Voltage Drops Across Strain Gauges

By using simple voltage divider equations, and an assumption of 3.3VDC of excitation to the wheatstone circuit, it is found that at zero load conditions a voltage drop of 0.825VDC will occur over each strain gauge. The voltage drop across the strain gauge can be measured using a multimeter. Then, a load can be applied to see if the voltage drops change. This proves that the wiring is correct, there are no shorts or open circuit conditions and that the circuit is being energized correctly.

On the measurement structure, at zero load conditions, voltage drops of ~ 0.825VDC existed across all strain gauges. There were differences from 0.825VDC due to tolerances that exist in the gauges, and possibly the resistances of lead wires factoring in. Applying a torsional load resulted in minor voltage differences on the order of microvolts.

Table 1. Voltage measured at each strain gauge.

Gauge	Voltage (mV)
1	824.22
2	825.79
3	822.09
4	824.51
5	825.2
6	825.66
7	825.41
8	824.93
9	825.34
10	824.95
11	824.57
12	823.88
13	824.68
14	824.45
15	825.25
16	824.44
17	823.79
18	823.69
19	824.46
20	824.57
21	825.73
22	824.74
23	825.41
24	825.27

This concludes that the wiring is correct, and that all strain gauges are being excited correctly, and that there are no shorts in the circuit or open circuit conditions.