Assignment 03:
Data Extraction and Plotting

Instructions

1) *Extract the data from the given images using **'Web Plot Digitizer'**.*
2) *Use **'Microsoft Excel'** for replotting the images.*
3) *In line plots, **width** of the **line** should be kept at **2 pt**.*
4) *All **text** in the graphs should be in **black** colour with **'Bold'** format.*
5) *Borders must be closed, grid lines should be removed, and **axis titles** should be in **'Bold'** format.*
6) *In any circumstance, avoid use of colours light colours in the plot.*
7) *All images should be uploaded in **MS teams** as a pdf file and excel file with file name as **"RollNo_Name***

---

1. Tensile tests were conducted on Aluminum and Steel samples. The stress (σ) - strain (ϵ) plots obtained from the test is depicted in Figure 1 in linear scale along x and y axis. The relationship of stress strain curve is of the form is $\sigma = A\epsilon^n$. *Convert the linear graph data represented in figure 1 to log-log plot and obtain the curve fitting equation in the power law mentioned above and determine the value of A and n.*

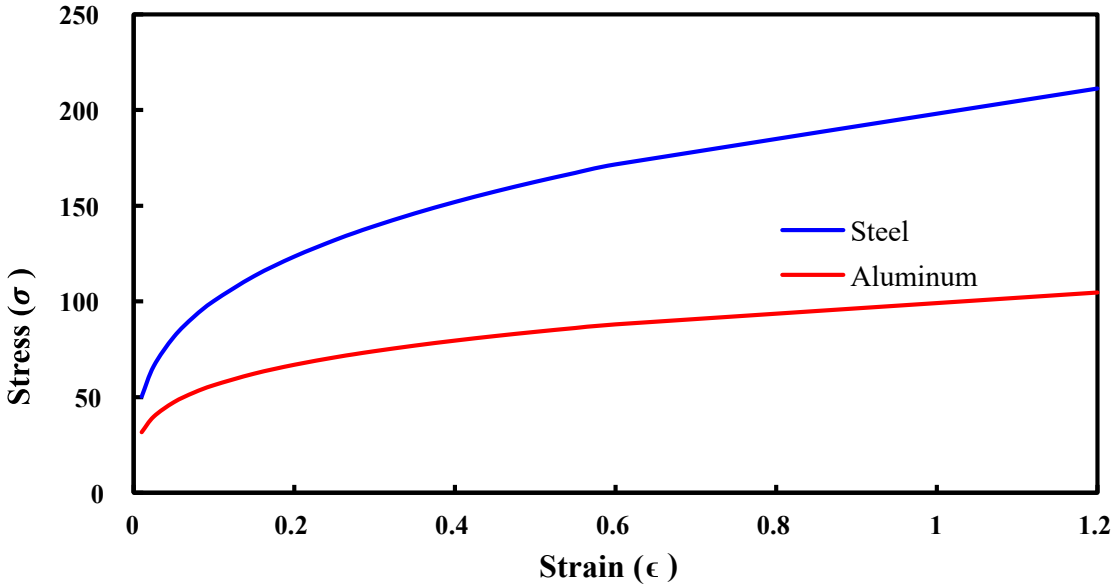

Fig. 1: Stress-Strain curve for Aluminum and Steel

Plot the smooth line graph in excel with logarithmic scale. For log-log plot, set the minimum bounds in axis options in *x-axis* to be 0.01 and maximum 1.2; set the major units in axis options as 10 and minor units as 10. Set the minimum bounds in axis options to *y-axis* to be 10 and maximum to 250; set the major units in y axis options as 10 and minor units as 10. *Fit the curve with power law and display the curve fitted equation with R^2 value with font size of 14 pt, Times New Roman font, black colour and bold formatted.*

2. The temperature contours across the cross-sectional area (area 1 meter × 10 mm) of a continuous cast rod is shown in figure 2. The values of various iso-temperature (in °C) contours at different locations of the cross section are shown on the respective contour lines. Extract the data for the contour lines with values of 1785°C, 1780°C, 1700 °C and 1650 °C and then replot Fig. 2 as line plots (continuous lines), with solid lines for each contour lines, but with different colours

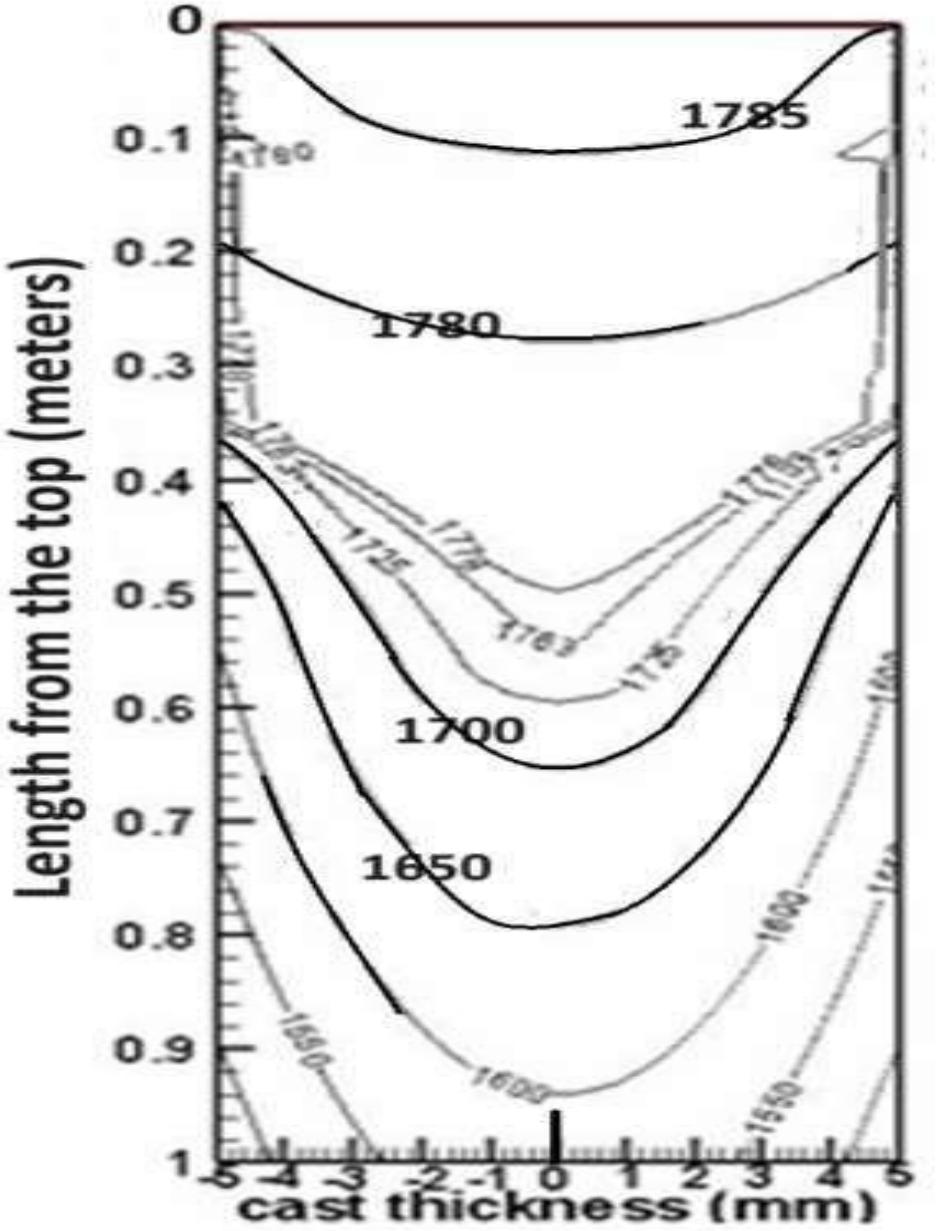

Fig. 2: Temperature contours across the cross section of a 1 meter long and 10 mm cross section of a continuous cast rod.

3. The average coefficient of Friction (COF) was determined during pin-on-disc wear testing experiments under combinations of disc speeds (speeds of 150 rpm, 200 rpm, 250 rpm and 300 rpm) and Normal loads (loads of 5 N, 10 N, 15 N and 20 N). Figure 3 shows the histogram plot of COF for various combinations of speeds and loads. Extract the data from Fig. 3 in a table format and plot a bar chart with colours of the bars different from those assigned in Fig. 3. Also draw the COF vs speeds (rpm) curves for various loads (N) in the form of the scatter plot with straight lines (with speed axis in the range 100-350 rpm).

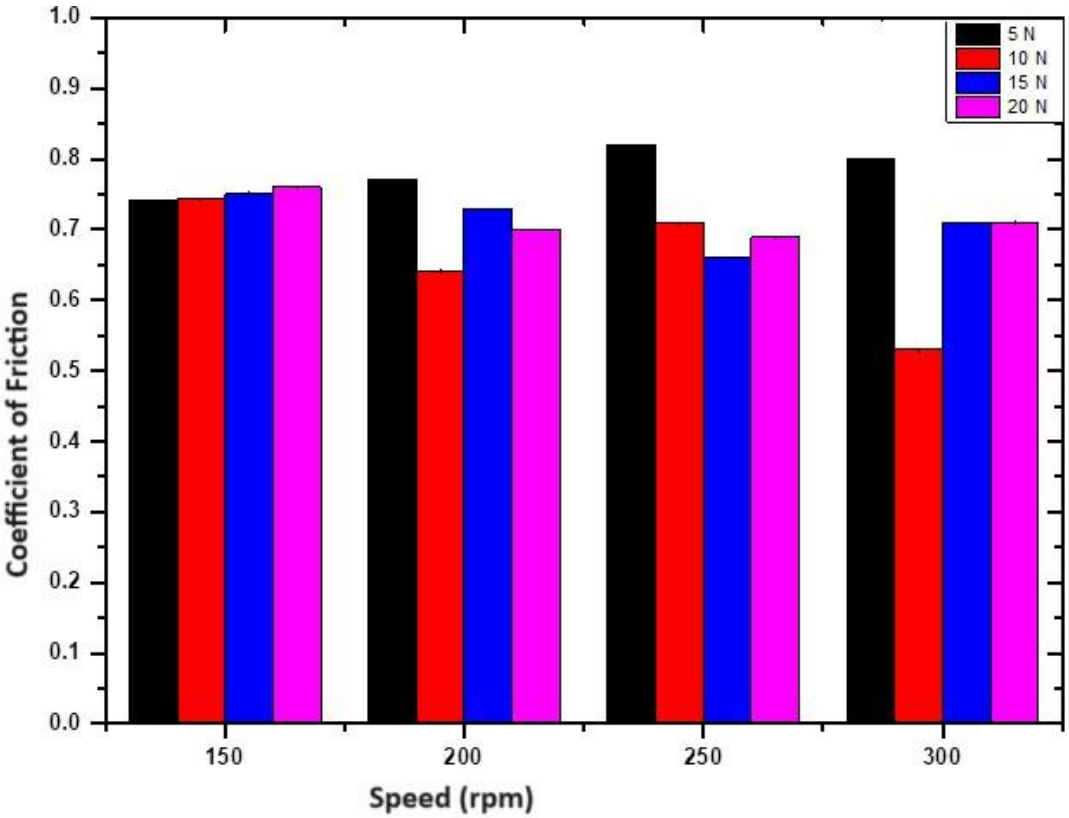

Fig. 3: Histogram plot of COF for different loads and speeds.