**Eccentric Loading - Worksheet**

1. Analyze the experimental data graphically in Excel per the instructions in the “Calculations” section of lab handout. Answer the following questions (15pts):
   1. What is the equation of the regression line for the plot of experimental stress vs. position relative to the centroid (3pts)?
   2. What is the location of the experimental neutral axis (show calculations) (4pts)?
   3. What is the experimental maximum tensile stress (show calculations) (4pts)?
   4. What is the experimental maximum compressive stress (show calculations) (4pts)?
2. Analyze the problem theoretically per the instructions in the “Calculations” section of lab handout. Answer the following questions (16pts):
   1. What is the theoretical equation of the line for the plot of stress vs. position relative to the centroid (show calculations) (4pts)?
   2. What is the location of the theoretical neutral axis (show calculations) (4pts)?
   3. What is the theoretical maximum tensile stress (show calculations) (4pts)?
   4. What is the theoretical maximum compressive stress (show calculations) (4pts)?
3. Compare the experimental and theoretical results by filling out the following table. Note any out of place data and give plausible reasons for the percent error. Also, include one calculation of percent error for partial credit purposes (12pts).

|  |  |  |  |
| --- | --- | --- | --- |
| Entity | Experimental Value | Theoretical Value | % Error |
| Position of the Neutral Axis Relative to the Centroid (yNA), in |  |  |  |
| Maximum Tensile Stress (σTmax), psi |  |  |  |
| Maximum Compressive Stress (σCmax), psi |  |  |  |

1. After the analysis be sure to back up your results by completing the following tasks (7pts):
   1. Attach the Lab Data Sheet completed in full to the end of this worksheet (3pts).
   2. Attach a printout of the Excel analysis. This should include tables of the all the measured and calculated values necessary for the analysis, and a plot of the stress vs. position relative to the centroid. The plot should include the experimental data, the experimental regression line and its equation, and the theoretical line and its equation. (Label the tables and graphs appropriately.) (4pts)