Sustainable Resilience – The Impact Of Hydrogel Technology On Concrete Infrastructure Service Life

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Concrete is an integral portion of global infrastructure, and of course is coming under increasing scrutiny for the carbon impact of its manufacturing process. Concrete replacement due to deterioration is therefore undesirable; besides unplanned cost impacts involved. Premature maintenance costs are likewise a significant and undesirable factor in the management of infrastructure assets. Reducing the need to replace concrete structures has obvious benefits in reducing the need for new concrete. Further, early action can reduce the ongoing costs of infrastructure maintenance, even if the structure is not to be replaced. For these reasons, making concrete more resilient is a clear means of improving infrastructure sustainability.

Deterioration of concrete is a result of an aggressive environment including permeability, carbonation, chloride, and sulphate attack; ultimately resulting in cracked concrete and corrosion in the reinforcing steel. The long-term impact of this deterioration on Government and Private entities is ongoing strain on asset maintenance and repair budgets.

Where the concrete is in use for basements or similar structural elements, factors such as waterproofing become a major concern.

In a recent study, two methods were used to elucidate the impact of the hydrogel technology on concrete: BS EN 12930-8, Depth of Penetration Under Water Pressure and AASHTO T 259, Test for resistance of concrete to chloride ion penetration. The values reported from both methods confirmed that the hydrogel technology reduce water and chloride migration. The purpose of these tests was to showcase the use of hydrogel technology to increase the service life of concrete structures.