METHOD FOR THE EXAMINATION OF THE FREEZE-THAW RESISTANCE OF CONCRETE STRUCTURES

There are several methods for studying the effect of freeze-thaw resistance from concrete, such as cyclic freezing and lateral sealing. However, a major disadvantage of these methods is that the test can be started after the concrete has hardened, (days of age), and these tests can take several months.

SOLUTION

Our solution package offers a service, which saves significant amount of time and provides crucial information for anyone in the industry, whose work is dependent on knowing how the concrete specimen - they are about to use for their project - is going to withstand highly destructive forces of cyclic freezing and thawing.

The basic concept of our method is that freeze-thaw resistance of concrete is greatly influenced by its pore structure. Our service is able to rapidly assess the pore structure of concrete using computed tomography (CT). Since CT’s are available worldwide, the assessment of the concrete sample can become very easy. Computed topography supplemented by our service can be used not only to assess multiple material related problems (i.e. sulphate swelling, freezing with internal degradation, alkali silicate swelling) or to understand specific processes (i.e: frost peeling, acid effect), but also to predict the durability of the concrete (freeze-thaw resistance, acid resistance) based on its internal structure. Using our solution on top of significantly reducing testing duration, the time that is generally required to begin testing can be minimised by up to 75%. Reliable results were obtained using 7 days old concrete samples, instead of having to wait the standard 28 days.

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INTELLECTUAL PROPERTY

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BENEFITS

- Significant time saving potential resulting in expedited project implementation
- 3D diagnostics of pore structure of concrete
- Forecasting frost resistance of concrete within hours

APPLICATION

- any practicing engineers and industry partners, who are interested in freeze-thaw resistance of concrete structures
- Civil engineering construction uses for concrete: dams, residential / commercial buildings, roads, driveways, marine constructions, culverts and sewers etc.

PUBLICATIONS:

Éva Lublóy, Kristóf Kapitány, György L. Balázs, Tamás Földes, Viktor Hlavíčka, Lili Hlavíčka-Laczák, CT and laboratory test of the wall panels after fire load, Construction and Building Materials, Volume 211, 2019, Pages 1105-1116,


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