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Variability of fatigue parameters under uniaxial loading in the function of the number of cycles

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Abstract: This paper presents the problems relating to the determination of the material constants. It was demonstrated that the scatter of the values of the fatigue life and stresses applied for determination of the σ_a-N_f characteristics could have an impact on the slope of the m curve. The phenomenon associated with the variability of a number of material parameters relating to the variable number of cycles is discussed. In addition, the paper reports on the impact of the number of cycles on fatigue notch factor and on the variability of the function accounting for geometrical and structural notches for the case of the welded elements.

Keywords: fatigue life, fatigue notch factor, critical length

Nomenclature:

A, m – constants of the regression model,

a – material constant,

b – fatigue life exponent,

c – ductility exponent,

E – Young's modulus,

K' – cyclic hardening coefficient,

K_f – fatigue notch factor,

K_t – stress concentration factor,

ΔK_{th} – threshold stress intensity factor range,