DESIRABLE PROPERTIES OF MATERIALS

These materials, their associated properties, and their interactions determine the properties of the resultant pavement. Thus, a good understanding of these materials, how they are characterized, and how they perform is fundamental to understanding pavement.

PROPERTY OF MATERIALS

Soil	Aggregates	Bitumen	Cement
Short and long term stability of the subgrade and slope of embankment	Sufficient Strength and resistance to crushing	Easy to get mixed	Provides strength to masonry
Compressibility within the permissible limits	Hard enough to resist wear	Attainment to desired stability	Stiffens or hardens early
Adequate permeability	Toughness	Maintain stability for all weather conditions	Possesses good plasticity
Compaction should be ease and economical	Durability	Sufficient flexibility to avoid cracking	An excellent building material
Minimum volume change at all weather conditions	Shape	Sufficient adhesion	Easily workable and Good moisture-resistant

Various Tests to be conducted on road materials

TABLE 2 TESTS ON ROAD MATERIALS

Tests on Soil	Tests on Aggregates	Tests on Bitumen
Shear Test	Crushing test	Penetration test
Direct Shear Test	Abrasion test	Ductility test
Triaxial Compression test	Impact test	Softening point test
Unconfined Compression test	Soundness test	Flash and fire point test
Bearing Test	Water absorption test	Specific gravity test
Plate Bearing Test	Shape test	viscosity test
Penetration Test	Abrasion test	
California Bearing Ratio Test		

SOIL:

Soil is an accumulation or deposit of earth material, derived naturally from the disintegration of rocks or decay of vegetation that can be excavated readily with power equipment in the field or disintegrated by gentle mechanical means in the laboratory. The supporting soil beneath pavement and its special under courses is called sub grade. Undisturbed soil beneath the pavement is called natural sub grade. Compacted sub grade is the soil compacted by controlled movement of heavy compactors.

The following tests are used to evaluate the strength properties of soil.

TABLE 3 TESTS ON SOIL

Shear Test	Bearing Test	Penetration test
These are usually carried out on relatively small soil samples in the laboratory	These are loading tests carried out on subgrade soil in situ with a load bearing area	These may be considered as small scale bearing tests in which the size of the loading area is relatively much smaller and ratio of the penetration to size of loaded area is much greater than the ratios in bearing tests.
Direct Shear Test (Lab) Triaxial Compression Test (Lab) Unconfined Compression Test (Lab) (3) Vane shear test (field)	Plate Bearing Test	California Bearing Ratio Test

DIRECT SHEAR TEST:

This test is used to determine the shear parameters (cohesion and angle of internal friction) of a soil sample and to determine the stress-strain characteristics. Shear strength of the soil means the maximum resistance offered by the soil against shearing forces. Failure occurs by slip for cases where the shearing force exceeds this particular value. By Coulomb's law, $S = C + \sigma \tan\theta$

Where S-Shear resistance or shear strength of soil,

σ -the normal stress applied, C-cohesion of the soil and

θ -Angle of internal friction of the soil .