Cement Testing

- **Chemical analysis**

Chemical analysis of hardened concrete can provide a wealth of information about the mix constituents and possible causes of deterioration. Standard methods can be used to find the cement content and original water/cement ratio, but many other properties can also be established; Cement Content and Aggregate Cement Ratio, Cement Content and Pulverised fuel ash/fly ash (pfa) content, Cement Content and Slag content, Water/Cement Ratio, Aggregate Grading, Determination of the presence of High-Alumina Cement (HAC)

Test Method: IS: 4032-1985

- **Compressive strength:**

The most common strength test, compressive strength, is carried out on a 50 mm (2-inch) cement mortar test specimen. The test specimen is subjected to a compressive load (usually from a hydraulic machine) until failure.

Test Method: IS: 4031 (P-6) 1988

- **Fineness:**

The fineness of cement has an important bearing on the rate of hydration and hence on the rate of gain of strength and also on the rate of evolution of heat. Greater fineness increases the surface available for hydration, causing greater early strength and more rapid generation of heat. Cement fineness play a major role in controlling concrete properties. Fineness of cement affects the place ability, workability, and water content of a concrete mixture much like the amount of cement used in concrete does.

Test Method: IS: 4031 (P-2)1990

- **Heat of Hydration:**

  When cement is mixed with water, heat is liberated. This heat is called the heat of hydration, the result of the exothermic chemical reaction between cement and water. The heat generated by the Cementenious hydration raises the temperature of concrete.

  Test Method: 4031 (P-9) 1988

- **Loss on Ignition:**

  This test helps in determining the inorganic analytical chemistry, particularly in the analysis of minerals. It consists of strongly heating ("igniting") a sample of the material at a specified temperature, allowing volatile substances to escape, until its mass ceases to change.

  Test Method: IS: 4032-1985

- **Setting Time:**

  Initial setting time is the time that elapsed from the instance of adding water until the paste ceases to behave as fluid or plastic. Whereas final setting time referred to the required for the cement paste to reach certain state of hardness to sustain some load.

  Test Method: IS: 4031 (P-5) 1996

- **Soundness:**

  Soundness refers to the ability of a hardened cement paste to retain its volume after setting. Lack of soundness is observed in the cement samples containing excessive amount of hard burnt free lime or magnesia.

  Test Method: IS: 4031 (P-3) 1990