

ROCK MECHANICS

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M.Mary Soujanya
Assistant Professor,
CED,MCET.

Engineering Properties of Rocks

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Important engineering properties tested for rocks

As sites for foundation

Lab tests

1. UCS
2. Tensile strength
3. Shear strength
4. Modulus of Elasticity
5. Triaxial test

Field tests

1. Jack test
2. Shear test
3. Seismic test

As building stones

1. Crushing strength
2. Transverse strength
3. Porosity
4. Density
5. Abrasive resistance
6. Durability
7. Appearance

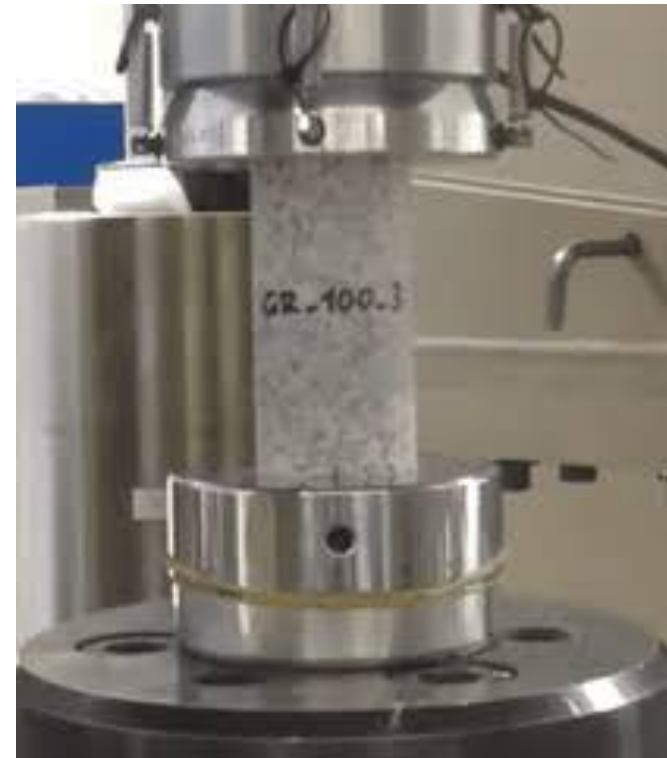
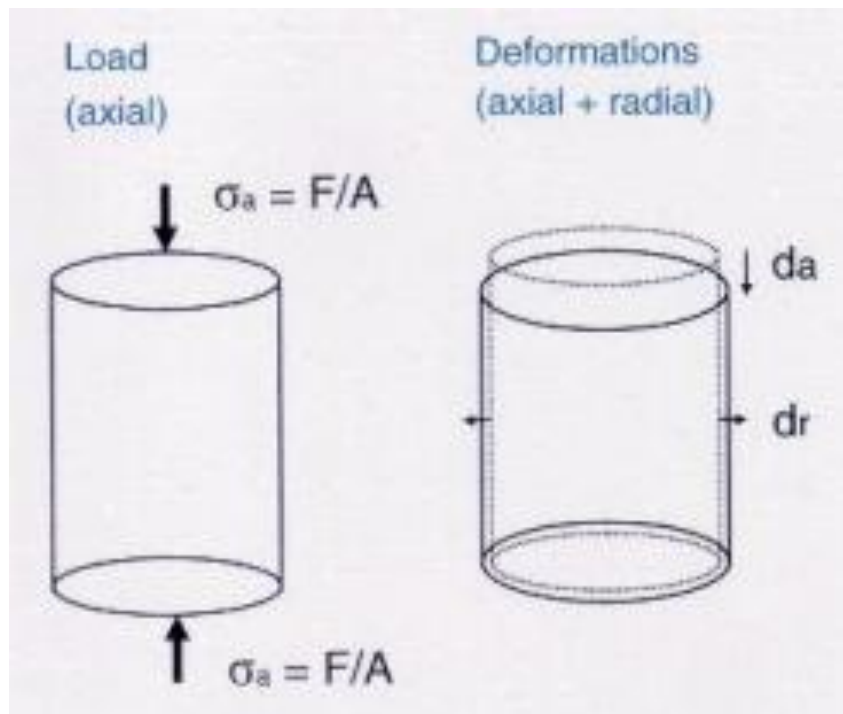
As aggregate

1. Hardness
2. Toughness
3. Binding properties
4. Crushing strength
5. Cracking of concrete.

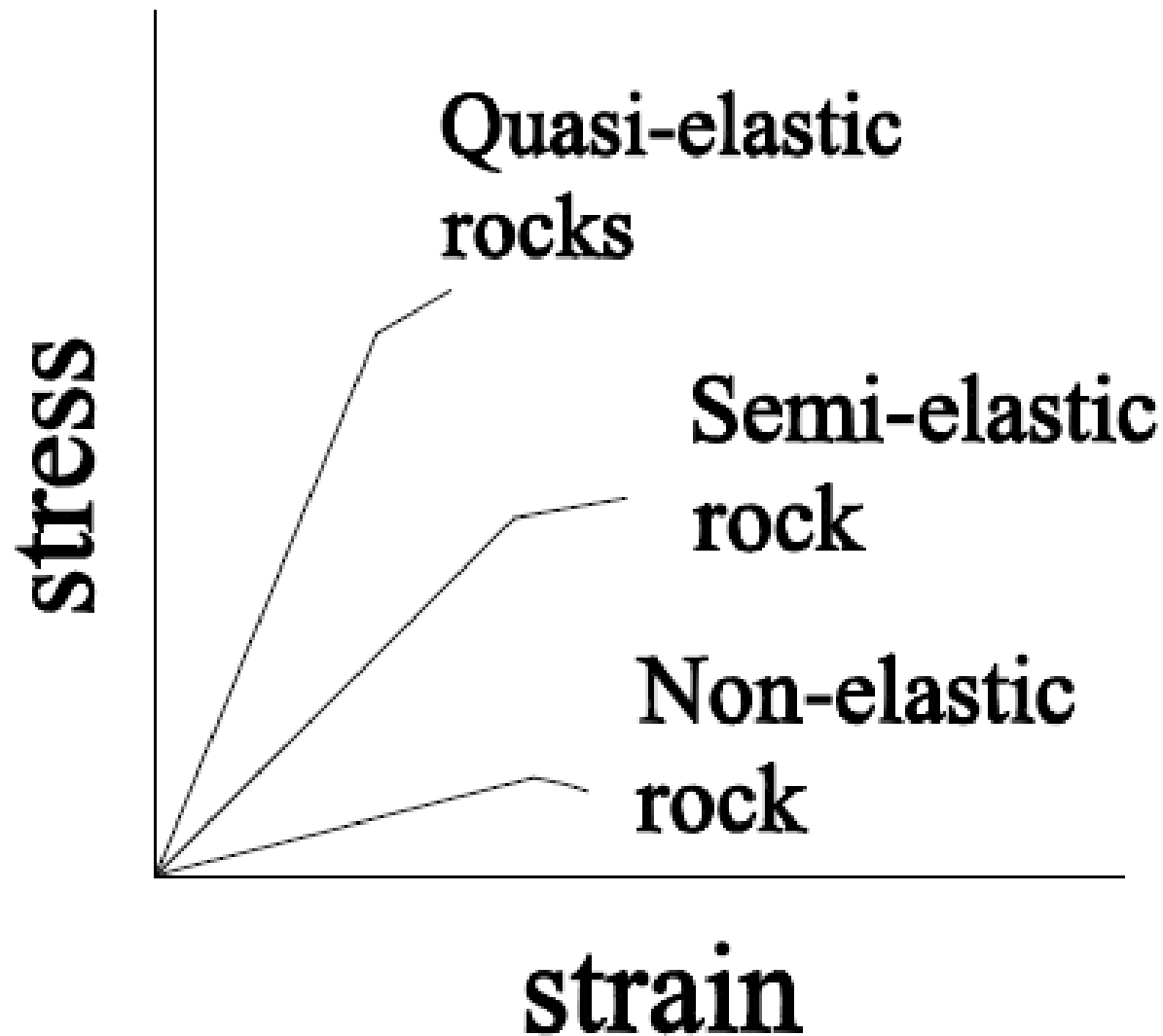
Stress-Strain behavior of Rock under Uniaxial compression

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- ✓ These tests are carried out on a cylindrical specimens with **L/D = 2**.
- ✓ The modulus of Elasticity indicates their deformation under loads.



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Quasi-elastic rocks:

- ✓ The stress-strain relationship is almost a straight line till the point of failure occurs.
- ✓ They are massive, dense and non-foliated rocks of igneous and metamorphic rocks like granites, gabbros, dolerites, basalts and quartzite's.
- ✓ E ranges from **6×10^5** to **11×10^5** kg/cm².

Semi-elastic rocks:

- ✓ The curve indicating the modulus of elasticity is such that its slope tends to decrease with increasing loads.
- ✓ These are generally coarse grained, slightly porous and possess minor structural discontinuities.
- ✓ Coarse grained granites, dolomites, sandstones etc., fall under this group
- ✓ E ranges from **4×10^5** to **6×10^5** kg/cm².

Non-elastic rocks:

- ✓ The stress-strain relationship tends to break into an initial zone to a steep slope followed by a curve with least slope.
- ✓ These are porous and coarse grained.
- ✓ $E < 4 \times 10^5$ kg/cm².