A THESIS ON
CUMULATIVE CHANGES IN BASIC PROPERTIES ASSOCIATED WITH LOW-CYCLE FATIGUE

By

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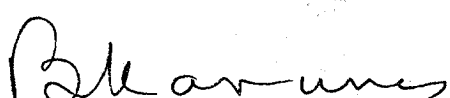
CERTIFICATE

This is to certify that the thesis entitled, "Cumulative Changes in Basic Properties Associated with Low-Cycle Fatigue," which is being submitted by A.K. Mukhopadhyay to the Indian Institute of Technology, Delhi for the award of the degree of Doctor of Philosophy in Applied Mechanics, is a bonafide research work carried out by him under my guidance and supervision during the last three years. His thesis has reached the standard fulfilling the requirements of the regulations relating to the degree.

The results contained in the thesis have not been submitted in part or full, to any other university or institution for the award of any degree or diploma.



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LIST OF SYMBOLS

a, b	constants
E	Young's modulus
E_e	area of the stress-strain diagram recovered on removal of the load
E_p	area of the hysteresis loop
E_t	total area of the stress-strain curve on application of a load
K, γ	cyclic deformation parameters
k, l	constants of proportionality of terms in the power law
m	index of the power law
n	strain-hardening index
n_o	strain-hardening index of the virgin material, defined at R = 1
R	number of stress repetitions, defined that R = 1 corresponds to the failure of the material in static tension
T	temperature
t	time
α, β	high-stress level low-cycle fatigue parameters
δ	hysteresis loop width
ϵ	nominal strain
ϵ_a	anelastic strain component
ϵ_e	recoverable elastic strain component
ϵ_p	plastic strain component
ϵ_t	total strain

ϵ_i	instability strain
ϵ_{io}	instability strain of the virgin material, defined at R = 1
ϵ_R	constant strain amplitude
$\epsilon_{R'}$	cumulated strain
σ	true stress
σ_1	nominal yield stress
σ_i	true instability stress
σ_{io}	true instability stress of the virgin material, defined at R = 1
σ_R	true constant amplitude of repeating stress
$\sigma_{R'}$	true varying amplitude of stress limit in constant-strain-amplitude tests
ξ	hysteresis loop width dependence parameter

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