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MS.D.1 – ANNEX 1, MEASUREMENT OF MOISTURE CONTENT BY DRILLING

Scope/Principle

Small quantities of dust and debris are removed from the specimen (structure or material) by drilling. The dust is weighed then dried to constant weight in an oven at 100°C. The weight loss represents the weight of water or any other volatile compound absorbed in the pore structure of the specimen.

Limitations

1) The technique normally assumes that the only volatile component is water and any significant contamination by other volatile compounds would invalidate the test.

2) There will be a substantial reduction in accuracy for very high water contents due to loss of free water as the solid material is broken down.

3) There will be a reduction in accuracy for very hard materials where heating of the drill bit will result in evaporation.

Specimens

At least two, and preferably five or more, replicate drillings should be taken to represent a given material or zone of a structure. The variation of moisture content with depth may be obtained by separating the drilling dust into multiple samples representing increments of depth of the drill.

Apparatus

A power drill (normal or percussive) with a selectable speed of 1200 ± 100 rpm. Sharp 8 mm diameter (= 5/16"), 150 mm long (= 6") tungsten carbide tipped drill bits. A collecting device which is either held in place or temporarily attached just beneath the drill hole. A balance accurate to 0.01 g. An oven.

Procedure

Hold or attach the dust collector to the specimen within 25mm below position selected for the the hole. Starting with the drill-bit at room temperature, drill a hole horizontally to a sufficient depth to give a representative sample. The drill should be hand held and sufficient pressure should be applied to attain a depth of 100 mm in 45-60 seconds. Allow the drill bit to cool between each measurement or cool it by dipping into methylated spirits to speed up the process. Change the collector at set depth intervals if a depth profile is required. Weigh each specimen of dust, then dry to constant weight in the oven. Fig. 4 illustrates the specimen gathering process.

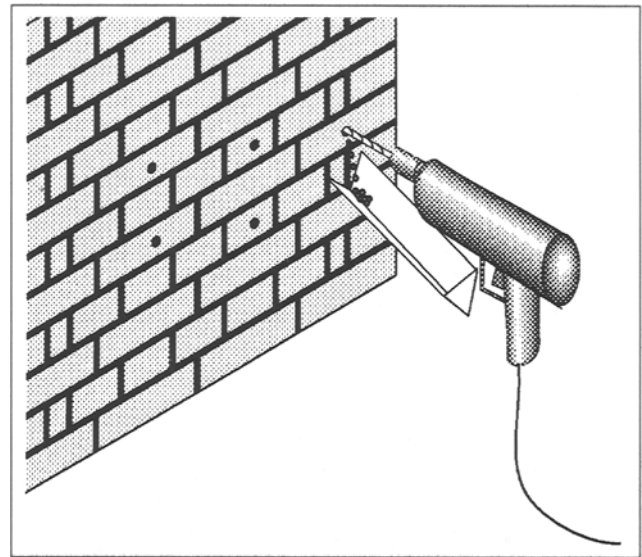


Fig. 4 – Typical drilling / collection procedure.

Test results

For each individual determination report the percentage moisture content by mass as the weight change on drying divided by the dry weight multiplied by 100. Calculate the mean of replicate specimens.

Bibliography

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