

### 3.2DESIGN PRINCIPLES

#### **Flexible pavement:**

- A load of magnitude may be dissipated by carrying it deep into ground through layers of granular materials.
- The intensity of load diminishes in geometric proportions as it is transmitted downwards from the surface by virtue of spreading it over an increasing larger area.
- Strength of each layer could be reduced with increased depth.

#### **Rigid pavement:**

- Design is based on providing flexural strength in a structural slab to resist destructive action of wheel loads.
- A rigid pavement because of its rigidity and high modulus of elasticity tends to distribute the load over a relatively wider area of soil.

### **FUNCTIONS OF PAVEMENT COMPONENTS**

The functions are:

#### ***Soil sub grade and its evaluation:***

- The soil sub grade is a layer of natural soil prepared to receive the layers of pavement materials placed over it. It is essential that at no time the soil sub grade is overstressed, it means that the pressure transmitted on the top of the sub grade is within the allowable limit.
- Many tests are known for measuring the Strength properties of the sub grades .Some of the tests have been standardized for the use. The common strength test for the evaluation of soil sub grade is:
  1. California bearing ratio test.
  2. California resistance value test.
  3. Triaxial compression test
  4. Plate bearing test.

#### ***California bearing ratio (CBR) test:***

It is evolved for the empirical method of flexible pavement design. The CBR test is carried out either in the laboratory on prepared specimens or in the field by taking in situ measurements.

*California resistance value:*

It is found by using hveem stabliometer. This test is used in an empirical method of flexible pavement design based on soil strength.

*Triaxial test:*

It is the most important soil strength, but still the test is not very commonly used in structural design of pavements.

*Plate bearing test:*

It is carried out using a relatively large diameter plate to evaluate the load supporting capacity of supporting power of the pavement layers. The results are plate bearing tests are used in flexible pavement design method like McLeod method on based on layer system analysis by brumister.

***Sub base and base courses and their evaluation:***

- There layers are made of broken stones, bound or unbound aggregate, some times in sub base course a layer of stabilized soil.(or) Selected granular soil is also used. however at the sub base course it is desirable to use smaller size graded aggregates. When the sub grade consists of fine grained soil and when the pavement carries heavy wheel loads.
- Sub base course primarily has the similar function as of the base course and is provided with inferior materials than of base course. Base courses are used, under rigid pavement for
  1. Preventing pumping
  2. Protecting the sub grade against frost action.
- Thus the fundamental purpose of a base course and sub base course is to provide a stress transmitting medium to spread the surface wheel loads in such manner.
- The sub base and base course layers may be evaluated by suitable strength or stability test like plate bearing CBR test.

***The function of wearing course***

- To provide a smooth riding surface
- To resist pressures exerted by tyres.

- To take up wear andtear
- To prevent infiltration of rainwater into the pavement and subgrade

