

# Properties of Lightweight Self-consolidating Fibre Reinforced Concrete

K.M. A. Hossain<sup>1</sup>, I. N. Celasun<sup>1</sup>, K.M. Y. Julkarnine<sup>1</sup>, M.A. Hossain<sup>1</sup>

<sup>1</sup>Ryerson University

350 Victoria St, Toronto, Canada

ahossain@ryerson.ca; incelasun@ryerson.ca; kmyjulkarnine@ryerson.ca; mohammadali.hossain@ryerson.ca

**Abstract-** This paper presents the influence of four different types of fibres such as Polyethylene (PE), Polyvinyl Alcohol (PVA), High-Density Polyethylene (HDPE) and Crumb Rubber on various properties of lightweight self-consolidating fibre reinforced concrete (LWSCFRC). The influences of fibre types and dosages were evaluated based on slump flow, density, compressive/flexural strength and rapid chloride permeability characteristics. All concrete mixtures satisfied the criteria to be classified as structural LWSCC by exhibiting a slump flow and 28-day compressive strength of more than 500 mm and 17.8 MPa, respectively with a 28-day air dry density of less than 1840 kg/m<sup>3</sup>. The compressive strength and slump flow of LWFRSCC mixtures decreased with the increase of fibre dosage. The good performance of LWSCFRC mixtures were reflected in terms of their lower compressive strength to flexural strength ratio, higher energy absorbing/toughness capacity and similar/better chloride permeability compared to their LWSCC counterpart (without fibre).

**Keywords:** Lightweight self-consolidating fibre reinforced concrete; Flowability; Strength; Chloride permeability