Materials

1 Bulk Properties of solids

Hooke's law - Force is directly proportional to extension, provided the proportionality limit has not been reached

1.1 Spring constant

1.1.1 Series

$$\text{Spring constant} = \frac{\text{Spring constant of one spring}}{\text{Number of springs}}$$

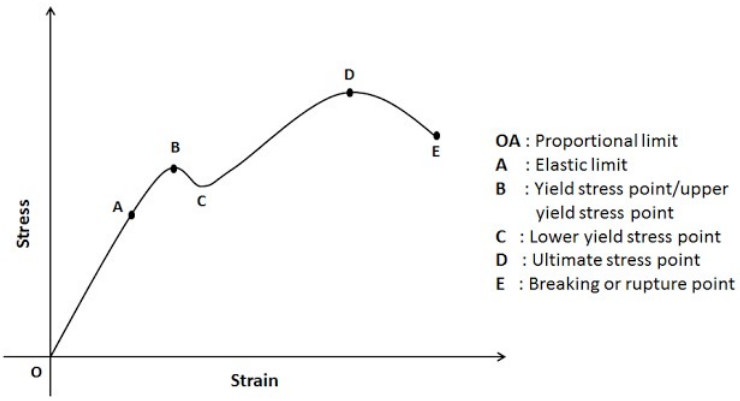
1.1.2 Parallel

$$\text{Spring constant} = \text{Spring constant of one spring} \times \text{Number of springs}$$

1.2 Material properties

Brittle material - Snap
Ductile material - Stretch
Plastic Behaviour - The behaviour of a material after it has reached it's elastic limit

1.3 Stress strain graph of a metal wire



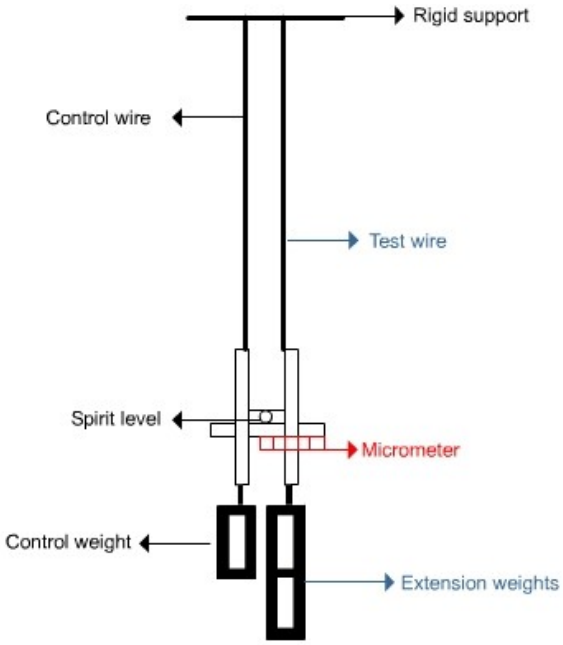
2 The Young Modulus

The **gradient**of a stress strain graph is the Young Modulus

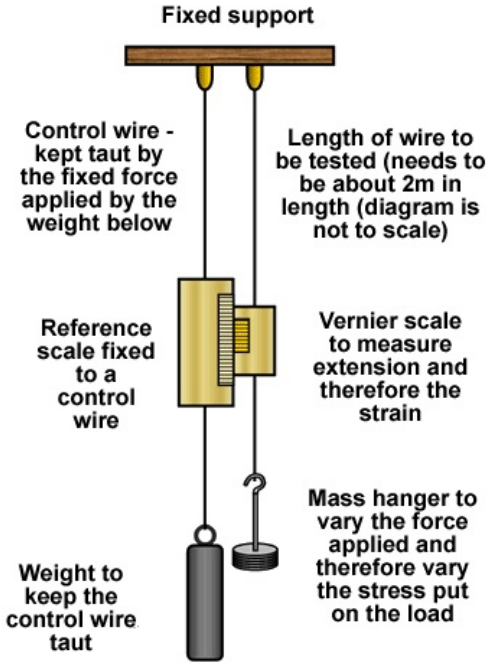
Units of Young Modulus: Nm^{-2} or Pa

Stiff Material - **High** Young Modulus
Flexible Material - **Low** Young Modulus

2.1 Searle's apparatus for measuring Young's Modulus

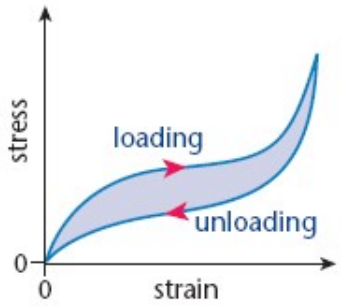


2.2 Vernier apparatus for measuring Young's Modulus

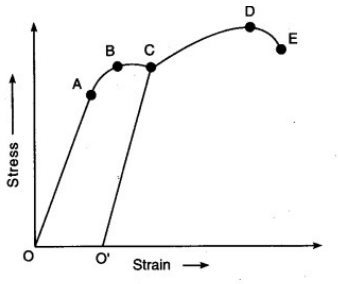


3 Stress Strain Graphs

3.1 Rubber



3.2 Metal



3.3 Polythene