

Abstract

The Effect of SAP and POSS Additives on the Durability of Concrete in Artic Environments [†]

Peter Lundqvist

Vattenfall AB, Research and Development, Civil Engineering, SE-814 26 Älvkarleby, Sweden;
peter.lundqvist@vattenfall.com

[†] Presented at the 1st International Conference on Smart Materials for Sustainable Construction—SMASCO 2019, Luleå, Sweden, 10–12 December 2019.

Published: 18 November 2019

Abstract: In an on-going European project LORCENIS, which focus on the development of durable concrete structures, different types of innovative additives have been tested for use in concrete. As a part of this project the effect of super absorbent polymers (SAP) and polyhedral silsequioxanes (POSS) on different durability issues was investigated in laboratory tests. In this study the focus was on the application for large concrete structures in arctic environments, e.g., hydro power dams. The purpose was to investigate the effect of the additives on two durability issues: the combination of leaching and freeze-thaw and the self-healing of cracks under hydro static water pressure. In addition, the influence of the additives on the fresh and hardened properties of the concrete was also investigated, this included e.g., flow characteristics, compressive strength and volume stability. As basis for the tests, a concrete mix suitable for use for large concrete structures was developed within the project. In this paper, the results and conclusions from the laboratory tests will be presented.

Keywords: durability; concrete; arctic



© 2019 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).