

Subject Index

A

Acoustic emission, 509
 Adhesive joints, 556
 Aging, strain, 350
 Aircraft structure, 631
 Aluminum and alloys
 2024-FC, 376
 2024-T3, 223, 243, 256, 303
 2024-T351, 376
 6061-T651, 284
 7075-T651, 652
 aluminum-lithium, 600
 thin sheets, 631
 Anisotropy, 600
 Applied load, 698
 Applied stress, 223, 243
 Arcan specimen, 256
 ASTM standards
 A 515, 107
 A 516, 54
 A 533, 142, 715
 E 399, 178, 272
 E 813, 178, 587
 E 1152, 178, 272
 E 1290, 126
 Asymptotic fields, 673

B

Bending, 284, 391
 Bonding, 587
 Bond thickness, 556
 Bridge indentation method, 447

C

Carbon/epoxy composites, 486
 Center-crack tension
 specimens, 284, 336
 Ceramics, 447
 Charpy tests, 732
 Chevron notch method, 447
 Cladding, 417
 effects, 600
 Cleavage, 199

Compact tension specimens, 43,
 178, 272, 284, 376
 Composites
 carbon/epoxy, 486
 lamina, 531, 486
 metal matrix, 461
 Computer code verification and
 validation, life prediction,
 779
 Constant amplitude loading, 600
 Constant extension rate test,
 698
 Constraint, 43, 556, 54, 715
 crack tip, 178, 391
 effects, 142, 284, 321
 factor, 223
 loss of, 3, 178
 Controlled surface flaw method,
 447
 Crack bridging, 509
 Crack closure, 509
 Crack extension method, 86
 Crack face separation profiles,
 284
 Crack front tunneling, 303
 Crack growth, 199, 223, 391
 creep, 673
 directions, 531
 ductile, 391
 fatigue, 600, 617, 652
 intermittent, 698
 monitors, probes, 799
 rate, 509, 617
 resistance curves, 698
 stable, 256, 447, 531, 822
 theory, 652
 Crack initiation stretch, 284
 Crack initiation toughness, 43
 Crack mouth opening
 displacement, 486
 Crack resistance curves, 361
 Cracks, 715
 corner, 799
 environmentally assisted, 698
 interfacial, 86
 semielliptical, 430
 shallow, 126

subclad, 417
 surface, 86, 107, 779, 799
 Crack tip, 3
 blunting, 617
 constraint, 107, 178, 391
 fields, 178, 631
 opening angle, 199, 243, 303
 opening displacement, 43, 54,
 256, 376, 556, 763
 E 1290, 126
 estimating, 336
 three-dimensional, 223
 shear decohesion, 652
 Crack tunneling, 223
 Creep crack growth, 673
 Cyclic fatigue, 509
 Cyclic loading, 617

D

Damage, notch-tip, 486
 Damage zone model, 531
 Defect assessment, 336, 822
 Deformation, 54
 Deformation, nonlinear, 447
 Deformation, plastic, 417
 Dimple, 652
 Disk shaped specimen, 272
 Dispersoids, 652
 Displacements, 284, 486
 Displacement test, rising, 698
 Domain integral procedure, 715
 Double-edge notched tension
 specimens, 43, 587
 Ductile failure, 86
 Ductile fracture, 43, 142
 Ductile tearing, 321
 Dynamic toughness
 characterization, 732

E

Eddy current probes, 799
 Embrittlement, locally intensified
 straining and aging, 350
 Engineering Treatment Model,
 336, 763
 Environmentally assisted
 cracking, 698
 Extension rate test, constant, 698

F

Failure assessment method, R6,
 822
 Fatigue precrack, 447
 specimens, 698
 Ferralium, 255, 732
 Ferrite, 732
 Finite element analysis, 272, 531,
 572
 constraint characterization, 556
 Engineering Treatment Model,
 336
 geometrically nonlinear, 631
 modeling, 86
 plane-strain, 126
 stress triaxiality
 characterization, 556
 three-dimensional, 3, 223
 weldment specimen, 391
 Flaw assessment, 763
 Flaw, finite length, 430
 Flight spectrum loading, 600
 Four-point bend specimen, 361
 Functionally graded material, 572

G

Glass/epoxy panels, 531
 Grain boundaries, 652
 Graphite/aluminum panels, 531
 Graphite morphology parameters,
 quantitative, 361

H

Hardwood, 587
 Hold times, 617
 HY-80, 54
 HY-100 structural steel, 142

I

Impact loading, 715
 Impact toughness, 732
 Inclusions, 652
 Indentation fracture method, 447
 Inertial effects, 715
 Inner surface flaws, 430
 IN718-STAl, nickel-base
 superalloy, 284

Integrated Reactor Vessel
 Material Surveillance
 Program, 272
 Interface, bimaterial, 86, 321,
 336, 376
 Interlayer, 572
 Interleaf specimen, 391
 Iron, nodular cast, 361

J

J_{Ic} , 142, 447
 E 813, 178, 587
J-integral, 43, 54, 86, 107, 142,
 272, 284, 361, 556
 modified, 763
 Joints, adhesive, 556
 Joints, bimaterial, 376, 572
 Joints, welded, 361
 Joints, mismatched, 336
J-*Q* methodology, 107, 556
J-*R* curves, 272, 587
 E 1152, 178, 272
J-resistance curves, 284

L

Laminates, 531, 486
 Leak-check port specimens, 799
 Life prediction computer
 code, 779
 Lithium, aluminum-lithium
 alloy, 600
 Loading, 284
 constant amplitude, 600
 history dependent
 conditions, 673
 minimum, hold, 617
 monotonic, 178, 199
 prediction, 531
 static, 361
 test, rising, 698
 unloading compliance
 technique, 361
 Load separation, 86
 Loss of constraint, 3, 178

M

Microtopography reconstruction,
 303
 Mismatching, 361

effects, weld metal, 321
 joints, estimate, 336
 strength, 336, 376, 391
 Modeling
 Bodner-Partom viscoplastic
 constitutive, 715
 computerized life prediction,
 779
 crack tunneling, 223
 damage zone, 531
 failure prediction, 461
 finite element analysis, 54, 86
 metal matrix composite
 system, 461
 numerical, 673
 three-dimensional crack
 model, 430
 Mode I crack growth, 199
 Mode I/Mode II stable crack
 growth, 256
 Morphology parameters,
 quantitative graphite, 361

N

NASCRAC, 779
 Nickel-base alloy, 284
 Notch-tip damage, 486
 Numerical modeling, 673

O

Orientation, 600

P

Paper, 587
 Peak stress location, 572
 Plane-strain bending, 391
 Plane-strain finite element
 analysis, 126
 Plane-strain fracture toughness
 E 399, 178, 272
 Plane-strain Mode I crack
 growth, 199
 Plasticity, 461
 Plates, thin, 631
 Plates, wide, 336, 350
 Plate theory, 631
 Profiling, 284

Q

Q-stress, 178

R

R6, 822

Radiography, X-ray, 486

Rate sensitivity, 715

R-curves, 376, 447, 509

Reconstruction, microtopography, 303

Recycling, 587

Rolling orientation, 243

Rotation correction, 142

S

Safety analysis, 3

Safety assessment, 417

Scanning electron microscopy, 509, 556

Scatter, 732

Shear decohesion, 652

Single-edge bend specimen, 732

Single-edge notch bend specimens, 126, 376, 715

Single-edge notched tension specimens, 43, 284, 587

Single specimen technique, 86

Small-scale yielding, 178

Softwood, 587

Space shuttle rocket motor, 799

Steel

A 515, 107

A 516, 54

A 533, 142, 715

D6AC, 799

HY-80, 54

HY-100, 142

stainless, 732

welded, 350

Strain, critical, stress modified, 54

Strain aging, 199

locally intensified, 350

Strain hardening, 3

Strain rate sensitivity, 715

Strength mismatch, 391

Stress, 486

applied, 243

intensity factor, 417, 430, 509, 631

average, 779

local, 779

level, precracking, 799

peak, 572

peak applied, 223

ratio, 600

strain curves, 336

triaxiality, 391, 556

Striation, 652

Structural integrity, welds, 321

T

Tearing, ductile, 321

Tearing modulus, 142

Tearing resistance, 142

Tearing, stable, 223, 303, 391

Tensile loading, 531, 631

Tensile strength, 126

Tensile test, in situ, 361

Thermal shock, 417, 430

Thin sheet, 223

Three-dimensional crack model, 430

Three-dimensional crack tip opening displacement, 223

Three-dimensional finite element analysis, 223

Three-dimensional finite element model, 54, 86

Three-dimensional loss of constraint, 3

Three-dimensional nonlinear dynamic analyses, 715

Three-dimensional transverse constraint, 178

Three-parameter characterization, 199

Three-point bend specimen, 486

Titanium, 391, 461, 617

Toughness, 587

Toughness scaling, 107

Transformation induced dilation, 509

Transition toughening, 509

Transition zone, 256

Translaminar fracture, 486

T-stress, 142

Tunneling, 223
 behavior, 243
 crack, 303
 Two-parameter fracture
 mechanics, 107

U

Unloading compliance
 technique, partial, 361
 Upper shelf fracture, 142

V

Void growth, 43, 54
 Void nucleation, 43

W

Warm prestress, 178
 Welds, 321, 336, 361
 electron beam, 376
 geometry, 391
 heat-affected zone, 350
 undermatched, 391
 Wide plate tension tests, welded,
 350

Y

Yielding, small-scale, 178
 Yield strength, 376, 587

X

X-ray radiography, 486

Z

Zirconia, 509