

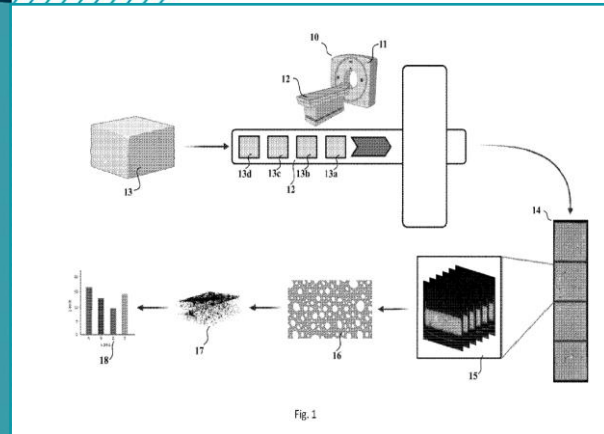
METHOD FOR THE EXAMINATION OF THE FREEZE-THAW RESISTANCE OF CONCRETE STRUCTURES

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.



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

Balázs, G. L., Lublőy, É., & Földes, T. (2018). Evaluation of concrete elements with X-ray computed tomography. Journal of Materials in Civil Engineering, 30(9).

CONTACT

BME Center for University-Industry Cooperation BRIDGE (TTO), 2 Bertalan Lajos utca, 9th floor 1111 Budapest, bridge@bme.hu +36 1 463 1728

INVENTORS

György L., BALÁZS
Éva E., MAJOROSNÉ LUBLÓY
Viktor, HLAVIČKA
Salem G., NEHME
Kristóf, KAPITÁNY
Tamás, FÖLDES
Géza, LIZAKOVSKY
Tamás, MOLNÁR

INTELLECTUAL PROPERTY

Priority HU patent application P2000073 (filed on 27 February 2020)

PCT application: PCT/HU2021/050013 (filed on 17 January 2021)