

Field Compaction in construction sites

Compaction is an important and integral activity of virtually any construction project, be it a road construction project, an industrial construction project or a building construction project. This article briefly highlights some quite useful details on various types of field compaction, their suitability for different types soil or materials and also on various types of compacting equipments used in construction sites.

Field compaction is commonly achieved by rolling, ramming or vibrating. There are some other methods as well which are not as common as the abovementioned ones. Of these, the most commonly or widely used method is rolling and most commonly seen rolling equipment is the ordinary smooth wheeled roller. Few other commonly used rolling equipments are pneumatic tyred rollers, sheep foot rollers etc. Smooth wheeled rollers are widely used for roadwork or pavement construction work. They are quite suitable for compacting layers of broken stones such as aggregates base or sub-base courses in road or other pavements. They can also very well be used for compacting sand gravels, gravels and soil with medium cohesion. However, smooth wheeled rollers are not suitable for cohesive soils like clay or soils with high clay content.

Compaction by vibration is most suitable for cohesionless soils such as sand, sand gravel or soils with high % of sand having no or negligible cohesion. Vibrating compaction equipments are basically vibrators mounted in plates, rollers etc. and are accordingly called plate vibrators, vibrating or vibro-rollers and so on. Another type of equipment equally suitable for cohesionless soils is the rubber tyred roller.

Another method of field compaction is ramming which is normally adopted for compacting soils in confined areas. In some occasions manual ramming or tamping also is performed, especially in small portions where mechanical ramming is not convenient or in compacting foundation soils of ordinary small buildings and so on. Mechanical rammers may be of weight dropping type, pneumatic type, combustion type etc. Ramming is however not a suitable option for compacting large areas.

Pneumatic tyred rollers are suitable for both cohesive as well as cohesionless soils.

Standard Proctor Test and Modified Proctor Test are the most widely conducted tests in site laboratories for determining the maximum dry densities (MDD) and optimum moisture content (OMC) of soils. Modified Proctor Test is conducted when very degree of compaction is to be achieved in field such as construction of highways.

Common field density determination tests include the core cutter test and the sand replacement method. However, for quick determination of approximate field densities and moisture content other tests are conducted in field. Few among them are calcium carbide test, Proctor needle test, Nuclear density test etc.

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