

Title (en)

METAL FIBER WITH OPTIMIZED GEOMETRY FOR REINFORCING CEMENT-BASED MATERIALS

Title (de)

METALLFASER MIT OPTIMIERTER GEOMETRIE ZUR VERSTÄRKUNG VON ZEMENTMATERIALIEN

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 $A_{o,opt}$ defined by: $A_{o,opt} = [k_1(\sigma_c) - k_2] [\sigma_u - \alpha \epsilon_f \beta] [A_f/P_f]$, where $k_1 = 2.025 \times 10^{-2}$, σ_c = compressive strength of the cement-based material in MPa, $k_2 = 3.19 \times 10^{-1}$, σ_u = ultimate tensile strength of the metal in MPa, $\alpha = 6.60 \times 10^{-1}$, ϵ_f = ductility of the metal in percent, and $\beta = 3.20 \times 10^{-1}$, A_f = cross-sectional area of the fiber in mm^2 , and P_f = perimeter of the fiber in mm. The sinusoid further has a wavelength L_s defined by: $L_s = (L_f - L_m)/2$, where L_f = length of the fiber, L_m = length of the central portion, and wherein $0.5 L_f < L_m < 0.75 L_f$. 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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