Title (en)

METAL FIBER WITH OPTIMIZED GEOMETRY FOR REINFORCING CEMENT-BASED MATERIALS

Title (de)

METALLFASER MIT OPTIMIERTER GEOMETRIE ZUR VERSTÄRKUNG VON ZEMENTMATERIALEN

Title (fr)

FIBRE METALLIQUE A GEOMETRIE OPTIMISEE POUR RENFORCEMENT DES MATERIAUX A BASE DE CIMENT

Publication

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Application

EP 95915725 A 19950421

Priority

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Abstract (en)

[origin: WO9606995A1] A metal fiber (10) for reinforcing cement-based materials comprises an elongated, substantially straight central portion (12) and sinusoid shaped end portions (14, 14'). The sinusoid at each end portion (14, 14') has an optimum amplitude Ao,opt defined by: Ao,opt = [k1(sigma c)<k>2] [sigma u< alpha > epsilon f< beta >] [Af/Pf], where k1 = 2.025 x 10<-2>, sigma c = compressive strength of the cement-based material in MPa, k2 = 3.19 x 10<-1>, sigma u = ultimate tensile strength of the metal in MPa, alpha = 6.60 x 10<-1>, epsilon f = ductility of the metal in percent, and beta = 3.20 x 10<-1>, Af = cross-sectional area of the fiber in mm<2>, and Pf = perimeter of the fiber in mm. The sinusoid further has a wavelength Ls defined by: Ls = (Lf - Lm)/2, where Lf = length of the fiber, Lm = length of the central portion, and wherein 0.5 Lf < Lm < 0.75 Lf. Since the optimum amplitude is defined as a function of the ultimate tensile strength and ductility of the fiber material as well as of the compressive strength of the matrix material, it is possible to tailor the fiber geometry according to the properties of the fiber and matrix materials chosen, and ultimately to the composite toughness desired in an actual structure.

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