

Subject Index

A

Air cooling-induction heating, 370
 Alloy 718, 411
 Aluminum, 562
 Aluminum plate alloy, 309
 American Iron and Steel Institute
 AISI304, 105
 American Society of Mechanical
 Engineers, 263
 ASTM standards, 214
 A 515, Grade B, 243
 A 533, Grade B, 485
 E 399, 146, 263
 E 740, 146
 E 813, 469
 E 1152, 469
 E 1290, 469
 Automotive design, 327

B

Bending, 146, 214, 243, 515
 Bending test program, 146
 British Standards Institute 7448,
 469
 Burst test, 535

C

Cladding, 515
 Cleavage, 179, 296
 precleavage tearing, 485
 Coarse grain heat affected zone,
 427
 Composites
 fiber reinforced metal
 laminates, 123
 glass woven fabric, 55
 overwrap for pressure vessel,
 86
 polymer matrix composite
 laminates, 123

Constraint, 243, 485, 535
 effects, 179, 214
 in-plane, 296
 model, 198
 plastic, 671
 Crack arrest toughness, 617
 Crack closure, 3, 411
 Crack, continuous
 circumferential, 642
 Crack, corner, 656
 Crack, fatigue, 397
 Crack front tunnelling, 535, 617
 Crack growth, 3
 fatigue, 411
 model, 123
 rates, 602
 resistance, 535
 safe-life analysis, 86
 stable, 146, 167, 309, 577
 unstable, 577
 Cracking tests, hydrogen-
 induced, 602
 Crack opening, critical, 123
 Crack propagation, 411, 562, 617
 stable, 55
 Crack, shallow, 485
 Crack size, initial, 355
 Crack, surface, 146, 214, 243, 656
 Crack tip opening angle, 309
 Crack tip opening displacement,
 296, 309, 427, 450, 469
 Crack tip stress fields, 214
 Crack tip stress triaxiality, 485
 Crack velocity, 617
 Creep, 70
 Cylinders, circumferential
 cracks, 641

D

Damage accumulation,
 time-dependent, 70
 Damage, fatigue, 105
 Damage growth, 123
 Damage, impact, 86
 Damage mechanisms, 370

Damage model
 continuum, 485
 cumulative, 397
 Damage tolerance analysis, 656
 Damage tolerance design, 3
 Deformation, 535
 cyclic microstructural, 105
 Delamination, 55
 Dissipation approach, 535
 Ductile fracture, 562
 Ductile tearing, 485
 Ductile-to-brittle transition, 179,
 243
 Ductility, 167
 Durability, ground vehicle, 327

E

Elasticity, 3
 Electric Power Research
 Institute, 263
 Embrittlement, 427, 515

F

Failure prediction, 562
 Fatigue analysis, 397
 Fatigue, high cycle, 342
 Fatigue intensity factor, 355
 Fatigue life prediction, 327
 Fiber surface treatments, 55
 Finite element analysis, 3, 296, 411
 elastic-plastic, 515
 physical shape modeling, 562
 residual stress effects, 499
 rubber toughened polymer
 blends, 671
 three-dimensional, 243, 309
 Finite elements, 179, 641
 Flaw analysis, pressure vessel
 steels, 515

H

Heat affected zone, 427
 Heat transfer, 370
 HSLA, 469
 HSLA 100, 450
 Hydrogen-induced cracking
 tests, 602

I

Impact damage, 86
 Inference equations, 469

J

J_{IC} , 167
 J-integral, 3, 243, 469, 499
 Joint efficiency, 450
 J-Q theory, 296, 485
 J-R curve, 535

K

K_{IC} , 198, 263
 K_{JC} , 198, 263, 280

L

Leak-before-burst failure mode,
 86
 Liners, metallic, 86
 Loading, 214, 296, 355, 535
 applied, 123
 bending, 146, 214, 243, 515
 conditions, 656
 cubic, 641
 cyclic, 105
 elastic-plastic, 411
 fatigue, 55
 field service, 342
 spectra, 342
 static, 55
 tensile, 146
 tension, 243
 thermomechanical, 370
 Local brittle zone, 427
 Low cycle fatigue, 370, 397

M

Magnification factors, 641
 Maintenance, high temperature
 equipment, 70
 Martensite-austenite
 constituent, 427
 Master curve, 263, 280
 Material improvement, ground
 vehicle, 327

Microstructural deformation,
105

Microvoid nucleation, 167

Models and modeling, 55
characteristic distance, 167
cleavage fracture, 296
crack growth, 123
cumulative damage, 397
physical shape, 562
scaling, 179
thermal, 499
three-dimensional constraint
effects, 179

N

Nickel-iron base alloys, 602

Nondestructive evaluation
techniques, 86

Nonisothermal testing, 370

Numerical analysis, 469

O

Order statistics, 198, 280

P

Palmgren-Miner rule, 397

Paris law, 411

Performance optimization,
ground vehicle, 327

Piping fracture assessment, 499

Plane strain core analysis, 309

Plasticity, 3

Plastic strain, 167

Plate, crack stress intensity
factors, 656

Polymer blends, 671

Polymethylmethacrylate, 577

Power plant gas turbines, 70

Pressure oscillation, 397

Pressure tubes, 535

Pressure vessels, 397, 499

metallic, 86

reactor, 485

steel, 105, 263, 515

R

Railway bogie components, 342

Reliability, ground vehicle, 327

Residual stress, 397, 499, 515

Rubber cavitation, 671

S

SA508, 105

Service behavior, 70, 342

Service load fatigue testing, 342

Shear lead yielding, 671

Silicon nitride, 577

S-N curve, 355

Space system pressure vessels, 86

Stability analyses, 577

Standards

AISI304, 105

BSI 7448, 469

military, 86

Steels, 280

ASTM A 533 Grade B, 485

ASTM A 515 Grade B, 243

ferritic, 179, 198

high strength, 602

HSLA, 469

HSLA 100, 450

low carbon, 167

plates, 427, 450, 617

pressure vessel, 105, 263, 515

SA508, 105

structural alloy, 427

Strain ageing embrittlement, 515

Strain control, 411

Strength, residual, 123

Stress analysis, 370

Stress, applied, 411, 617

Stress concentration, 656

Stress corrosion cracking

resistance, 427

Stress criterion, local fracture,
617

Stress, hoop, 397

Stress, hydrostatic, 671

Stress intensity factor, 3, 214, 411

comparison with fracture
toughness, 146

cylinders, 641

determining, 656

pressure vessel steels, 515

steel plate, 617

Stress intensity field, 577

Stress intensity threshold, 355,
602

Stress range, 355
 Stress, residual, 397, 499, 515
 Structural alloy steel plate, 427

T

Tearing
 precleavage, 485
 stable, 309, 562
 Tensile strength, 450
 Tensile/yield strength, 123
 Tension test program, 146
 Thermal stress analysis, 370
 Thermomechanical fatigue, 370
 Time-dependent fatigue, 370
 Toughness, 55, 243, 263
 brittle materials, 577
 fracture, 671
 inference equations, 469
 pressure vessels, 198, 263
 pre-strain influence on, 167
 scatter, 296
 specimens with surface
 cracks, 146
 transition region, 280
 values, 55
 Transition, ductile-to-brittle,
 179, 243
 Transition region, 263, 280, 296
 Transition temperature, 198
 Tungsten, 577
 Turbines, 70, 370

V

Valve bodies, cracks, 641
 Vinyl ester composite, 55

W

Weibull statistics method,
 263
 Weibull stress, 179
 Weight function method, 656
 Weight reduction, structural,
 327
 Welded structures, 342
 Welding simulation, 499
 Weld material fracture
 assessment, 485
 Weld metal, 450
 Weldments, 427

X

X-ray diffraction, 105
 X-ray double crystal
 diffractometry, 105

Y

Yield level approximation, 499
 Yield strength, 123, 167, 450,
 602

Z

Zirconium/niobium pressure
 tubes, 535