Durability of Steel Fibre Reinforced Concrete (SFRC) exposed to acid attack – A literature review

Steel Fibre Reinforced Concrete (SFRC) is increasingly used in the construction of civil infrastructure. There is particular interest in the behaviour of SFRC under chemical and bio-chemical exposure, since it can be utilized, among others, for the construction of waste-water and agricultural infrastructure. However, the applicability of SFRC exposed to acidic environments is hindered by inconsistencies among international regulations. This paper reviews the published literature concerning the durability of SFRC exposed to acid attack. Research suggests that the exposure to acids of uncracked SFRC results in damage similar to what would occur in Plain Concrete (PC). There is insight into the non-critical corrosion of steel fibres embedded in the neutralized concrete layer, not entailing corrosion-induced cracking or spalling and steel fibres have been reported to limit secondary damage by bridging cracks and restraining the progress of the chemical-erosion front. However, there is limited data regarding the residual mechanical performance of cracked SFRC that has been exposed to acids. Published research suggests the existence of a critical crack width, below 0.3 mm, where the corrosion damage to the steel fibre is non-critical and there is a limited loss of fracture toughness. However, it has been observed that the exposure of cracked SFRC to acids leads to a larger deterioration of its residual mechanical performance compared to other exposures.

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