Impact resistance and strength reliability of fiber-reinforced concrete in bending under drop weight impact load

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This paper presents an experimental investigation on the Impact failure energy and strength reliability of fiber reinforced concrete (FRC) by using a simple drop weight test which was based on the testing procedure recommended by ACI committee 544. Two different steel fibers were used as the reinforcing material in various volume fractions such as 0%, 0.5%, 1.0% and 1.5% with a water cement ratio of 0.42. Furthermore, the two-parameter weibull distribution was used to analyze the experimental data in order to sort out a variation of test results. Using the weibull distribution, the impact failure strength reliability, in other words, the probability distribution according to which the concrete will fail, was obtained. The results indicated that the concrete containing a 1.5% volume fraction of fiber gave the best performance followed by 1.0% and 0.5% under impact loading. It was proven that the probabilistic distributions of the impact failure energy of seven types of samples approximately follow two-parameter Weibull distribution.