

Patcharaporn Tumboon 2014: Comparison of Mechanical Properties and Durability of Hybrid Fibers Reinforced Concrete. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Associate Professor Suvimol Sujjavanich, Ph.D. 96 pages.

This research reported the comparative study of mechanical properties and chloride penetration resistance between plain concrete and fibers reinforced concrete (FRC), using mono and hybrid type fiber. In the study, concrete with single type ; steel fiber and polyvinyl alcohol (PVA), with percentage variation of 0.5 and 1.0 by volume and the hybrid composite concrete using the percentage combination of one for both fibers were investigated. Increasing PVA content significantly reduced concrete workability, compared to that of steel fibers. The fibers slightly affected the compressive strength of concrete. However, incorporating fibers in the matrix improved the load carrying capacity after the first crack. The increased energy absorption was observed, this prevented the sudden failure after the ultimate load. Concrete with steel fibers showed the better improvement in flexural behavior than that of PVA. The behavior improvement of hybrid FRC indicated deflection hardening behavior. The hybrid fibers also reduced the plastic and drying shrinkage in concrete better than that of the single type and plain concrete. The performance in reducing shrinkage depended on the amount of addition PVA. The average coefficient of thermal expansion of about $10-11 \times 10^{-6}/^{\circ}\text{c}$ was in the same range for all mixtures. The hybrid FRC concrete showed the better resistance to chloride penetration than those of mono fibers under the continuous wet condition. However, under wet and dry conditions, the effect of hybrid fibers was slight.

Student's signature

Thesis Advisor's signature