

Subject Index

A

Adherends, composite patch repair, 444
 Adhesives, composite patch repair, 444
 Aircraft
 HALE, 264
 horizontal tail, 253
 Angle-ply laminates, commingled
 polyetherketone/carbon composites,
 400

B

Bondlines, composite patch repair, 444
 Boron/aluminum, macro—micromechanics
 analysis, 222
 Brittle-matrix composites, deformation and
 failure, 204

C

Carbon-epoxy composites, open hole and
 postimpact compressive fatigue, 37
 Carbon fiber composites, 293
 Celion 3000/PMR-15, hot/wet testing, 131
 Ceramic composites, 204
 Co-cured process, 293
 Coefficient of moisture expansion, IM7
 graphite/PEEK, 118
 Coefficient of thermal expansion, IM7
 graphite/PEEK, 118
 Composite materials
 brittle-matrix, 204
 carbon-epoxy composites, 37
 carbon fiber, 293
 CELION 3000/PMR-15, 131
 co-cured sandwich panels, 293
 commingled PEEK/carbon, 400
 compressive deformation and failure, 87
 with defects, 320
 E-glass/epoxy laminates, 87
 fiber waviness, 20
 film adhesive interlayers, 384
 glass-epoxy laminates with matrix cracks,
 348

high strain rate compressive properties, 54
 high-temperature fatigue behavior, 192
 hot/wet testing, 131
 IM7/PEEK, 118
 integral, 238
 notched, 222, 414
 out-of-plane loads, 238
 polyimide quartz laminate, 279
 sandwich shell horizontal tail, 253
 SiC(SCS-6)/Ti-15-3, 70, 175
 SiC/Ti-24Al-11Nb, 192
 strain distribution and tab orientation,
 103
 strength prediction, 142
 stress field sensitivity, 444
 stub-blade wing joint, 264
 tab orientation effect, 103
 test methods, 7
 thermographic stress analysis, 428
 thermomechanical testing, 70
 thermosetting, 308
 ultrasonic nondestructive evaluation, 330
 unidirectional curved laminates, 365
 Composite repair, stress field sensitivity, 444
 Compression testing, 7
 Compressive behavior
 composite materials, 54
 E-glass/epoxy laminates, 87
 fiber composites, 20
 notched composite laminates, 414
 Compressive failure, 7
 E-glass/epoxy laminates, 87
 Compressive fatigue, stitched and unstitched
 composites, 37
 Creep, SCS-6/Ti-15-3, 175
 Cure monitoring, 308
 Cyclic fatigue, metal-matrix composites, 70

D

Damage
 accumulation, notched composite
 laminates, 414
 evaluation, composite materials, 428
 suppression, film adhesive interlayers, 384

Damage—*continued*
 tolerance, commingled PEEK/carbon
 composites, 400
 Defects, composite materials with, 320
 Deformation
 brittle-matrix composites, 204
 E-glass/epoxy laminates, 87
 Delamination
 glass-epoxy laminates with matrix cracks,
 348
 out-of-plane loads, 238
 suppression, film adhesive interlayers, 384
 unidirectional curved composite
 laminates, 365
 Discrete fiber-matrix model, 222
 Dry ply, composites, 320

E

Edge delamination test, 7
 E-glass/epoxy laminates, compressive
 deformation and failure, 87
 End tab design, composite materials, 103

F

Failure
 brittle-matrix composites, 204
 composite materials, 142
 Failure modes
 analysis, 7
 commingled polyetherketone/carbon
 composites, 400
 metal-matrix composites, 70
 Fatigue
 composite materials, 428
 SCS-6/Ti-15-3, 175
 SiC/Ti-24Al-11Nb, 192
 Fiber composites, strength prediction, 142
 Fiberglass, strain distribution and tab
 orientation, 103
 Fiber-matrix debonding, 204
 Fiber-reinforced composites, 54
 thermographic stress analysis, 428
 Fiber waviness, composite materials, 20
 Film adhesive interlayers, delamination
 suppression, 384
 Finite element analysis, composite
 materials, 103
 with defects, 320
 patch repair, stress field sensitivity, 444
 sandwich shell horizontal tail, 253
 three-dimensional, glass-epoxy laminates
 with matrix cracks, 348
 unidirectional curved composite
 laminates, 365

Forward sweep, 253
 Fractography, metal-matrix composites, 70
 Fracture
 film adhesive interlayers, 384
 notched composite laminates, 414
 toughness, curved composite laminates,
 365
 Free-edge stress analysis, glass-epoxy
 laminates with matrix cracks, 348

G

Glass-epoxy laminates
 compressive deformation and failure, 87
 with matrix cracks, free-edge stress
 analysis, 348
 Graphite/epoxy laminates
 film adhesive interlayers, 384
 out-of-plane loads, 238
 Graphite fiber composites, spacecraft
 structural applications, 118
 Graphite/polyimide composites, hot/wet
 testing, 131

H

HALE aircraft, 264
 Heating effects, metal-matrix composites, 70
 High strain rate, composites, 54
 High-temperature composites,
 thermomechanical testing, 70
 Honeycomb core construction, 293

I-J

Image enhancement, ultrasonic
 nondestructive evaluation, 330
 IM7 graphite/PEEK, spacecraft structural
 applications, 118
 Impact, low-velocity, 37
 Interface, notched metal-matrix composite,
 222
 Interlaminar fracture, glass-epoxy laminates
 with matrix cracks, 348
 Interlaminar stress, 238
 film adhesive interlayers, 384
 Joints, composite patch repair, stress field
 sensitivity, 444

L

Laminates
 composite patch repair, stress field
 sensitivity, 444
 curved, delamination, 365
 E-glass/epoxy, 87

glass-epoxy, with matrix cracks, 348
graphite/epoxy, 238, 384
notched, 414
PEEK/carbon, 400
strength prediction, 142
thick, 279
Load cycling, polyimide quartz, 279

M

Macro-micromechanics analysis, notched
metal matrix composite, 222
Matrix ply cracking, 348
Mechanical properties
Celion 3000/PMR-15, 131
IM7 graphite/PEEK, 118
Metal-matrix composites
notched, macro-micromechanics
analysis, 222
thermomechanical fatigue behavior, 70
unnotched, 175
Micromechanics, 20
Minimum strength model, 414
Moisture content, Celion 3000/PMR-15,
131
Multiaxial testing, E-glass/epoxy laminates,
87

N

NASTRAN model, 253
Nondestructive evaluation
composites with defects, 320
ultrasonic, 330
Notched composite laminates, damage
accumulation and fracture, 414
Notched metal-matrix composite, macro-
micromechanics analysis, 222

O

Open hole compressive and tensile strengths
carbon-epoxy composites, 37
commingled polyetherketone/carbon
composites, 400
Out-of-plane analysis, composite materials,
238

P-Q

Patch repair, composites, stress field
sensitivity, 444
Ply drop off, 238
Polyetherketone/carbon composites,
commingled, damage tolerance,
400

Polyimide quartz laminate, temperature and
load cycling, 279
Postimpact fatigue, 37
Process control, automated, thermosetting
composites, 308
Properties, loss of, 279
Quadratic Delamination Criterion, 384
Quality evaluation, co-cured sandwich
panels, 293

S

Sandwich panels, co-cured, 293
Sandwich skin, 253
Scarf lap joints, composite patch repair,
444
SCS-6/Ti-15-3, unnotched, 175
Shear behavior, nonlinear, 20
Shear lag analysis, brittle-matrix composites,
204
Shell structure, 253
Short beam shear, 7
SiC(SCS-6)/Ti-15-3
thermomechanical fatigue behavior, 70
unnotched composites, 175
SiC/Ti-24Al-11Nb, high-temperature
fatigue behavior, 192
Silicon-carbide fibers, 175
Single lap joints, composite patch repair,
444
SPATE, composite materials, 428
Static tests, composite patch repair, 444
Stepped lap joints, composite patch repair,
444
Stitched composites, compressive fatigue,
37
Strain energy release rate, curved composite
laminates, 365
Strain gages, Celion 3000/PMR-15, 131
Strength prediction, composite materials,
142
Stress
contours, notched metal-matrix
composite, 222
out-of-plane loads, 238
Stub-blade wing joint, 264

T

Tape composites, compressive fatigue, 37
Temperature cycling, polyimide quartz,
279
Tensile strength
composite materials, 103
notched composite laminates, 414
Test methods, composite materials, 7

Textile composites, compressive fatigue, 37	Titanium aluminide, high-temperature
Thermoelasticity, 428	fatigue behavior, 192
Thermographic stress analysis, damage in	Translaminar stress, 238
composites, 428	
Thermoplastics, commingled PEEK/carbon	U-W
composites, 400	
Thermosetting composites, automated	Ultrasonic nondestructive evaluation, 330
process control, 308	Water absorption, IM7 graphite/PEEK, 118
Three-dimensional braid, commingled	Wing joints, 264
PEEK/carbon composites, 400	Wrinkle, composites, 320