

Investigation of the Addition of Macro and Micro Polypropylene Fibers on Mechanical Properties of Concrete Pavement

Authors : Seyed Javad Vaziri Kang Olyaei, Asma Sadat Dabiri, Hassan Fazaeli, Amir Ali Amini

Abstract : Cracks in concrete pavements are places for the entrance of water and corrosive substances to the pavement, which can reduce the durability of concrete in the long term as well as the serviceability of road. The use of fibers in concrete pavement is one of the effective methods to control and mitigate cracking. This study investigates the effect of the addition of micro and macro polypropylene fibers in different types and volumes and also in combination with the mechanical properties of concrete used in concrete pavements, including compressive strength, splitting tensile strength, modulus of rupture, and average residual strength. The fibers included micro-polypropylene, macro-polypropylene, and hybrid micro and macro polypropylene in different percentages. The results showed that macro polypropylene has the most significant effect on improving the mechanical properties of concrete. Also, the hybrid micro and macro polypropylene fibers increase the mechanical properties of concrete more. It was observed that according to the results of the average residual strength, macro polypropylene fibers alone and together with micro polypropylene fibers could have excellent performance in controlling the sudden formation of cracks and their growth after the formation of cracking which is an essential property in concrete pavements.

Keywords : concrete pavement, mechanical properties, macro polypropylene fibers, micro polypropylene fibers

Conference Title : ICCPRD 2021 : International Conference on Concrete Pavement Research and Development

Conference Location : Montreal, Canada

Conference Dates : August 05-06, 2021