

Subject Index

A

Abrasion resistance, 120, 168-169
 Apparent opening size, 7, 21, 29-30,
 172-173
 defined, 30
 versus equivalent opening size, 9-
 12
 Apparent slope height, 96
 Approved list, 21, 25, 28
 Armored revetment, 46, 48
 Armor stones, placement, 53-54
 ASTM Committee D-35, 161-175
 endurance property subcommit-
 tee, 168-171
 mechanical properties subcommit-
 tee, 162-168
 permeability and filtration sub-
 committee, 171-175
 standards, 162
 ASTM D 76-77, 164
 ASTM D 120-1, 120
 ASTM D 737-75, 13
 ASTM D 751-68, 129
 ASTM D 751-79, 126, 166-167
 ASTM D 854-83, 126
 ASTM D 1117-80, 126, 129, 167
 ASTM D 1175, 169
 ASTM D 1388-64, 126
 ASTM D 1652-73, 126
 ASTM D 1682-64, 129, 163, 169
 ASTM D 1777-64, 175
 ASTM D 3786-80a, 168
 ASTM D 3787-80a, 166
 ASTM D 3884-80, 169
 ASTM D 4354, 162
 ASTM D 4355-84, 120, 162, 168
 ASTM D 4429-84, 134
 ASTM D 4491-85, 13, 162
 ASTM D 4533-85, 167

ASTM D 4595-86, 28, 57, 63, 67, 83-
 86, 98, 111, 163-166
 ASTM D 4632-86, 57

B

Bearing capacity, embankment,
 112-113
 Biogeoproducts, 153
 Biological stability, 169-170
 Burst test, circular or rectangular, 60

C

California bearing ratio, 60
 California Department of Transpor-
 tation geotextile methods
 generic specifications, 22-33
 nonwoven, applications and ad-
 vantages, 23-24
 specification need for utilization
 improvement, 24-25
 Chemical stability, 169-170
 Christopher clamp, 164-165
 Clogging, 146
 behavior, 7-8
 ratio, 14, 173
 soil-fabric test results, 16
 Coherent gravity procedure, 100-101
 Constant-head permeameter, 14
 Construction
 criteria, 125-137
 construction-related problems,
 125-126
 drainage, 127-129
 erosion control, 127, 130-131
 reinforcement, 135-137
 separation, 131-135
 site damage, 85-86
 resistance, 105

methods, 153-155
 Cordrain, flow rate, 43
 behavior, 37, 39
 Creep, 84, 161, 170
 test, 69, 85, 87-89
 Crucifax biaxial test, 60
 Cylindrical sleeve test, 60

D

Darcy's equation, 149
 Darcy's law, 12-13, 18
 Darcy's permeability coefficient, 7,
 12-13, 28
 nominal, 30-31
 Design, 145 (*See also* specific appli-
 cations)
 development of empirical and
 semiempirical methods, 156
 sophisticated analytical methods,
 155-156
 Diaphragm bursting strength test
 method, 168
 Direct shear test, 69, 88-90
 Drainage, 17-19, 21-32, 125, 145
 application areas, 34
 California Department of Trans-
 portation, geotextile meth-
 ods, 22-25
 construction criteria, 127-129
 gravity flow on sloped embank-
 ment, 40-41
 in-plane, 36
 lateral designs, 33-44
 approaches, 33
 hydraulic considerations, 34-36
 required data base, 36-37
 using bulky geotextiles, 37, 40-
 42
 using geocomposites, 42-43
 pressure flow under surcharge fill,
 41-42
 transmissivity of drainage net, 150
 Durability testing, 119-121

E

Earth structure, 70
 Effective opening size, 49
 Embankments, weak foundations,
 69, 74-75, 106-114
 bearing capacity failure, 112-113
 design principles, 106-107
 lack of embankment internal sta-
 bility, 106-107
 lack of foundation stability, 107
 lateral sliding, 107-109
 performance criteria, 106
 reinforcement elongation, 110-
 111
 reinforcement properties and rele-
 vant test methods, 113-114
 simplified design, 107-113
 slip surface failure, 109-112
 strain level, 111
 Empirical, 21
 Enkadrain, flow rate, 39, 43
 Equivalent opening size, 172
 versus apparent opening size, 9-12
 versus port structure, 9-11
 retention ability and, 8-9
 Erosion control, 45, 125
 applications, 46, 48
 concept, 45-46
 construction criteria, 53-54, 127,
 130-131
 design criteria for needle-punched
 nonwovens, 50-53
 filter, 45-54
 geotextile functional design con-
 siderations, 48-49
 riprap slope protection, 47

F

Fabrics, 45
 Factor of safety, 35, 43, 80-82
 Filter
 criteria, 45
 design, 146-149

mechanisms and properties, 146-147
 nonclogging criterion, 148
 permeability criterion, 147
 retention criterion, 148
 Filtration, 8-17, 21, 145
 criteria, 8
 permeability, 12-14
 Flow rate, 33

G

Geocomposites, 33
 drainage systems, 38
 lateral drainage designs, 42-43
 Geogrids, 69
 properties, 82-83
 Geosynthetics, 33, 145
 drain design, 149-151
 future, 153
 properties, 151, 155
 Geotechnical engineering, 145
 Grab tensile strength, 163
 Grab tension, 28-29
 Grab test, 63
 Gradient ratio, 7, 173-174
 permeameter, 15
 test, clogging resistance, 14-17
 Granular soil, 45

H

Horizontal stress, 103-104
 Hydraulic conductivity, 171-172
 Hydraulic properties, 7-19 (*See also*
 Filtration)
 drainage, 17-19

I

Index test, 119
 Initial tangent tensile stiffness, defined, 86
 In-plane transmissivity, 174
 Instrumentation, 141

L

Laboratory tests, 141
 Laterally restrained tension test, 63
 Lateral sliding, embankment on weak foundations, 107-109
 Load supporting pads, 75-77
 Load supporting structures, 70

M

Materials, range of, 152-153
 Melt-bonded, 21
 Microgeosynthetics, 153

N

Needle-formed, 21, 23-24
 Needle-punched, 21, 149-150
 New York State Department of Transportation, geotextile methods, 25-31
 background, 25
 critical designs, 30-31
 slope protection, 26, 28
 testing and acceptance, 28-30
 underdrain, 26-27
 Nonclogging criterion, 148
 Nonwoven, 21, 148
 applications and advantages, 23-24
 drainage systems, 38
 needle-punched, 149-150
 design criteria, 50-53

O

On-site protection of handling, 170
 Overlap, minimum, 134

P

Permeability, 7-8, 12-14, 21
 criterion, 147
 equivalent ratio, 52

- fabric compressibility effect, 13-14
- soil type and hydraulic gradient effect, 17
- Permeameter, 29
 - constant-head, 14
 - gradient ratio, 15
- Permittivity, 7, 21, 29, 171-172
 - defined, 13, 28
 - underload, 174-175
- Physical properties (*See* Properties)
- Pin spacing, 130
- Planar flow, 33
 - transmissivity, 17-18
- Polyfelt TS geotextiles, filter design criteria, 51
- Polymeric reinforcement material, idealized creep and stress relaxation behavior, 84
- Pore size, 7 (*See also* Apparent opening size; Equivalent opening size)
- Pretensioning, 153-154
- Properties, 82-83, 126, 141 (*See also* Filtration; Hydraulic properties)
 - current requirements, 143
 - geosynthetics, 151, 155
 - minimum, 129
 - soil-fabric, 141-142
- Pullout test, 69, 89-90
- Puncture test, 166-167

R

- Railroad track structures, 77-78
- Reinforced slopes, 90-99
 - amount of reinforcement, 94-96
 - deformations under working conditions, 98
 - design principles, 91-94
 - distribution of reinforcement, 96
 - external stability, 93
 - failure modes, 91

- friction between soil and reinforcement, 99
- internal stability, 91-93
- length of reinforcement, 96-97
- limit equilibrium design, 97-98
- performance criteria, 90-91
- reinforcement force effect, 92-93
- reinforcement orientation and length, 94
- simplified design, 94-97
- soil reinforcement, 70, 72
- wedge failure mechanism, 94
- Reinforced soil walls, 70, 72-73, 99-105
 - construction site damage, 105
 - design principles, 100
 - environmental exposure resistance, 105
 - external stability, 104-105
 - initial tangent stiffness, 105
 - internal stability, 102-104
 - performance criteria, 99-100
 - simplified design, 100-105
- Reinforcement, 125
 - construction criteria, 135-137
 - material types, 82
- Research, 141-143, 155-156
- Retaining walls, 69
- Retention criterion, 148
- Riprap slope protection, 47
- Roads, 77-78
- Rutting, repair, 134-135

S

- Sanders clamp, 165-166
- Seaming techniques, 135-136
- Secant tensile stiffness, defined, 86
- Separation, 125
 - construction criteria, 131-135
 - construction problems, 132
- Sieving test, 172-173
- Silt fences, construction, 131-132
- Slip surface failure, embankment, 109-112

- Sloped soil layers, 73-74
- Slopes (*See also* Reinforced slopes)
 protection, New York State Department of Transportation, geotextile methods, 26, 28
 stability, 69
- Soil, 145
 layers, nonuniform foundations, 74-76
 permeability, 12
 reinforcement, 69-114, 145 (*See also* Reinforced slopes; Reinforced soil walls)
 categories, 79
 construction site damage effects, 85-86
 design approach, 79-80
 discrete approach, 89
 embankments on weak foundations, 74-75
 factor of safety, 80-82
 global approach, 80
 influence of load duration on isochronous load-strain behavior, 89
 interaction characteristics, 88-90
 load supporting pads, 75-77
 railroad track structures, 77-78
 reinforced slopes, 70, 72
 reinforced soil walls, 70, 72-73
 reinforcement material types, 82
 roads, 77-78
 sloped soil layers, 73-74
 soil layers on nonuniform foundations, 74-76
 soil mass-reinforcement geometry, 79
 temperature effects, 85-86
 tensile characteristics, 82-89
 time-dependent behavior, 84-85
 types of structures, 70-80
 retention, 21, 29-30
- Soil-fabric properties, 141-142
- Standardization, 141-142
- Standards, 161-162
- Strength, 21
- Stress relaxation, 84
- Strip tension test, 63
- Survivability, 125, 126-128
- T**
- Taber test, 120, 169
- Tensile force, 104
- Tensile resistance, 87
 defined, 82-86
- Tensile strength, 86, 161
- Tensioned membrane effect, 152
- Tension testing, 57-69
 California bearing ratio, 60
 choice, 63-64
 circular or rectangular burst test, 60
 criteria, 58
 crucifax biaxial test, 60
 cylindrical sleeve test, 60
 existing tests, 58, 62
 grab test, 63
 in-soil, 82-83
 jointing and seaming, 68
 laterally restrained tension test, 63
 load/extension envelope for differing rates of strain, 59
 localized load results, 65, 67
 results, 64-65
 size specimen, 58-59
 strip tension test, 63
 unidirectional load results, 67
 unidirectional test setup, 60
 wide strip, 28-29, 83-84, 163-166
- Testing
 current, 141-142
 future, 141-144
 New York State Department of Transportation, geotextile methods, 28-30
- Thermal stability, 121
- Thickness, 175
- Tieback wedge procedure, 100-101
- Tortuous path, 23

Transmissivity, 7, 33
definition, 35
drainage net, 150
planar flow, 17-18
response versus applied normal stress, 37
tests, 18-19
Trapezoid tear, 167

U

Ultraviolet
degradation resistance, 170-171
stability, 119-120

Underdrain, New York State Department of Transportation, geotextile methods, 26-27
Unpaved roads, 145
geosynthetic-reinforced, 151-152

V

Vertical stress, maximum, 102-103

W

Woven, 21-22, 148