CONCRETE, HARDENED:
REBOUND NUMBER

1. SCOPE AND FIELD OF APPLICATION

This NORDTEST method is intended for the determination of the rebound number of a concrete surface, that is, the value obtained when a rebound hammer is used in the manner described in 4, (Note 1).

The method may be used for the investigation of completed objects, e.g. the variation in the strength of concrete, the determination of areas with deviating quality or of damaged concrete, evaluation of changes in the strength of concrete prior to the mould stripping, or similar things.

The method is not intended to replace the testing of strength of concrete. However, the strength of concrete may be roughly estimated with the aid of this method, with the condition in mind that the values must have been calibrated from concrete with the same composition as the object, whose strength one intends to estimate.

The age of the concrete is not considered in this method.

Note 1 The method agrees in the main with ISO DP 8045 Concrete (hardened) - Determination of the rebound number with a rebound hammer.

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NT BUILD 202 CONCRETE, HARDENED: SAMPLING AND TREATMENT OF CORES FOR STRENGTH TESTS

ISO 5725-1981 Precision of test methods; determination of repeatability and reproducibility.

3. SAMPLING

The concrete object shall be at least 100 mm thick in the direction of impact. Smaller test specimens must be clamped rigidly in a compressive strength testing machine and loaded with about 2.5 MPa prior to the testing.

One should avoid surface of aerated concrete, scaled-off surfaces, surfaces with uneven structure or those with high porosity.

The concrete should have about the same composition, age, curing and moisture content if one intends to compare different rebound numbers from different tests.

The following factors influence the numbers obtained from the rebound hammer test and must be kept in mind:
- A dry concrete surface renders a higher rebound number than a wet surface
- A carbonized concrete surface renders higher numbers than one which is not carbonized
- The material used for the mould and the surface structure influence the number, thus rebound numbers obtained from different objects should only be compared if they are similar with regard to these instances
- A surface derived from a steel mould renders higher numbers than a surface from a wooden mould. Steel throwelled surface renders higher rebound numbers than a screeded surface. One should avoid untreated horizontal surfaces. Built-in beams should, if possible, be tested from underneath
- The concrete must not be frozen during the testing
- The temperature of the rebound hammer may influence the value. It is recommended that it should be at least 10 °C
- To make it possible to compare the numbers, the direction of
impact must be the same. Compared to a horizontal impact direction, the rebound numbers should be increased with about 3 units when an impact direction downwards is used and it should be decreased with about 5 units when an impact direction upwards is used.

- Different rebound hammers of the same type may render different readings. Therefore one must use the same rebound hammer in order to obtain comparable results.
- Readings obtained from ground and unground surfaces should not be compared.

4. METHOD OF TEST

4.1 Principle

The method is based on selecting a concrete surface acc. to 3 so that the conditions for comparisons are as good as possible. The surface should be prepared acc. to 4.3, thereafter the rebound numbers should be determined acc. to 4.4 as a mean value derived from at least 9 readings.

4.2 Apparatus

Rebound hammer, Schmidt, type N, with instructions for use and control of function.

Other types of rebound hammers whose scales can be adjusted to suit the one on the Schmidt hammer may be used with the condition that it shows rebound numbers with the same accuracy.

 Grinding stone made from Carborundum.

 Calibration piece, for instance a 150 mm cube made of aluminium 4212-6, which during the calibration in the compressing strength testing machine is loaded with about 55 kN. The rebound number is then usually about 50 ± 5 units, calculated as the mean value of 5 separate readings.
4.3 Preparation of Test Samples

The surface to be tested shall be at least 400 cm² with the edges at a distance of at least 30 mm from the edges of the object. Weaker surface layers should be ground off from the area to be tested and loose particles should be removed.

Surfaces cast in a steel mould as well as steel throwelled surfaces for testing shall be tested without any previous grinding.

Any water film on the surface of the area should be removed.

4.4 Procedure

The rebound hammer should be placed perpendicularly to the surface to be tested and the value is then determined in the manner stated in the instructions. The procedure should be repeated with at least a 30 mm internal distance so that at least 9 readings are obtained.

Every impact point should be inspected. If the surface layer has pores which have been broken, the testing should be repeated at another point.

The mean value of the readings should then be calculated. If more than 20 % of the values deviate from the mean value with more than 6 units, the total series should be discarded,

4.5 Expression of Results

The rebound number should be expressed as the mean value without any decimal figures acc. to 4.4.

4.6 Accuracy

Acc. to ISO DP 8045 the reproducibility of the method is 7 units when it is performed acc. to ISO 5725 using a Schmidt rebound hammer, type N.
4.7 Test Report

If a test report is submitted, it should contain at least the following information:

a) Name and address of the testing laboratory
b) Date and identification symbols of the report
c) Test method (number and title)
d) Any deviation from the test method
e) Name and address of the person or institution who ordered the test
f) Name and address of the person performing the test
g) Name and address of the manufacturer of the concrete
h) The identification symbols of the concrete. If a reference test has been performed, the composition of the concrete and the type and number of the rebound hammer should be noted (for this method only)
i) Date when the test was performed and the age of the concrete, if known
j) Test results
k) Any other information of importance for the evaluation of the test results
l) Evaluation of the test results, if this is required in the request for the test.