
7			
8			

9			
10			

Conclusions:

Compare the slope of the two graphs? And write your comments.