

Index

A

- Abelkis, P. R., 257-273
 Acoustic emission, 195
 Activation energy, 130
 Aircraft, 241, 257
 Aluminum alloys, 6, 16, 57, 243, 258
 Annealed, 85, 103, 175
 Asperities, 69, 71
 ASTM E 8, 215
 ASTM E 112, 215
 ASTM E 399, 178, 193, 215, 216
 ASTM E 561, 242
 ASTM E 647, 65, 149, 178
 Attaar, M. H., 173-190
 Auger spectroscopy, 80
 Autogeneous gas tungsten arc metal
 (GTAW), 175

B

- Bailey, W. J., 163-172
 Base metal, 275
 Bausinger effect, 42
 Beevers, C. J., 102-120
 Body centered cubic, 6, 32, 43, 49,
 106, 196
 Boltzmann's constant, 130
 Boyce, D. A., 163-172
 Bond, 122
 Brittle mechanisms/fracture (*see also*
 Cleavage), 8, 94
 Buckling, 165

- Burgers vector, 16, 97, 130
 Bussiba, A., 191-209

C

- Carbides, 34
 Carbon replica, 87
 Cellular structure, 34, 37
 Characteristic distance, 205
 Charpy V-notch energy, 49, 142, 295
 Cheng, Y. W., 5-30
 Chung, J. H., 140-160
 Cleavage, 20, 67, 70, 76, 94, 106, 155,
 196, 278, 307
 Clip-on gage, 32
 Cold rolled, 175
 Compliance, 7, 49, 65, 87, 216
 Composites (*see* Fiberglass compos-
 ite laminates)
 Computerized near-threshold crack
 growth technique, 186
 Cox, J. M., 241-256
 Crack closure, 65, 71, 110, 155, 181,
 233, 283
 Geometry induced, 70
 Oxide induced, 70, 110, 181
 Plasticity induced, 70
 Roughness induced, 181
 Crack initiation, 253
 Crack opening displacement (COD),
 65, 104, 216
 Crossover, 67, 94, 106, 148, 243

Cross slip, 38

Crystallographic features, 56

Cumulative damage, 205

Cyclic softening/hardening, 32, 146

Cyclic stress-strain curve, 143

D

Damage tolerance, 244

Design curve, 218

Dimples, 49, 94, 155, 307

Dislocations, 34, 37, 43, 77, 97, 116, 129

Drop-weight test, 142, 295

Ductile-brittle transition, 11, 71, 106, 155, 193

Ductile fracture, 8, 70, 94, 129

E

Electrical discharge machining (EDM), 258

Electropolish, 87

Electropotential, 194, 296

Esaklul, K. A., 63-83

F

Face centered cubic, 6, 241

Failure mechanisms, 8

Fatemi, A., 140-160, 293-312

Fatigue fracture toughness (K_{fc}), 88, 133, 194, 278

Fiberglass composite laminate, 164

Finite element analysis, 296

Flow stress, 77, 205

Forging, 32, 48, 212

Fractography, 76, 87, 107, 155, 195, 287, 302

Fracture surface, 91, 184

Fracture toughness, 7, 8, 20, 216, 308

Frequency effects, 227, 258, 260, 264

Fretting oxidation, 181

Fuchs, H. O., 28

Fuel pump impeller, 211

Fujita, T., 31-46

G

Gerberich, W. W., 63-83, 102-120

Grain boundaries, 51

Grain size, 34, 64, 67, 77, 96, 212

Granular facets, 52, 56

Grinberg, N. M., 84-101

Gumbel double exponential distribution, 217

H

Harmon, M. B., 257-273

Hayman, E. L., 257-273

Heat-affected zone (HAZ), 122

Hexagonal close-packed, 6, 49, 212

High cycle fatigue, 143

Hot-rolled, 48, 65, 85, 122

Humidity, 253

Hydrogen, 103, 109

Hysteresis curves, 35, 146

I

Inclusions, 142, 158, 304

Inert gas, 184

Initiation, 155, 296

Intergranular, 8, 20, 71

Interstitials, 35, 42

J*J*-integral, 7, 203 J_{lc} , 122

Jata, K. V., 102-120

Jin, Z., 121-139

K

Katz, Y., 191-209

Kishimoto, Y., 31-46

Kitsunai, Y., 274-292

L

Lamellar, 52

Langenbeck, S. L., 241-256

Lee, H. W., 140–160, 293–312
 Lee, S. G., 140–160, 293–312
 Liaw, P. K., 82, 120, 173–190, 209
 Life prediction, 246
 Liquid helium, 7, 32, 174
 Liquid hydrogen, 32, 65, 166, 215
 Liquid nitrogen, 7, 87, 104, 122, 260,
 276
 Load interaction, 246
 Load ratio (R), 65, 71, 149, 180, 232
 Load shedding, 65, 149, 174
 Logsdon, W. A., 173–190
 Low cycle fatigue, 143
 Lüders strain, 43

M

Mackay, T. L., 257–273
 Maekawa, I., 121–139
 Magnesium alloys, 85
 Mathias, H., 191–209
 Mean stress, 71
 Mechanisms, 20, 94, 287
 Metastable, 19, 49
 Microstructure, 18, 37, 70, 193, 215
 Mixed-mode fracture, 196
 Mode I and/or II displacements, 114,
 181
 Molybdenum, 43
 Monoball grip system, 149
 Morris, J. W., Jr., 47–59

N

Namura, N., 31–46
 Nickel alloys, 6, 16
 Nil ductility transition (NDT), 143,
 153
 Nishida, S. I., 121–139
 Nitrogen, 32
 Nuclear fusion reactor, 121

O

Ogawa, R., 47–59
 Orientation effects, 221

Orlando, J., 257–273
 Overloads, 194, 250

P

Paris equation, 7, 50, 67, 88, 129,
 151, 277
 Pettit, D. E., 241–256
 Pivot point, 16, 97
 Plastic work, 19
 Plastic zone, 87, 107, 290
 Porosity, 142, 304
 Process zone, 205

Q

Quasi-cleavage, 91

R

Rate process, 130
R-curve, 242
 Reemsnyder, H. S., 28
 Region I and/or II, 8, 88, 196
 Residual stress, 65, 275, 281
 Retardation, 246
 Reversal point, 125
 Reversed plastic flow, 8
 River structure, 94
 Roth, L. D., 190
 Ryder, J. T., 210–237

S

SAE transmission history, 296
 Scanning electron microscopy (SEM),
 51, 155, 242, 303
 Scatter, 8, 125, 221, 262, 299
 Secondary cracks, 52, 158, 304
 Serdyuk, V. A., 84–101
 Serrated flow, 35
 Shibata, K., 31–46
 Slip or slip bands, 20, 42, 44, 56, 76,
 90, 106, 116
 Space shuttle, 211

- Specimens**
- Axial, 143, 165
 - Bend, 7, 85, 106
 - Center cracked panel (CCP), 246, 258
 - Compact type (CT), 7, 48, 65, 104, 122, 149, 175, 193, 215, 275
 - Keyhole, 296
 - Spectrum loading, 246, 257, 261, 297
 - Stability, 19
 - Stacking fault energy, 38
 - Steels
 - Austenitic, 122
 - Austenitic stainless, 6, 16, 32, 175, 195
 - Cast-carbon and low alloy, 142, 294
 - Fe-nickel, 6
 - Fe-silicon, 64, 106
 - 4340, 193
 - High manganese, 32, 48, 121
 - Maraging, 19
 - Mild, 43, 275
 - Stephens, R. I., 1-2, 140-160, 293-312, 315-320
 - Strain amplitude, 32, 35, 143
 - Stress intensity factor
 - Closure (K_{cl}) or opening (K_{op}), 67, 71, 181, 284
 - Effective (ΔK_{eff}), 67, 71, 181, 196, 283
 - Intrinsic effective (ΔK_{eff}^i), 114
 - Threshold (ΔK_{th}), 65, 71, 87, 106, 152, 174, 178, 194 - Stress concentration factor (K_t), 253, 296
 - Stress relieved, 275
 - Stretch zone, 135
 - Striations, 8, 51, 87, 91, 107, 155, 199, 287, 304
 - Subgrain, 97
 - Substitutional atoms, 42
- Superconducting magnets, 47**
- Surface roughness, 70, 303**
- T**
- Tanabe, Y., 121-139
- Titanium alloys, 6, 16, 103, 211
- Tobler, R. L., 5-30
- Toth, J. M., Jr., 163-172
- Transgranular, 8, 20, 51, 70, 91, 107, 155, 306
- Transition point, 8, 98
- Transmission electron microscopy (TEM), 34, 97
- Trunnion design, 164
- Twinning, 20, 56, 76
- V**
- Vacas-Oleas, C., 140-160, 293-312
- Vacuum, 85, 182
- Vacuum melting, 32, 48, 65
- Verkin, B. I., 84-101
- Voids, 158
- W**
- Wang, C. M., 293-312
- Warm prestressing, 194
- Welds/weldments, 8, 122, 175, 275
- Witzell, W. E., 210-237
- X**
- X-ray diffraction, 87
- Y**
- Yield strength, 34, 69, 96, 142, 175
- Yokobori, T., 121-139
- Young's modulus, 7, 18, 77, 97, 133, 184, 220, 278
- Yttrium, 212
- Yu, W., 63-83