

P. Paryad

Department of Civil
Engineering, Sari Branch,
Islamic Azad University, Sari,
Iran.

e-mail:

paryad.peyman@gmail.com

H. Naderpour*

Faculty of Civil Engineering,
Semnan University, Iran.

e-mail:

naderpour@semnan.ac.ir

M. K. Sharbatdar

Faculty of Civil Engineering,
Semnan University, Iran.

e-mail:

msharbatdar@semnan.ac.ir

Assessing the Effects of Volume Fraction and Diameter of Hooked-End Steel Fiber on Vebe Time and Mechanical Properties of RCCP

Using Roller Compacted Concrete Pavement (RCCP) is expanding all around the world and it shows the importance of accurate experimental assessment of this kind of concrete. In this research, in order to investigate the influence of volume fraction and diameter of hooked-end steel fiber on Vebe time, compressive strength, splitting tensile strength, flexural strength, and toughness of RCCP, ten mixtures were used. One control mixture and nine fibrous mixtures contain volume fraction of 0.25-0.75 and diameter of 0.38-0.7 mm fiber were constructed. Results showed that increment of fiber volume fraction and decrease of fiber diameter led to increase of mechanical properties and Vebe time of RCCP. Due to experiments, the factor of volume fraction was more determinative than diameter. By adding hooked-end steel fiber, load-deflection curve and toughness demonstrate sensible improvement. Some of mixtures showed softening behavior and other showed hardening behavior. Mixtures which contain higher fiber volume fraction and lesser fiber diameter showed hardening behavior. Mixture with volume fraction of 0.75 and diameter of 0.38 mm recorded the most appropriate mechanical strength and toughness, and the results of splitting tensile and flexural strength indicated increment more than about 100%.

Keywords: Roller compacted concrete pavement, Steel fiber, Mechanical properties, Vebe time, Toughness.

* Corresponding author

Received 11 January 2022, Revised 18 February 2022, Accepted 20 February 2022.

DOI: 10.22091/cer.2022.7777.1353