Analysis of Results and Points for Discussion

1. Plot Load-Displacement curves of 1018 cold-rolled steels for three different weld geometry-power configurations in one graph. Discuss the effect of different geometry and power configurations on the strength and ductility of the welded samples. Repeat for 6061-T6 Al alloy.
2. Find the strongest configuration for steel and aluminum, plot the corresponding Stress-Strain curves in one graph. Find the yield stress and UTS. The tensile test data for the regular 1018 and 6061 specimens are also provided. Plot the Stress-Strain curves for those data and find the yield stress and UTS. How is the mechanical performance of the welded specimens compared to the regular tensile specimens? Discuss the differences and possible reasons.
3. Series of micrographs for welded 1018 and 6061 are provided. Identify the base metal, heat affected zones and fusion zones, and include the corresponding micrographs showing these regions in your report (3 for 1018 and 3 for 6061). Describe the microstructural features in different zones and explain the mechanism behind the formations of such microstructures.
4. Calculate the Vickers hardness and plot the measured hardness at different positions for both metals. Mark the heat affected zone on your graphs. Discuss how welding affected the hardness of these specimens.