

AE351 - IITK
LAB 1 - Uniaxial Tensile Testing

Lab Objective: Perform uniaxial tension test on a dog-bone shaped tensile specimen. Plot stress vs. strain curve and analyze material behavior by identifying key material parameters.

Procedure:

1. Switch on the 10 kN Tinius Olsen universal testing machine (UTM). With the help of lab instructor understand the method of conducting tensile test and learn salient features of the software-in-use.
2. Hold the dog-bone shaped test specimen at the UTM grips and carefully mount 25 mm extensometer in between the gage length region of the specimen.
3. Load the specimen in displacement control mode at the speed suggested by the lab instructor.
4. Remove the extensometer at pre-decided (specified) load/strain value.
5. Continue loading the specimen until failure is observed.
6. Record the load vs. cross head displacement data and the load vs. strain gage data (**RAW DATA**).
7. Plot the stress vs. strain curve as discussed in the class.
8. Carefully observe the failed specimen and perform failure analysis. Analyze and discuss the material behavior from the stress-strain plot. Determine all material characteristics (including elastic modulus, yield stress, failure stress, elastic and plastic zones/limits and various strains).
9. Compare the experimental value of elastic modulus with the published data for the specimen-in-consideration. Calculate the percent differences between the measured and published values.
10. Identify sources of errors in your experiments/measurements.

Prepare a lab report using provided Lab Format guidelines.