

Characterization of Structural Elements in Metal Fiber Concrete

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Abstract : This work on the characterization of structural elements in metal fiber concrete is devoted to the study of recyclability, as reinforcement for concrete, of chips resulting from the machining of steel parts. We're interested in this study to the Rheological behavior of fresh chips reinforced concrete and its mechanical behavior at a young age. The evaluation of the workability with the LCL workabilimeter shows that optimal sand gravel ratios (S/G) are $S/G = 0.8$ and $S/G = 1$. The study of the content chips (W%) influence on the workability of the concrete shows that the flow time and the S/G optimum increase with W%. For $S/G = 1.4$, the flow time is practically insensitive to the variation of W%, the concrete behavior is similar to that of self-compacting concrete. Mechanical characterization tests (direct tension, compression, bending, and splitting) show that the mechanical properties of chips concrete are comparable to those of the two selected reference concretes (concrete reinforced with conventional fibers: Eurosteel fibers corrugated and Dramix fibers). Chips provide a significant increase in strength and some ductility in the post-failure behavior of the concrete. Recycling chips as reinforcement for concrete can be favorably considered.

Keywords : fiber concrete, chips, workability, direct tensile test, compression test, bending test, splitting test

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