Mechanical Properties of Hybrid (Steel-Kenaf) Fiber Reinforced Concrete

Sharifah Maszura Syed Mohsin[1,a*], *Rasheed Abed Hammood[2,b]*,
Nur Farhayu Ariffin[1,c], *Fadzil Mat Yahaya[1,d]*, *Saffuan Wan Ahmad[3,e]*
and Khairunisa Muthusamy[1,f]

[1]Faculty of Civil Engineering Technology, Universiti Malaysia Pahang, 26000 Kuantan, Pahang, Malaysia
[2]Faculty of Civil Engineering, University of Al Anbar, Ramadi. Al-Anbar, Iraq
[3]Civil Engineering Department, College of Engineering, Universiti Malaysia Pahang, 26000 Kuantan, Pahang, Malaysia

[a]maszura@ump.edu.my*, [b]rasheed_eng2000@yahoo.com, [c]farhayu@ump.edu.my, [d]fadzil@ump.edu.my, [e]saffuan@ump.edu.my, and [f]khairunisa@ump.edu.my

ABSTRACT
Fiber reinforced concrete is a commonly used material to cater for the shortcomings of concrete, such as low tensile strength, brittleness, and rapid crack propagation. This paper presents an experimental study on the mechanical properties of the hybrid (steel-kenaf) fiber added into concrete mixture. Two types of fibers, namely hooked-end steel fiber and kenaf fiber were considered. A control specimen without fibers was used to compare with fiber reinforced concrete mixture considering 1% and 2% volume fraction. Mechanical properties, i.e., workability, compressive strength and flexural strength, were investigated. In this study, the kenaf fibers were treated by 6% concentration of Sodium Hydroxide (NaOH) through immersion in the laboratory for 24 hours. The results showed that the addition of hybrid fiber improves the performance of compressive strength and flexural strength of the concrete. Specimens with 2% hybrid fibers show the best flexural performance. Moreover, an increase in volume fractions of steel fibers leads to an increase in the compressive and flexural strengths of concrete. In addition, specimens with steel-kenaf hybrid fibers exhibit a better failure behavior than specimens without fibers.

KEYWORDS
hybrid fiber; kenaf fiber; steel fiber; mechanical properties

ACKNOWLEDGEMENTS
The authors would like to acknowledge the support provided by UMP through Research Grant Scheme (RDU1803168).