

TESTS ON CONCRETE

Concrete Slump Test

This test is performed to check the consistency of freshly made concrete.

The slump test is done to make sure a concrete mix is workable.

The measured slump must be within a set range, or tolerance, from the target slump.

Workability of concrete is mainly affected by consistency i.e. wetter mixes will be more workable than drier mixes, but concrete of the same consistency may vary in workability.

It can also be defined as the relative plasticity of freshly mixed concrete as indicative of its workability.

Tools and apparatus used for slump test (equipment):

1. Standard slump cone (100 mm top diameter x 200 mm bottom diameter x 300 mm high)
2. Small scoop
3. Bullet-nosed rod (600 mm long x 16 mm diameter)
4. Rule
5. Slump plate (500 mm x 500 mm)

Procedure of slump test for concrete:

- ❖ Clean the cone. Dampen with water and place on the slump plate. The slump plate should be clean, firm, level and non-absorbent. Collect a sample of concrete to perform the slump test.
- ❖ Stand firmly on the footpieces and fill 1/3 the volume of the cone with the sample. Compact the concrete by 'rodding' 25 times. Rodding means to push a steel rod in and out of the concrete to compact it into the cylinder, or slump cone. Always rod in a definite pattern, working from outside into the middle.
- ❖ Now fill to 2/3 and again rod 25 times, just into the top of the first layer.
- ❖ Fill to overflowing, rodding again this time just into the top of the second layer. Top up the cone till it overflows.
- ❖ Level off the surface with the steel rod using a rolling action. Clean any concrete from around the base and top of the cone, push down on the handles and step off the footpieces.
- ❖ Carefully lift the cone straight up making sure not to move the sample.

Turn the cone upside down and place the rod across the up-turned cone.

Take several measurements and report the average distance to the top of the sample. If the sample fails by being outside the tolerance (ie the slump is too high or too low), another must be taken. If this also fails the remainder of the batch should be rejected.

Compression Test

The compression test shows the compressive strength of hardened concrete.

The compression test shows the best possible strength concrete can reach in perfect conditions.

The compression test measures concrete strength in the hardened state. Testing should always be done carefully. Wrong test results can be costly.

The testing is done in a laboratory off-site. The only work done on-site is to make a concrete cylinder for the compression test.

The strength is measured in Megapascals (MPa) and is commonly specified as a characteristic strength of concrete measured at 28 days after mixing.

The compressive strength is a measure of the concrete's ability to resist loads which tend to crush it.

Apparatus for compression test

Cylinders (100 mm diameter x 200 mm high or 150 mm diameter x 300 mm high) (The small cylinders are normally used for most testing due to their lighter weight)

1. Small scoop
2. Bullet-nosed rod (600 mm x 16 mm)
3. Steel float
4. Steel plate

Procedure for compression test of concrete

- ❖ Clean the cylinder mould and coat the inside lightly with form oil, then place on a clean, level and firm surface, ie the steel plate. Collect a sample.
- ❖ Fill 1/2 the volume of the mould with concrete then compact by rodding 25 times. Cylinders may also be compacted by vibrating using a vibrating table.
- ❖ Fill the cone to overflowing and rod 25 times into the top of the first layer, then top up the mould till overflowing.
- ❖ Level off the top with the steel float and clean any concrete from around the mould.
- ❖ Cap, clearly tag the cylinder and put it in a cool dry place to set for at least 24 hours.
- ❖ After the mould is removed the cylinder is sent to the laboratory where it is cured and crushed to test compressive strength