

Testing Stand for Shotcrete

Key words

Systems for the protection and repair of concrete structures, shotcrete, sprayed mortar and plaster

Fields of application

Test arrangement for fixing different steel moulds and concrete samples as base plates for application of shotcrete and sprayed mortar

Methodology and instrumentation

Fixing of concrete samples and steel moulds for spraying with low vibration in two directions: vertical and overhead

Items tested

Concrete samples, steel moulds

Quantities / characteristics tested

Changeable samples, velocity of fixing, stiffness of frame, curing

Uncertainty / reliability of results

In the testing stand for shotcrete specimens are manufactured, but not tested.

After hardening, many material characteristics of all samples will be tested with different testing methods away from the testing stand.

Qualification and quality assurance

This testing stand is unique in Germany with its flexibility in size, weight, sample materials, the arrangement of specimens, spraying direction, time for placing, curing and safety in service.

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Division 7.1 - Building Materials			back to Catalogue of Unique Test Facilities

Further information

Products and systems for the protection and repair of concrete structures are preferably polymer modified cement concrete/mortar (PCC) and – among those – increasingly the sprayable polymer modified cement concrete/mortar (SPCC). The interaction of material composition and placing of PCC/SPCC will be tested with special test regulations.

Engineers of BAM built the testing stand with an area of 1.80 m x 2.80 m for application of approximately 40 specimens in different formats of moulds or specimens. The directions of spraying the concrete samples and steel moulds are: vertical and overhead. Curing with temperature and humidity is possible.

After a period of time away from the test stand, the determination of the mechanical, chemical or thermal behaviour is investigated.

For example the density of green mortar, the bending tension- and compressive strength after dry and underwater curing, the shrinkage behaviour within three months, the dry volume weight, the elastical behaviour, the progress of carbonation, the resistance to calcium hydroxide solution and the capillary absorption will be tested.

The determination of adhesive properties of mortar to concrete is investigated over several stages under various different curing conditions. The influence of freeze-thaw-(salt)-cycling and resistance to temperature changes to adhesion can be controlled as well as the corrosion resistance of coating composition for structural steel.



Figure: Vertical wall with concrete samples and steel moulds for testing concrete protecting products with special testing regulations.