FRICTION MECHANISM INVESTIGATION DURING STRAIGHT STEEL FIBER PULL-OUT FROM CONCRETE OR EPOXY MATRIX

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Micro mechanic of single fiber pull-out is still not enough investigated phenomena [1, 2]. In the present work, straight steel fiber pull-out of concrete and epoxy matrix, where investigated experimentally and performing FEM modelling. Friction process during pulling steel fiber out of concrete matrix is dependent on concrete channel erosion. Microscopical channel's surface investigation was shown areas of spalling. Pull out process numerical modelling was included surface erosion and plugs formation between fiber and matrix surfaces. Epoxy matrix was used as a model material, because matrix is transparent and is possible to see all process from the beginning to the end. . In Figure 1, a straight steel fiber in epoxy resin, which is testing, can be seen.

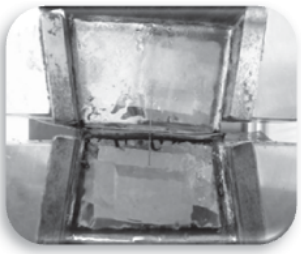

Fig. 1. Straight steel fiber pull-out from epoxy matrix

Fiber is well recognized through the matrix and is possible to see how it begins and ends the pull-out process. In the investigation, experimental single fiber pull-out curves were obtained depending on fiber embedment depth and inclination angle to pulling force direction. Later, the results, which were obtained in experiments with epoxy matrix, were compared with concrete matrix experiments. Using earlier elaborated numerical crack opening model [1] failure modelling of the 10 10 40 cm specimens subjected to bending, having straight steel fibers with the length 30 mm and a diameter 0.75 mm was realized .

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