1.5-6 The data shown in the table were obtained from a tensile test of a metal specimen with a diameter of 0.500 inch and a gage length (the length over which the elongation is measured) of 2.00 inches. The specimen was not loaded to failure.

a. Generate a table of stress and strain values.

b. Plot these values and draw a best-fit line to obtain a stress–strain curve.

c. Use the slope of the best-fit line to estimate the modulus of elasticity.

d. Estimate the value of the proportional limit.

e. Use the 0.2% offset method to determine the yield strength.

Load (kips)	Elongation (in.)
0	0
1	0.0010
2	0.0014
2.5	0.0020
3.5	0.0024
5	0.0036
6	0.0044
7	0.0050
8	0.0060
9	0.0070
10	0.0080
11.5	0.0120
12	0.0180

1.5-7 The data shown in the table were obtained from a tensile test of a metal specimen with a rectangular cross section of 0.2 $in.^2$ in area and a gage length (the length over which the elongation is measured) of 2.000 inches.

a. Generate a table of stress and strain values.

b. Plot these values and draw a best-fit line to obtain a stress–strain curve.

c. Determine the modulus of elasticity from the slope of the linear portion of the curve.

d. Estimate the value of the proportional limit.

e. Use the 0.2% offset method to determine the yield stress.

Load (kips)	Elongation $\times 10^3$ (in.)	Load (kips)	Elongation $\times 10^3$ (in.)
0	0	7.0	4.386
0.5	0.160	7.5	4.640
1.0	0.352	8.0	4.988
1.5	0.706	8.5	5.432
2.0	1.012	9.0	5.862
2.5	1.434	9.5	6.362
3.0	1.712	10.0	7.304
3.5	1.986	10.5	8.072
4.0	2.286	11.0	9.044
4.5	2.612	11.5	11.310
5.0	2.938	12.0	14.120
5.5	3.274	12.5	20.044
6.0	3.632	13	29.106
6.5	3.976		

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The John Hancock Building in Chicago is a steel-framed structure. It features an exposed wind-bracing system.