

Buckling

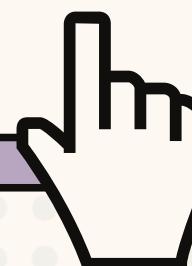
A Student Design Experiment

Objective

- . To find the critical buckling load of an axially loaded mild steel column that is fixed-ended by studying the axial compression vs. lateral displacement plot at the centre.
- . To compare the effect of boundary condition (fixed-ended column vs pinned column) on critical buckling load

S2G9
STAGE 2 PRESENTATION

EKNOOR SINGH
DINESH DABI (P)
RUSHIKESH BHOR
BALBIR YADAV



Method

Acquire our testing specimens of appropriate dimensions from the **vendor**

Set up the Universal Testing Machine for use in **Heavy Machinery Lab, CE**

Setting up **LVDT** to measure the lateral **displacement** accurately

Perform buckling, until noticeable **snap-bending** takes place in the specimen

Use **videography** with LVDT readings and set-up for **continuous data range**



← LVDT



Setting up our specimen for the fixed-fixed boundary condition

Materials and Availability



MATERIAL TO BE USED

Mild Steel

DIMENSIONS OF SPECIMEN

50cm x 10cm x 0.7cm

AVAILABILITY

Available with **Suresh Metals**, 3 such needed
1 for each boundary condition, 1 backup

All the above specifications are in accordance with consultations with
the lab incharge who has access to the UTM.

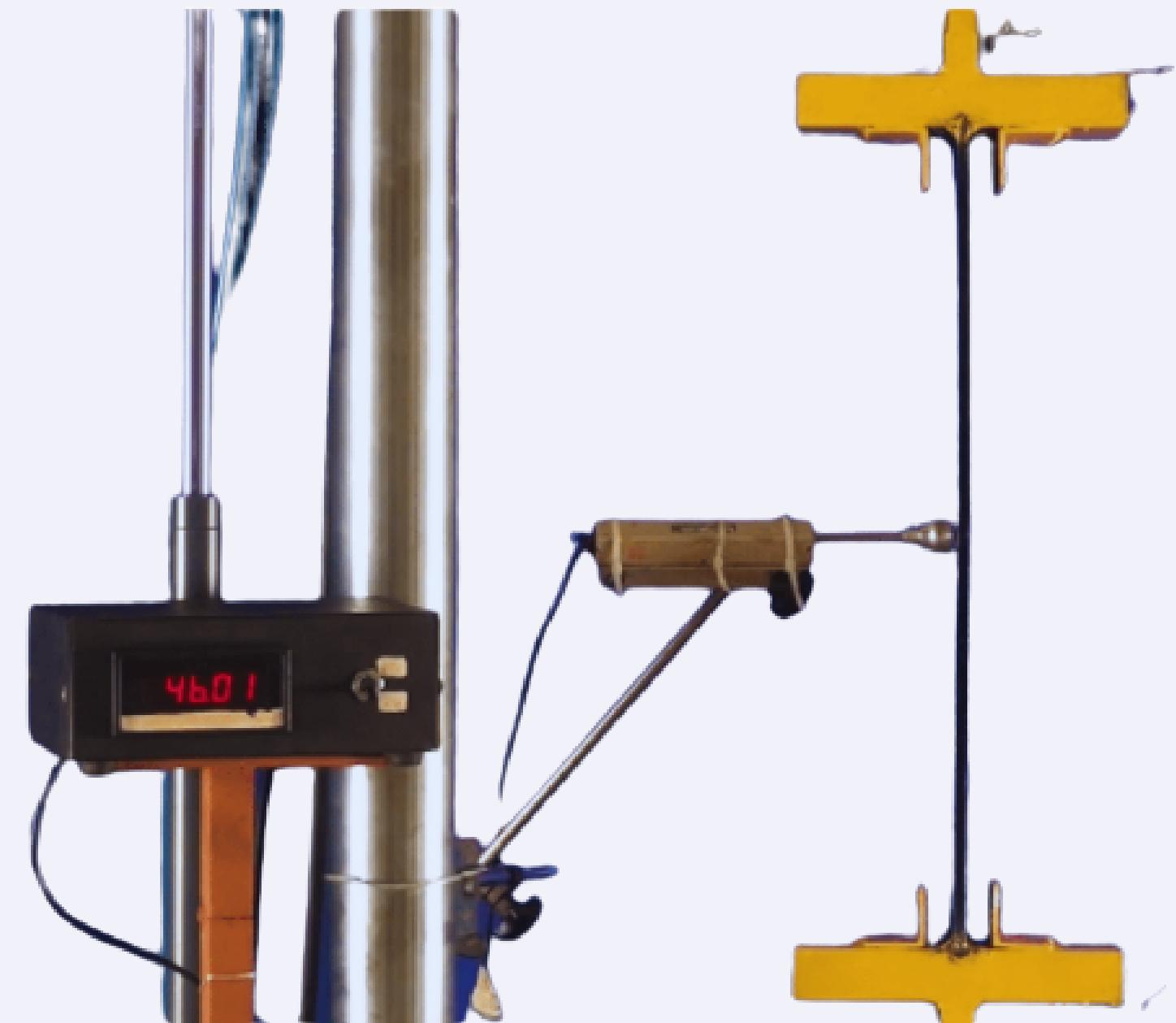
Instruments and Access

- Equipment to be used:

1. UTM
2. LVDT

- Permission/ Access:

- Our team has procured permission to conduct the experiment on the condition that we inform them of the same at least a week in prior so that they could assign us a suitable time.



UTM machine with a fitted LVDT

Data Collection and Analysis

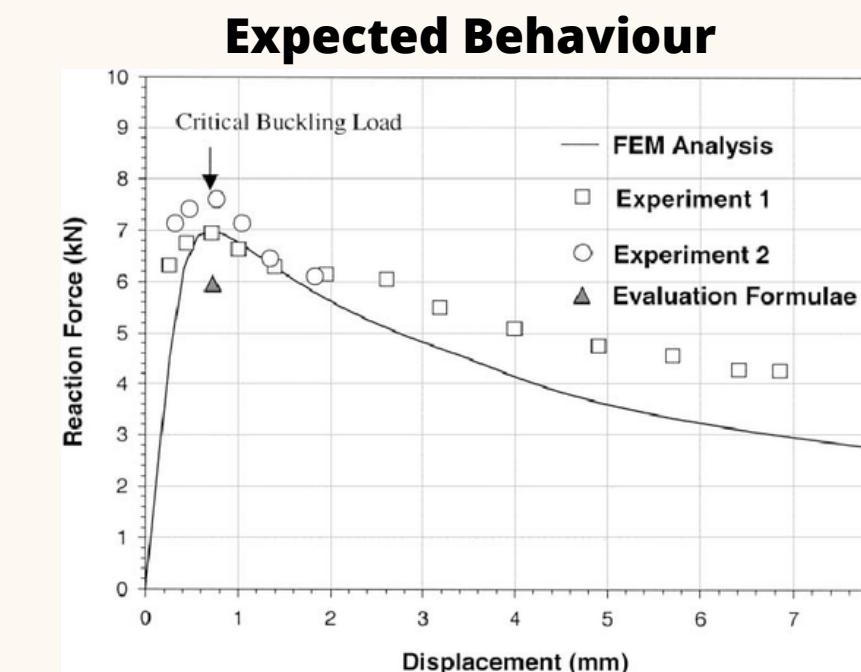
1. Data Collection:

- Applied axial **force data** to be taken from the **UTM**
- Resultant transverse **displacement** to be measured using a **LVDT**

2. Analysis:

- Plotting a graph of Axial Force v/s Displacement
- Calculating experimental Critical Buckling Load
- Comparing experimental values with theoretical values

$$P_{cr} = \frac{\pi^2 EI}{L^2}$$



***"Looking forward to an enriching
learning and experimenting experience"***

THANKYOU