Subject Index

A

Abrasion, 278
Abrasive wear, 13, 90
Actuators, 200
Additives, oil, 563
Adhesion, 3, 278
Air cleaner fine test dust, 190
Aircraft, 370
hydraulic system problems, 489
Aluminum alloy, 549
Amines, 450
Analytical ferrography, 179, 225
Anti-foaming agent, 167
Army, U.S., fluid failure mode
analysis, 167
Asperities, 3

B

Barium dinonylnaphthalene
sulfonate, 489
Barrier, storm surge, hydraulic
system, 150
Bearings, 31, 299
life, 500
Biodegradable fluids, 75, 427, 575
Blistering, 450
Bottle sampling, 190
Boundary lubrication, 3
Brinelling, 299
Bronze/steel, 427
Bulk modulus, 318

C

Cam ring, 333
Cavitation, 119, 214, 278, 299
cavitating-jet apparatus, 563
damage, 357
pump, 299, 318
Ceramic parts, hydrostatic
pumps and motors, 417
Ceramics, 402
Cerium, 549
Coatings, 402, 427, 500
Composites, titanium-nickel
matrix, 382
Compressibility, 318
Construction equipment, 263
Contact resistance, 535
Contacts, lubricated, abrasive
wear, 13
Contamination, 13, 167, 340
control, 190, 474
diamond, 13
particle, 299
quartz, 13
recirculating, 3
sensitivity, 248
water, 214
Contradiction elimination,
TRIZ, 340
Copper, 462
Corrosion, 214, 263, 278, 299
damage prediction, 357
Corrosive wear, 119, 382
resistance, 535, 549
Cracking, 450
CrAIN, 427
Cylinders, 31

D

Damage prediction, 357
Debris, wear, 200
Degradation, 370
Delta Works, The Netherlands,
150
Density, 318, 563
Density analysis, ferrous, 225
Design, hydraulic system, 318
Design paradigms, system
components, 340
Deterioration, oil, 263
Deutsches Institut für Normung
standards (DIN), 75
Diffusion, 462
Drilling applications, 427
Drive system, storm surge
barrier, 150
Dry sand/rubber wheel abrasion tester, 90
Dryness, target, 214
Durability, 462
Dust, test, 190

E
Elastic modulus, 90
Elastic-plastic finite element stress analysis, 59
Elastohydrodynamic lubricants, 3 films, 333, 500
Electrochemical corrosion, 119
Electrochemical scratch, 535
Endurance life, 417
Energy management issues, 340
Engines, hydrostatic, 427
Environmentally acceptable hydraulic fluids standard, 137
Erosion, 357, 382, 563 corrosion, 119
Ester based fluids, 575
Excavator, 263

F
Failure mode, hydraulic system, 119, 137, 167
common, 299
Failure probability, 150 ceramic parts, 417
Fatigue, bearing, 500
Fatigue life, 333
Ferrography, 225
direct reading, 179
Ferrous density analysis, 225
Film, elastohydrodynamic, 333, 500
Film, hydrodynamic, 13
Film, lubricant, 370
Filters, 474
component design studies, self cleaning, 340
testing, 190
Finite element analysis, 90
Finite element stress analysis, 59
Fire resistant fluids, 137, 263
Fluid analysis technologies, 225
Fluid, chemical properties, 167
Fluid lubrication properties, 75
Fluid, physical properties, 167
Fluid power components, 563
Fluoro elastomer, 450
Flywheel test, 575
Foaming, 563 resistance, 167
Foil bearing, 13
Forestry equipment, 523
Fourier transform infrared spectroscopy, 489
Friction, 200, 402, 462 behavior, 549 characteristics, 41
coefficient, 427, 441, 474 data, load capacity test, 105
Function analysis, TRIZ, 340
FZG test, 75

G
Gas turbine, 105
Gear pumps, 105, 119
Grease, 462, 500, 549
Growth, microbial, 214

H
Hardness, differential, 13
Hertzian distribution, 59, 333
HfCg, 427
Hydrodynamic effects, surface roughness, 31
Hydrodynamic film, 13
Hydrogen-induced wear, 214
Hydrolysis, 214
Hydrostatic components, 575
Hydrostatic machinery, 417, 427
Hydrostatic transmission, 402, 575

I
Ideal final result, TRIZ, 340
Incubation period, 357
Integrated Drive Generators, 370
International Organization for Standardization (ISO)
ISO 11158, 137
ISO 12922, 137
ISO 15380, 137
K
Komatsu HPV35 + 35 pump test, 263

L
Lacquer formation, 263
Laminar flow, 31
Laser surface texturing, 441
Lattice sites, 90
 Leak-free coupling, 340
Load capacity, 441
tests, 105
Load conditions, 417, 462
Loading, 402
Lube analysis monitoring, 179
Lubricated contacts, 13

M
Maintenance, 200
condition-based, 225
Martensitic transformation, reversible, 382
Mechanical components, performance improvement, 441
Mechanical testing of hydraulic fluids, 75, 575
Metal, friction, 549
Metal parts, 417
Metal, yellow, 462
Metallic materials, surface behavior, 357
Microbial growth, 214
Microhardness, 535
Micro-indentation tests, 535
Microscopic analysis, 179
Micro-scratch tests, 535
Military aircraft, 489
Military standards
MIL-H-5606, 190
MIL-H-46170, 167
MIL-PRF-6083, 489
MIL-PRF-83282, 489
Milling applications, 427
Mineral oil hydraulic fluid, 137, 427, 575
Misalignment, 299
Models and modeling abrasive wear, 13

analytical, 248
computer, 90
finite element, 59
friction and wear, 462
plasticity, 59
Moisture, 225
Motors, 3, 31, 41, 402
hydrostatic, 417, 427
radial piston, 137, 333
Multiaxial fatigue, 59

N
Netherlands, storm surge barrier, 150
Newton's law of motion, 90

O
Oils, 263, 450, 462, 549, 563
analysis, 225
contamination, 474
gas turbine, 105
hydraulic fluids, water contamination in, 214
mineral, 427
oxidation, 299
products, 179, 474
properties, 225
Omega theory, 248
O-rings, 462
Oxidation, 225
Oxide-film bonding, 549
Oxygen-active element, 549

P
Particle analysis, 179
Particle concentration, 190
Particle counting, 190
Particle exposure rate, 248
Particles, 225
Particulate contamination, 13, 167, 179, 190, 299
Patch analysis, 179
Performance characteristics, 500
Piston, hydraulic log, 370
Piston profile, 41
Piston pumps, 41, 119, 137, 263
Piston rings, 31
Plastic deformation, 59, 357
Plastic flow, 59
Plastic strain, 90
Polarization behavior, 535
Polishing, 370
Polymer molecular weight, 523
Pressure drop, 523
Propellers, 462
Pseudoelasticity, 382
Pumps, 3, 31, 200, 402
axial piston, 299, 523
chamber, 248
failures, 137
gear, 248
gear pump failure analysis, 105
hydrostatic, 417, 427
inlet conditions, 318
Komatsu HPV35 + 35, 263
piston, 41, 119, 137, 263
test, 523
vane, 137, 563
Vickers V-104 vane pump, 75
wear problems, 278
PVD coatings, 427

R

Radial lip seal, 450
Roller bearings, 137
Rolling contact fatigue, 278
failure, 137
Rolling contact, two
dimensional, 59
Rolling elements, 333
bearing life, 500
Root cause analysis, 137, 278,
340
Rotary lip sealing, 450
Roughness, 41
Roughness, surface, hydrodynamic effects, 31
Rubber, 462
epidermoid layers, 450
Running in tests, 41
Russian Theory of Inventive
Problem Solving, 340
Rust, 214
inhibitors, 489

S

Scanning electron microscopy, 549
Scratch resistance, 427
Screening test, 575
Scuffing, 3, 105, 263
Seals, 31, 462, 500
radial lip sealing, 450
rotary lip sealing, 450
Sensitivity coefficients, contaminant, 248
Separation voltage, 41
Service life, 500
Shear degradation, 523
Shear stability, 523
Sliding surface, lubrication characteristics, 41
Sliding wear, 382
Slipper assembly, 370
Solvent extraction, 474
Spark discharges, 474
Spectrometric testing, ultraviolet, 179
Spectroscopy, 225
infrared, 489
Standards
DIN, 75
ISO, 137
military, 167
Steels
bearing, 500
quality, 137
stainless, 535
Type 304, 535, 549
Stiffness, 41
Storm surge barrier, 150
Strain, 59
distribution, 90
hardening, 357
Stress analysis, elastic
plastic, 59
Stress conditions, 417
Stresses, 333
Stribeck curves, 3, 41
Sulfonate, 489
Sulfuric acid, 549
Surface
analysis, 535
failure analysis, 105
fatigue, 370
laser, texturing, 441
profile, 333  
ratchetting, 59  
roughness, 31, 357  
sliding, lubrication characteristics, 41  
texturing, 441  
topography, 333  
Swashplate unit, 402  

T  
Temperature, fluid, 523  
Texturing, surface, 441  
Thermal stability, 225  
TiAIN/Al₂O₃, 427  
Titanium-carbon, 382  
Titanium-nickel matrix composites, 382  
Titanium-nitrogen, 382  
Tolerance profile, contaminant, 248  
Traction data, load capacity test, 105  
Trends of evolution, TRIZ, 340  
TRIZ, 340  
Turbine oil, gas, 105  

V  
Valves, 200  
hydraulic, problems, 474  
stuck servovalve, 489  
Vane pump, 137  
test, 75, 119  
Vapor pressure, 318  
Varnish, 225  
Velocity, relative, 462  
Vibration testing, 179  
Vickers 20VQ test, 563  
Vickers V-14, 75  
Viscosity, 225, 318, 563  
index improvers, 523  

W  
Water, 333  
Water-based fluids, 402, 500  
Water contamination, 214  
Water lubrication, 462  
Water monitoring, 214  
Water removal, 214  
Wear, 3, 263, 402, 575  
abrasive, 13  
coatings, 427  
contaminant, hydraulic pump, 248  
corrosive, 119, 549  
debris, 200, 225  
gear, 105  
hydraulic, processes, 278  
hydrogen-induced, 214  
mechanism, 370  
oil type, effect on, 563  
o-ring, lubrication influence on, 462  
particle analysis, 179  
performance, 382  
pump, 248  
resistance, 441  
simulation, 90  
sliding, 535  
titanium-nickel shape memory alloy, 382  
Work hardening, 90  

Y  
Yellow metal, 462  
Yield strength, 90  
Yttrium, 535, 549