

Index

A

Allowable fines, 6, 349, 350, 355, 359
 Angularity (see Roundness criteria)

C

Coarse aggregate correction, 221,
 224–231, 431

Compressibility

Plate load, 277, 395

Sensitivity, correlated to

Particle shape, 257, 304, 312

Plane-strain consolidation, 338

Relative density, 257, 338, 340

Relative compaction, 417

Triaxial consolidation, 338

Stress-strain behavior

Triaxial/Plain strain, 339, 342

Cone penetration (see Dynamic and
 Static)

Critical void ratio, 329, 342

D

Degree of compaction (see Relative
 compaction)

Density ratio, 252, 492, 496

Dynamic compaction (see Impact
 compaction)

Dynamic cone penetration, 268, 470

E

Errors

Analysis of, 74, 490

Magnitudes (see Reliability and
 Reproducibility under In-place,
 Maximum, Minimum,
 and Relative density)

Types, 75, 77, 488

F

Friction angle (see Strength)

G

Gelatin solution, 185, 198

H

Humphres method, 221

I

Impact compaction

Correlations with

Kneading, 220

Standard and modified, 45

Vibratory, 145, 220, 307, 352,
 358

Dry versus saturation, 411

Large scale tests, 215

Reliability (variability), 12, 14,
 43, 44, 153

Sensitivity to

Particle distribution, 359

Percent fines, 359, 409

Sample heterogeneity, 422

Saturation, 408, 411, 422

In-place density

- Control densities, 197, 385
- Correlations
 - Balloon/Cylinders, 388
 - Balloon/Nuclear, 274, 293
 - Balloon/Sand cone, 257
 - Balloon/Test pit, 391
- Equipment calibration, 197
- Equipment recommendations
 - Nuclear, 274–277
 - Washington densometer, 257–259, 385
- Reliability (between organizations), 14, 202, 213, 231, 417, 493
- Reproducibility (within organizations), 14, 416
- Required measurements, 80, 92, 206
- Selection of test method, 385
- Sensitivity to
 - Freezing, 371
 - In-situ water content, 203–205
 - Plastic liners, 213
 - Sample heterogeneity, 256, 387, 407
 - Specimen size, 209
 - Test depth, 275, 370, 386, 419
- Test methods
 - Deep depths
 - Freezing, 367, 369
 - Sampling, 368, 382, 393, 458
 - Shallow depths
 - General, 198, 257, 369, 382, 388, 389
 - Large scale, 212, 238, 246, 427
 - Nuclear, 274, 393
- Test procedure, 199, 202, 274, 370, 373, 382, 386
- Time, 279
- Typical results
 - Rock fills, 214, 241
 - Sand fills, 370, 383, 408, 415

L

- Liquefaction
- Critical void ratio, 329
- General, 183, 319, 455
- Sensitivity to
 - Effective stress, 329
 - Relative density, 329
 - Specimen size, 331
 - Specimen uniformity, 183
- Specimen preparation, 184, 324
- Test procedure, 324
- Testing equipment, 321

M

- Maximum density (laboratory)
 - Controlling factors, 99, 101, 106–109, 385, 422, 499
- Correlations with
 - Bagnold's grading parameters, 360
 - C_e , 94
 - C_u , 94, 108, 135, 255, 388, 414, 449
 - D_{10} , 447
 - D_{50} , 106
 - D_{60} , 448
 - Impact compaction, 45, 145, 154, 220, 307, 352, 358
 - Particle distribution, etc, 253, 360, 388, 431
 - Wet versus dry, 253, 360, 388, 431, 447
- Errors
 - Random, 78, 490
 - Systematic, 77, 490
- Reliability (between organizations), 31, 32, 137, 152, 231, 493
- Reproducibility (within organizations), 34, 68, 146, 412
- Selection of test method, 349, 385, 500

- Sensitivity to
 Particle distribution, 99, 108, 145, 220, 253, 256, 350, 360, 388, 422, 431
 Particle shape, 11, 99, 108, 114, 253, 257, 308
 Particle size, 11, 36, 99, 108, 145, 153, 220, 223–231
 Percent fines, 255, 349, 350, 355
 Sample heterogeneity (in-situ layering), 218, 256, 387, 407, 422
 Saturation, 293, 350, 355, 411, 422, 447
 Specimen similarity, 10
 Test procedures, 19, 36, 124, 134, 139, 146, 172, 216–220, 307, 323, 369, 385, 408, 497
 Testers, 91
 Testing errors, 8, 78, 489
 Type of fines, 350, 359
 Testing procedures
 General, 76, 99, 100, 115, 122, 134, 172, 293, 323, 354
 Large scale, 215, 236, 239, 430
 Testing requirements, 84, 349, 500
 Minimum density (laboratory)
 Controlling factors, 101, 106–109
 Correlations with
 C_e , 94
 C_u , 94, 108, 114, 135, 452
 D_{10} , 450
 D_{50} , 106
 D_{60} , 451
 Errors (type)
 Random, 78, 490
 Systemic, 77, 490
 Reliability (between organizations), 28, 31, 91, 137, 493
 Reproducibility (within organizations), 34, 68
 Sensitivity to
 Particle distribution, 99, 108, 117, 256, 350
 Particle shape, 11, 99, 106, 108, 114, 117, 257, 308
 Particle size, 11, 36, 99, 108, 117
 Percent fines, 255, 350
 Specimen similarity, 10
 Test procedure, 19, 34, 36, 323
 Testers, 91
 Testing errors, 8, 78
 Testing procedures, 76, 99, 100, 115, 122, 239, 296, 297, 307, 323, 409
 Testing requirements, 84, 499
- N**
- Nuclear density testing, 274–277, 393
- P**
- Particle breakdown, 25, 26, 27, 149
 Particle-size analysis
 Accuracy, 24–26, 64
 Sensitivity to
 Specimen selection, 28
 Specimen size, 27, 209, 428
 Weight retained, 28
 Specimen weight requirements, 209, 428
 Typical results
 Rock fills, 211, 244, 431
 Sand fills, 365, 384, 406, 446
 Penetration resistance (laboratory), 315
 Percent compaction (see Relative compaction)
 Plane strain, 334, 340, 342
 Plate load test, 277, 395
 Porosity, 144–120
 Preparation of test specimen, 122, 131, 184, 197, 286, 309, 324, 337

R

- Relative compaction
 Applications, 48, 232, 417, 420, 497
 Correlations with
 Control curves, 443
 C_u , 420
 D_{60} , 420
 Maximum density, 421
 Relative density, 48, 293, 419
 Definition, 47, 231, 252, 292, 410, 496
 Limitations (shortcomings), 420, 422
 Merits (advantages), 232, 417, 426, 503
 Sensitivity, to
 Control curves, 422
 Sample heterogeneity, 422
Relative density
 Accuracy, 489
 Allowable fines, 6, 349, 350, 355, 359
 Applications, 18, 251, 252, 279, 382, 455, 464, 480, 482, 496, 503
 Correlations with
 Dynamic cone, 269, 470
 Plate load test, 277, 395
 Relative compaction, 48
 Standard penetration, 262, 375, 376, 378, 392, 459, 470
 Static cone, 398, 459
 Definitions (equations), 6, 8, 19, 75, 85, 231, 252, 292, 382, 410, 496
 Errors (type/magnitude), 8, 78, 490, 503
 Limitations (shortcomings), 9, 19, 43, 83, 86, 96, 232, 252, 279, 305, 382, 413, 417, 420, 426, 463, 480, 482, 483, 487, 496, 498, 503
 Limits of acceptance, 71

Precision, 489

Reliability (between organizations), 10, 13, 15, 20, 31, 32, 39, 40, 93, 377, 378, 479, 493, 503

Reproducibility (within organizations), 34, 63, 68

Sensitivity to

Control densities, 197, 422

Controlling factors (see Maximum, Minimum, and In-place density)

Error analysis, 492

Groundwater (see also Standard penetration), 372

In-place density, 71

In-situ layering, 218, 256, 387, 407, 422

Liquefaction, 329

Particle distribution (see also Maximum and Minimum density), 99, 253, 256, 382, 420

Particle shape (see also Maximum and Minimum density), 11, 99, 114, 253, 257, 382

Particle size (see also Maximum and Minimum density), 11, 36, 99

Sample heterogeneity, 218, 256, 387, 407, 422

Specimen similarity, 10

Test procedures, 19, 34, 36, 139

Testing errors, 8, 78, 492

Time, 279

Relative dry density (see Density ratio)

Roundness (angularity) criteria, 191, 102, 116, 305, 499

S

Sample similarity

Dams, 211

- General, 10
 - Sand fills
 - General, 251, 366, 370, 383, 408, 415
 - Hydraulic, 403, 419, 445
 - Sensitivity to
 - Groundwater table, 372
 - Unconfined boundaries, 387
 - Water content, 422
 - Soil strain gage, 188
 - Specimen (test) uniformity
 - Effect of liquefaction, 190
 - General, 122, 129, 131, 189, 197
 - Tests for, 129, 185
 - Sphericity (see Roundness)
 - Standard penetration test
 - Controlling factors, 259, 264, 265, 397, 497
 - Correlation with
 - Dynamic cone, 268, 269, 470
 - Relative density, 262, 397
 - Static cone, 270, 398
 - Sensitivity to
 - Drilling procedure, 260
 - Groundwater table, 261
 - Horizontal stresses, 264, 265, 391, 398
 - Particle size, 261
 - Time, 279
 - Vertical stresses, 260, 263
 - Static cone penetration, 270, 398
 - Statistics, 22, 63, 490
 - Strength (sands)
 - Controlling factors, 257, 281, 287, 498
 - Density component, 290
 - Energy correction, 345
 - Liquefaction (see Liquefaction)
 - Penetration resistance (laboratory), 315
 - Plain strain, 285, 299, 344
 - Prediction, 290, 300
 - Relationship to
 - Crushing, 290
 - Density, 284, 465, 471
 - Density factors, 288
 - Minimum density, 286
 - Minor principal stress, 339
 - Particle distribution, 305
 - Particle shape, 257, 305, 309, 466
 - Particle size, 305, 466
 - Relative density, 257, 281, 344, 466, 471, 498
 - Triaxial, 282, 286, 299, 344
 - Stress-strain characteristics (see Compressibility)
- T**
- Test specimen preparation (see Preparation of test specimen)
 - Testing frequency, 495
- V**
- Vibratory compaction (laboratory)
 - Controlling factors, 385, 430, 500
 - Recommendations, 501
 - Relationship to
 - Acceleration, 126, 137, 147, 157, 162, 177, 219, 500
 - Amplitude, 137, 147, 177
 - Baggett's grading parameters, 360
 - Container size, 128, 147, 162
 - Frequency, 126, 151, 157, 162, 500
 - Height (mold), 162, 178
 - Impact compaction, 45, 145, 154, 220, 307, 352, 358
 - Mold type, 159
 - Particle shape, 125
 - Percent fines, 293, 350, 355, 359
 - Saturation, 147, 293, 355, 447
 - Surcharge, 138, 147, 175
 - Specimen heterogeneity, 122, 129, 218

- Test procedure (large scale),
217
- Test procedure (small scale),
385, 500
- Type of fines, 350, 359
- Vibration time, 124, 175, 219
- Test procedures (other than
ASTM)
 - Attached vibrators, 173
 - Hammering, 307, 369
 - Large scale, 215, 236, 430
 - Providence, 134
- Table, 122, 134, 142, 157, 173,
215, 354, 369, 500
- Vibrating hammer, 142, 215,
293
- Theoretical model, 163–167
- Volumetric behavior
 - Energy, correction, 345
 - General, 328, 340
 - Triaxial versus plane strain, 340
- W**
- Weighing accuracy, 23