SECTION B.
NOMENCLATURE

B.1. – The reviewer has found it advisable to evolve his own nomenclature because the papers reviewed differed considerably in nomenclature. Note that except for Δ, Greek characters are not used in this nomenclature. This is contrary to the nomenclature employed by many others, e.g. Fig. 1-1-11.

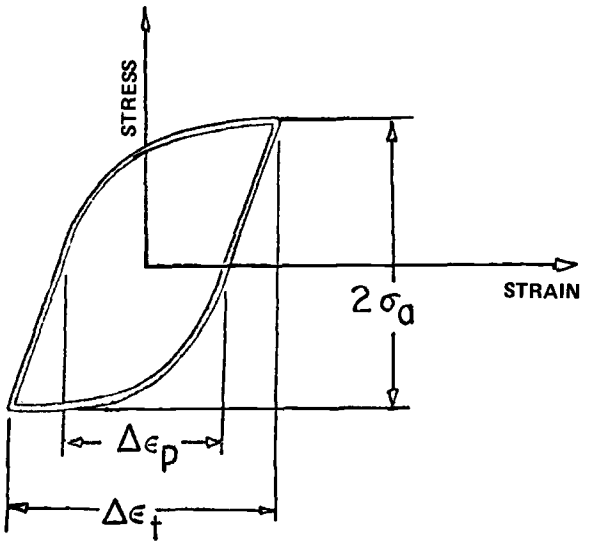

FIG. 1-1-11 – *Schematic of mechanical hysteresis loop with characterizing parameters.*

For convenience, the reviewer introduced also multiple letter abbreviations for often used expressions and definitions, e.g. "FSRF" for fatigue strength reduction factor, "ESCF" for elastic, theoretical stress or strain concentration factor, etc.

The titles of reproduced figures were not changed and therefore contain the original nomenclature used by the authors. The figures are numbered as follows: e. g., Fig. 125-26-40 indicates that its consecutive figure number is 125 and that it is Fig. 26 in reference 40.

Note that the elasto-plastic stress concentration factor "PS-sCF" is designated k_p and that the elasto-plastic strain concentration factor "PS-nCF" is designated q_p. These symbols are simpler than the usual.

Correspondingly, the fatigue strength reduction factors to cracking or to fracture, on stress basis and on strain basis are designated K_c or K_f and Q_c or Q_f, respectively. This separation of symbols is convenient in analysis of experimental data.

B.2. – ABBREVIATIONS

"LCF" – Low-Cycle Fatigue
"SHO" – Stowell-Hardrath-Ohman Method
"ESCF" – Theoretical elastic stress or strain concentration factor, k_t
"PS-sCF" – Elasto-plastic stress concentration factor, k_p
"PS-nCF" – Elasto-plastic strain concentration factor, q_p
"FS-thRFC" – Fatigue strength reduction factor to cracking on stress basis, K_c on strain basis, Q_c
"FS-thRFF" – Fatigue strength reduction factor to fracture, on stress basis, K_f on strain basis, Q_f
R. 39 – Indicates reference 39

B.3. – SYMBOLS

R – Load or stress ratio during cycling loading
R = 0 – Repeated or pulsating loading
R = -1 – Reversed constant amplitude loading
r – Notch root radius
N_c – Number of cycles to cracking
N_f – Number of cycles to fracture
S_t – Tensile strength
S_y – Yield strength
S_{pl} – Proportional limit
S_{max} – Maximum cyclic, local stress at a stress concentration, usually at the apex of a notch
S_{min} – Minimum cyclic, local stress at a stress concentration, usually at the apex of a notch
ΔS – Range of local cyclic, stress at the apex of a notch = $S_{max} - S_{min}$
$\bar{S}_{max}$ – Cyclic maximum *nominal* stress based on net cross-section of specimen
$\bar{S}_{min}$ – Cyclic minimum *nominal* stress based on net cross-section of specimen
$\overline{\Delta S}$ – Range of cyclic *nominal* stress during one reversal = $\bar{S}_{max} - \bar{S}_{min}$
$\bar{S}_m$ – Mean cyclic *nominal* stress
$= \frac{\bar{S}_{max} + \bar{S}_{min}}{2}$
$\bar{S}$ – *Nominal* stress based on net cross-section
E – Modulus of elasticity
E_s – Secant modulus corresponding to the maximum local stress S_{max}
E_{sn} – Secant modulus corresponding to $\bar{S}$, nominal stress based on net section
E_{sy} – Secant modulus corresponding to yield stress S_y
e_y – Elastic strain at yield stress S_y

$$e_y = \frac{S_y}{E}$$

e_{yt} – Total strain at yield stress S_y

$$e_{yt} = \frac{S_y}{E_{sy}}$$

k_p – Elasto-plastic stress concentration factor

abbrev. "PS-sCF". $k_p = \frac{\Delta S}{\Delta \bar{S}} = \frac{S_{max}}{\bar{S}_{max}}$

k_t – Theoretical elastic stress or strain concentration factor.

Abrev. "ESCF", $k_t = \frac{S_{max}}{\bar{S}}$

k_f – Fatigue strength reduction factor abbrev. "FS-thRF". Experimentally derived from high-cycle fatigue tests on smooth and notched bars. Ratio of endurance limit of unnotched bars to the endurance limit of notched bars.

$k_f \leq k_t$

K_c – Fatigue strength reduction factor, on *stress* basis, to macrocracking. Abbrev. "FS-thRFC"

K_f – Fatigue strength reduction factor, on *stress* basis, to fracture. Abbrev. "FS-thRF"

K_{fm} – Fatigue stress reduction factor, on stress basis, to fracture, for the same mean cyclic nominal stress $\bar{S}_m$

e_{max} – Maximum cyclic, local, total strain at a stress concentration, usually at the apex of a notch

e_{min} – Minimum cyclic, local, total strain at a stress concentration, usually at the apex of a notch

Δe – Range of local, cyclic, total strain at the apex of a notch = $e_{max} - e_{min}$

$\bar{e}_{max}$ – Cyclic maximum *nominal,* total strain based on net cross-section of specimen

$\bar{e}_{min}$ – Cyclic minimum *nominal,* total strain based on net cross-section of specimen

$\bar{e}_m$ – Mean cyclic *nominal,* total strain

$$= \frac{\bar{e}_{max} + \bar{e}_{min}}{2}$$

$\overline{\Delta e}$ – Range of cyclic *nominal,* total strain during one reversal = $\bar{e}_{max} - \bar{e}_{min}$

$\bar{e}$ – *Nominal* total strain which corresponds to the nominal stress $\bar{S}$, across the net section.

$$= \frac{\bar{S}}{E_{sn}}$$

q_p – Elasto-plastic strain concentration factor

$= \frac{\Delta e}{\overline{\Delta e}} = \frac{e_{max}}{\bar{e}_{max}}$ Abbrev. "PS-nCF"

Q_c – Fatigue strength reduction factor, on *strain* basis, to macrocracking Abbrev. "FS-thRFC"

Q_f – Fatigue strength reduction factor, on *strain* basis, to fracture Abbrev. "FS-thRFF"

Q_{bc} and Q_{bf} – The same as above, in bending.