INDEX

A

acceleration response spectrum 246, 720, 818, 822, 824, 826, 827, 837
acceleration time history 245, 609, 610, 611, 693, 694, 696, 697, 698, 720, 722, 723, 822
access bridge 150, 810, 814, 815, 817, 821, 827, 835, 840, 841, 842, 849, 854, 858, 859
accidental action 4, 9, 10, 11, 42, 84, 365, 402, 403, 586, 612, 649, 654, 655, 682, 849, 851, 904, 927, 935, 942, 948, 978
accidental situation 13, 14, 79, 314, 373, 374, 375, 376, 378, 392, 398, 403, 404, 407, 411, 500, 586, 587, 592, 593, 594, 595, 598, 612, 624, 635, 636, 641, 642, 648, 649, 655, 656, 678, 680, 681, 682, 683, 685, 686, 691, 698, 709, 711, 712, 713, 714, 715, 723, 742, 759, 801, 808, 811, 812, 813, 814, 815, 818, 826, 827, 829, 842, 843, 852, 853, 871, 875, 884, 886, 887, 889, 904, 905, 906, 914, 928, 935, 936, 943, 945, 949, 964, 965, 966, 967, 972, 978
accidental waves 10, 14, 79, 364, 365, 585, 586, 587, 613, 654, 655, 659, 660, 800, 849, 851, 853
active earth pressure 273, 277, 399, 434, 503, 507, 508, 510, 515, 516, 523, 526, 527, 545, 546, 700, 717, 724, 725, 731, 732, 738, 739, 742, 746, 763, 764, 773, 776, 777, 785, 791, 792, 862, 909
adaptive management method 49, 50
additional rate 520, 776
adjustment tower 854, 859
administration building 952, 953, 955
admixture 43, 339, 340
AE 220, 339
aggregate 338, 339, 342, 343, 344, 350, 351, 355, 416
air-cooled blast-furnace slag 350
air cushion craft 676, 868, 869
air cushion craft landing facilities 676, 868
algorithm 28
allowable axial bearing capacity of pile 451
allowable deformation 8, 424, 504, 537, 593, 679, 681, 694, 697, 698, 712, 713, 774
allowable displacement 518, 906
allowable limit for horizontal displacement 757
allowable pulling resistance 455
allowable safety factor method 19, 24
allowable settlement 454, 492
allowable stress 19, 23, 24
allowable stress design method 19
Allsop 151, 169
all terrain crane 891, 892, 894, 902
aluminum alloy anodes 334
amenity 50, 109, 114, 583, 586, 646, 664, 666, 669, 881, 976
amenity-oriented breakwater 586, 646
amenity-oriented function 50
amenity-oriented revetment 114, 664, 666, 669, 881
American Petroleum Institute 947
anchorage work 16, 25, 491, 684, 685, 712, 715, 717, 723, 737, 738, 739, 743
anchor chain type 802, 803
anchor chain type mooring buoy 802, 803
anchor holding power 860
anchoring 17, 122, 160, 578, 579, 580, 800, 802, 806, 807, 930
anchoring chain of floating body 17, 802, 806
ancillary facilities 10, 16, 17, 18, 586, 669, 870, 950
angle of internal friction 272, 275
angle of repose 484, 700, 701
angle of shear resistance 211, 213, 223, 225, 228, 230, 257, 345, 350, 351, 394, 430, 484, 486, 487, 491, 522, 523, 524, 525, 536, 545, 546, 547, 600, 602, 604, 605, 613, 623, 624, 627, 631, 634, 649, 706, 707, 777, 778, 779, 785, 786, 788, 791, 819
angular spreading method 92
annual average of daily traffic volume 920, 921
anode 333, 334, 335, 336
API 947
apparent cohesion 223, 224, 430, 431, 432, 484, 486, 487, 600, 602, 703, 704
apparent seismic coefficient 274, 275, 277, 278, 546, 763
apron 312, 314, 315, 338, 339, 343, 865, 869, 882, 884, 888, 889, 890, 891, 892, 893, 897, 898, 899, 900, 911, 951, 952, 953, 956, 962
apron pavement 338, 339, 890, 891, 897, 898, 899
apron width 865, 869, 889, 890
arc welding 326
armoring work 603, 605, 624
armor stones 128, 129, 411, 412, 413, 414, 415, 416, 417, 418, 420, 424, 614, 690
array observation 204, 256
asperity 176, 237, 241, 242, 262, 263, 264, 265, 267, 269
asphalt concrete pavement 901
asphalt mats 342, 343, 344, 410, 617
asphalt pavement 344, 347, 900, 924
Asphalt Paving Guidelines 343, 925
asphalt stabilization 342
assessed value of failure probability 28
assigned traffic volume 920
astronomical tide 68, 69, 70, 172
attenuation distance 81, 86
autocorrelation 24, 33
average degree of consolidation 220, 221, 476, 536
average strength of skin friction 444
axial spring constant of pile 469

B

backfilling materials 122, 280, 345
backfilling stones 539, 540, 694, 696
back scattering method 215
backshore 181, 973, 974, 975
back yard area 951, 952, 953, 955, 956
bank 6, 75, 212, 224, 225, 226, 353, 356, 482, 485, 490, 492, 493, 503, 540, 547, 561, 568, 569, 570, 571, 628, 650, 669, 797
Bascom 198
base course material 346, 350, 351
basic ship maneuvering width 554
basin 6, 7, 122, 175, 178, 179, 194, 196, 200, 250, 251, 363, 552, 554, 577, 578, 579, 580, 581, 582, 588, 590, 651, 662, 674, 802, 807, 863, 867, 868, 887, 936, 950
beach deformation 180, 183, 193, 194, 199, 976
beach erosion 194, 583, 652
beach nourishment 974
beach slope 195
bearing capacity 15, 16, 17, 25, 207, 225, 245, 346, 358, 390, 426, 427, 428, 429, 430, 431, 432, 434, 435, 436, 437, 438, 441, 443, 444, 446, 448, 449, 450, 451, 453, 454, 455, 458, 466, 467, 469, 470, 471, 472, 479, 480, 481, 482, 484, 488, 489, 504, 506, 510, 511, 529, 536, 537, 544, 587, 592, 593, 594, 600, 607, 612, 620, 626, 630, 633, 643, 648, 649, 691, 693, 699, 701, 702, 703, 704, 738, 750, 757, 767, 768, 785, 789, 793, 799, 819, 829, 830, 831, 832, 834, 835, 837, 839, 840, 844, 846, 893, 894, 895, 896, 898, 900, 927
bearing capacity coefficient 443, 444, 511, 894, 895, 896
bearing pile 207, 208, 440, 441, 451, 741, 832, 833, 834, 839,

909
bearing stress 909
bedload 181, 182, 183, 196
bedrock 5, 7, 230, 235, 236, 238, 248, 250, 251, 253, 258, 262, 263, 264, 265, 358, 441, 608, 609, 610, 614, 615, 693, 694, 696, 822, 826, 944
bending compressive stress 373, 375, 760, 769
bending failure 347, 470
benthos 975
berm 129, 134, 135, 137, 182, 412, 418, 597, 598, 617
berth 298, 304, 308, 678, 680, 683, 686, 687, 688, 689, 690, 844, 871, 872, 880, 887, 942, 944, 951, 952, 953, 955, 956, 962
berth configuration factor 289, 297, 298, 304
berthing energy 289, 297, 298, 304, 821, 844, 846, 875, 876, 877, 878, 879
berthing velocity 297, 298, 299, 300, 301, 302, 880
bilge keels 689
Bio 495
Bishop's method 489
bituminous material 19, 343, 358
blast furnace slag 338, 350, 351, 352, 521, 550
block coefficient 302, 303, 304, 305, 556, 564
block load 140
block type improvement 498
boarding facility 965, 966
boat lift yard 865, 866, 867
bollard 308, 309, 723, 733, 734, 742, 821, 871, 872
bore type tsunami 174
Borgman 147, 169
bottom friction 73, 87, 174, 176, 179, 862
bottom reaction 387, 388, 389, 390, 396, 407, 409, 699, 846
bottom seated 517
bottom slab 280, 373, 374, 377, 378, 379, 382, 383, 384, 385, 387, 388, 390, 391, 392, 394, 395, 396, 397, 399, 406, 409, 410, 423, 469, 640, 707, 708, 859
boundary element method 305
Boussinesq's solution 475
bow and stern side docking type quaywall 689
bow collision 937, 938
bow line 872
box shape platform 761
Brampton 195
breaker 77, 99, 103, 117, 136, 139, 143, 144, 165, 167, 182, 183, 186, 195, 202, 203, 412, 413, 652, 653, 658
breaker index curve 103
breaker index diagram 143
breaker line 165, 652, 653
breaking wave 86, 87, 88, 90, 103, 104, 117, 119, 128, 129, 130, 132, 133, 135, 136, 137, 138, 139, 142, 143, 144, 147, 148, 166, 167, 181, 195, 412, 417, 420, 589, 597, 622, 628, 632
breaking wave height 103, 104, 119, 143, 144, 195
breaking wave pressure 136, 137, 139, 147, 589, 632
breakwater alignment 139, 142, 143, 415, 416, 614, 615, 644
breakwater covered with wave-dissipating blocks 36, 415, 416, 590, 594, 632
breakwater head 81, 190, 191, 412, 416, 417, 418, 420, 614, 616
breakwater opening width ratio 91
breakwater shape influence factor 421
breakwaters with wide footing 640, 645
breakwater trunk 412, 416, 417, 418, 419, 420, 613, 616
breasting dolphin 844, 845, 846
breast line 309
Brebner 418, 424
Bretschneider-Mitsuyasu spectrum 80
Broms 481, 724
buckling 347, 407, 473, 474, 482, 786, 828
bulk cargo 312, 314, 702, 944
buried anchor 805
buttress wall 392, 395, 396, 397

C

caisson 20, 77, 78, 116, 122, 132, 133, 134, 136, 137, 139, 140, 141, 142, 167, 215, 244, 259, 280, 351, 354, 358, 367, 371, 372, 373, 374, 375, 376, 377, 378, 379, 381, 382, 383, 384, 385, 386, 388, 389, 390, 391, 392, 401, 403, 404, 405, 406, 407, 408, 409, 410, 416, 420, 423, 434, 485, 491, 498, 519, 539, 540, 590, 591, 592, 593, 594, 597, 598, 599, 600, 606, 609, 610, 611, 612, 614, 622, 628, 629, 630, 632, 633, 643, 644, 649, 691, 704, 706, 707, 795, 797, 798, 799, 844, 846, 847, 907
caisson breakwater 140, 141, 167, 416, 485, 590, 591, 594, 628, 632, 633, 644
caisson type composite breakwater 592, 593
caisson type dolphin 20, 846
caisson type quaywall 244, 691, 795
calculation method for refraction analysis 93
calculation method of wave height distribution around an island 94
cantilevered sheet pile quay 485, 685, 714, 745, 746
canvas sheet 618
capacitance type wave gauge 203
carbonation 368, 369
cargo handling area 4, 686, 933, 934
cargo handling efficiency 120, 876
cargo handling equipment 4, 50, 61, 312, 314, 317, 322, 323, 367, 678, 679, 681, 683, 702, 719, 813, 814, 818, 821, 835, 843, 845, 846, 848, 890, 891, 892, 897, 904, 905, 906, 907, 908, 909, 936, 937, 942, 943, 944, 945, 948, 950, 957
cargo handling equipment load 312, 314, 317, 892
cargo handling facilities 6, 43, 314, 363, 376, 936, 944
cargo ship 124, 290, 294, 298, 299, 300, 301, 552, 687, 887
cargo sorting area 941, 948, 949, 950
casing pipe 533
cast-in-place concrete pile 340, 341
cast steel 328
catenary line 860, 861
catenary mooring 156
catenary theory 861
cathodic protection method 13, 333, 335, 336, 367
CD 86, 144, 145, 196, 223, 224, 225, 228
CDL 68
ceiling slab 141, 142, 404, 405
cell bottom 775, 776, 778, 780, 781, 785, 792, 793
cellular block 20, 339, 358, 398, 399, 400, 401, 402, 597, 614, 615, 699, 707, 708, 799
cellular concrete block 691, 708
cellular concrete block type quaywall 691
cement-based hardener 547
cement-based stabilizer 523
center of buoyancy 377, 858
center of gravity 302, 303, 377, 486, 538, 558, 565, 821, 855, 858, 859, 944
Chakrabarti 146, 168
Chang's method 458, 464, 820
characteristic value 4, 5, 7, 9, 11, 20, 21, 22, 129, 150, 180, 210, 211, 212, 213, 215, 277, 280, 298, 304, 305, 306, 307, 312, 314, 317, 323, 328, 329, 330, 335, 338, 339, 340, 345, 347, 348, 349, 358, 368, 369, 370, 378, 382, 383, 388, 400, 401, 411, 418, 421, 427, 429, 434, 435, 436, 437, 439, 440, 441, 442, 443, 444, 450, 451, 452, 453, 454, 455, 456, 457, 458, 486, 487, 488, 500, 502, 503, 504, 505, 508, 510, 511, 512, 519, 520, 525, 526,

527, 537, 538, 599, 600, 601, 602, 604, 605, 606, 609, 611, 612, 613, 621, 623, 624, 627, 631, 634, 648, 649, 694, 697, 701, 702, 703, 704, 706, 707, 708, 722, 725, 728, 731, 736, 738, 741, 742, 746, 747, 750, 753, 757, 763, 764, 773, 774, 785, 786, 788, 789, 791, 794, 795, 822, 823, 827, 828, 830, 831, 832, 833, 834, 836, 838, 840, 841, 842, 846, 848, 860, 861, 874, 879, 890, 891, 893, 909, 910
chart datum level 68
chemical grouting method 357, 544
chloride ion 338, 369, 370, 423
Christensen 416, 424
circular slip failure 24, 34, 312, 429, 430, 431, 484, 486, 487, 488, 490, 491, 493, 516, 523, 525, 528, 533, 537, 538, 544, 551, 592, 600, 601, 603, 605, 620, 623, 624, 626, 630, 633, 665, 703, 704, 705, 706, 714, 734, 736, 766, 767, 769, 785, 819, 836, 969
Civil Engineering Handbook 67, 356, 587, 941, 956, 960
clearance limits 686, 915, 924
cliff 137, 173, 180, 198
closed ended pile 474
closing dike 424
coal ash 19, 350, 352, 545
coal storage yard 7, 958, 959
coarse sand 521
coating material 19, 333, 335
coating method 13, 333, 336, 367
coefficient of active earth pressure 434, 526, 527, 724, 792
coefficient of consolidation 211, 213, 220, 477, 495, 496, 541
coefficient of curvature 521
coefficient of earth pressure 226, 272, 273, 275, 385, 394, 400, 456, 511, 527, 530, 724, 773, 778
coefficient of earth pressure at rest 272, 273, 385, 456, 530, 724
coefficient of horizontal subgrade reaction 436, 437, 820
coefficient of lateral subgrade reaction 458, 464, 468, 820, 838
coefficient of passive earth pressure 740
coefficient of secondary compression 478
coefficient of stress distribution 493, 540
coefficient of variation 22, 28, 34, 36, 211, 212, 213, 232, 502, 603, 604, 605, 613, 621, 623, 624, 627, 631, 634, 649, 706, 707, 736, 830, 832, 833, 834, 874
coefficient of vertical subgrade reaction 437
coefficient of volume compressibility 213, 219, 476, 540
coefficient of wave transmission 116, 117, 632, 638
cohesive material 547
cohesive resistance 435
Collins 168
collision energy 937
collision force 938
color rendering performance 882, 883
compaction method 542, 548, 551
component wave method 88
composite breakwater 19, 116, 132, 133, 134, 137, 166, 259, 358, 412, 413, 418, 420, 421, 424, 592, 593, 595, 596, 598, 603, 605, 612, 615, 618, 619, 622, 624, 625, 626, 628, 630, 632, 633, 644, 649, 650, 846
composite ground 481, 533, 535, 536, 540
composite seismic angle 274, 275, 277, 278
composite slab 407, 409
composite structure 407
compressibility 209, 213, 219, 223, 445, 475, 476, 480, 522, 540
compression curve 218
compression frequency-dependent characteristics 880
compression index 212, 219, 222, 356, 476, 478, 540
compressive strength 209, 225, 227, 232, 258, 274, 339, 345, 352, 366, 432, 448, 452, 464, 500, 502, 511, 519, 520, 524, 525, 534, 535, 544, 545, 836
compressive strength of concrete 366, 836
concave corner 96, 97, 589, 614
concentrated corrosion 331, 332, 333, 334, 336
concentrated load 315, 317, 384, 475, 908, 909
concrete aggregate 350
concrete block type upright breakwater 625
concrete lid 339, 387, 388, 390, 410, 597, 614
concrete pavement 347, 892, 893, 894, 895, 897, 898, 901
concrete pile 340, 341, 473
concrete slab 409, 892, 893, 894, 896, 897, 898, 899
concrete slab thickness 892, 893, 894, 896, 897
concrete wall anchorage 16, 20, 684, 685, 722, 737, 738
confining pressure 225, 259, 260, 269, 432, 444, 511, 519, 523, 533, 709
consistency 216, 261, 338, 339
consolidated drained condition 223
consolidated undrained condition 223
consolidation characteristics 207, 218
consolidation rate 493, 540, 541
consolidation settlement 222, 288, 441, 452, 475, 476, 477, 491, 494, 503, 516, 517, 969
consolidation test 218, 219, 221, 222, 226, 475, 477, 478, 496
consolidation theory 221, 222, 476, 477
consolidation yield stress 210, 213, 219, 221, 222, 227, 477, 520
constant coefficient method 161
constructability 9, 10, 40, 49, 325, 342, 490, 588, 637, 890, 930
construction joints 340, 614, 898
construction method 40, 41, 49, 55, 441, 443, 447, 529, 551, 619, 690, 718, 723, 930, 931, 932
construction works 41, 180, 224, 345, 350, 384, 431, 446, 447, 449, 518, 588, 633, 796, 820
container crane 322, 818, 835, 944, 945, 946, 947, 951
container freight station 952, 955
container ship 124, 294, 295, 296, 300, 309, 951, 952, 953
container terminal 950, 951, 952, 953, 956
container terminal area 951, 952, 956
continuous slab 395, 396, 740
continuous underground wall 340, 434
controlled industrial wastes 968
converged embedded length 724, 728
coping 197, 723, 733, 734, 743, 877
coral reef 973, 976, 977
Coriolis force 176
corrected acceleration 503, 504, 537
corrosion control 43, 331, 333, 410, 473
corrosion rate 331, 332, 333, 334
Coulomb's equation 470
coupled oscillations 821, 835
coupled-pile anchorage 19, 684, 685, 721, 723, 738, 740, 741, 798
coupled piles 18, 457, 466, 467, 468, 481, 482, 740, 741, 765, 766, 838
covering 117, 136, 138, 139, 269, 298, 325, 333, 335, 336, 411, 418, 521, 522, 560, 706, 909, 928, 930
covering work 706
crack caused by bending 402, 403
cracking 7, 369, 448, 615, 898, 931
crack width 366, 367, 369, 371, 373, 374, 375, 813
crawler crane 317
creep characteristics 452, 880
crest height 10, 139, 165, 866, 867, 974, 975
crest line 107, 195, 204
critical wave height for cargo handling works 122, 123
cross-shore sediment transport 183, 189, 196
crown concrete 614, 615, 625
cumulative distribution function 28, 29
curbing 884, 885

current force 197, 561, 562, 566, 857, 860
current pressure coefficient 307
current pressure force 297, 304, 306, 307
curtain wall 117, 635, 636, 637, 638, 645
curtain wall breakwater 635, 636, 637, 645
curved-slit caisson 142, 628
cusp 124, 125, 128
cuspline 124, 125, 128
cylindrical failure surface 484
cylindrical member 145
cylindrical structure 129

D

damage rate 411, 415, 416, 417, 418, 419, 420, 422
damping factor 230, 231, 232, 248, 255, 256, 257, 260, 520, 822, 945
Darcy's law 217, 667, 668
Davenport 306, 310
dead weight tonnage 290, 298, 300
Dean 169, 198
deep foundation 434, 435, 436, 437, 450, 452
deep mixing method 19, 352, 498, 499, 500, 503, 506, 548, 549, 694
deepwater wave energy flux 188
deepwater wavelength 136, 184, 187, 413
deepwater waves 88, 89, 126, 127, 132, 202
deepwater wave steepness 109, 119, 135, 136
deflection curve equation 724
deformation modulus 210, 218, 499, 520
deformation moment 715, 757, 768, 775, 791, 792
deformation of ship hull 304, 880
degree of damage 6, 7, 8, 9, 14, 30, 38, 403, 411, 415, 417, 418, 431, 586, 655, 656, 660, 682, 849, 851, 904, 927, 935, 942, 948
degree of saturation 214, 229
density currents 178, 179
density currents at river mouth 178, 179
deposit layer 7
depth of navigation channel 122, 556, 558, 559, 931
design bearing capacity coefficient 894
design CBR 900, 902
design daily traffic volume 920, 921, 923
design depth 558
design high water level 666
design hourly traffic volume 915, 921, 922, 923, 924
design parameter 4, 6, 13, 14, 21, 22, 36, 225, 228, 590, 601, 603
design point 29, 31
design section force 905
design ship 55, 289, 290, 293, 294, 296, 297, 298, 302, 303, 306, 308, 553, 554, 555, 556, 558, 560, 563, 570, 573, 574, 575, 576, 577, 578, 579, 580, 581, 661, 682, 686, 687, 689, 837, 842, 844, 845, 851, 852, 854, 865, 866, 867, 871, 872, 877, 937, 938, 942, 944, 961
design significant wave height 132, 419, 597
design situation 11, 12, 13, 271, 373, 374, 375, 376, 387, 392, 403, 404, 406, 407, 411, 586, 587, 592, 594, 635, 641, 655, 681, 682, 683, 685, 686, 691, 711, 712, 713, 714, 758, 759, 767, 801, 808, 827, 829, 850, 852, 853, 864, 875, 884, 886, 889, 904, 905, 928, 936, 943, 949, 964, 966, 972, 978
design standard traffic volume 914, 915, 922, 923
design tide level 139, 156, 388
design traffic volume 915, 916, 921, 925
design value 5, 21, 22, 129, 210, 213, 215, 314, 331, 366, 368, 369, 411, 412, 418, 421, 426, 427, 428, 429, 430, 434, 436, 437, 439, 440, 442, 450, 452, 453, 454, 455, 456, 457, 466, 472, 484, 486, 487, 488, 489, 500, 505, 508, 510, 511, 512, 516, 526, 527, 537, 538, 598, 599, 600, 601, 602, 606, 612, 649, 699, 701, 702, 703, 704, 708, 725, 731, 732, 733, 734, 736, 737, 738, 739, 740, 741, 743, 747, 748, 763, 764, 775, 777, 778, 779, 785, 786, 791, 792, 793, 804, 823, 827, 828, 830, 831, 832, 833, 835, 836, 857, 860, 861, 862, 873, 874, 879, 892, 893, 901, 938, 944
design vehicle 914, 924, 933
design water depth 616, 690
design water level 138, 389, 620
design wave 119, 136, 137, 141, 145, 151, 154, 155, 156, 166, 169, 386, 556, 590, 593, 605, 607, 644, 666
design working life 4, 5, 6, 7, 9, 10, 11, 13, 14, 19, 23, 39, 42, 43, 44, 45, 50, 55, 79, 123, 152, 155, 311, 325, 344, 365, 368, 369, 373, 374, 375, 403, 411, 593, 605, 607, 624, 836, 893, 895, 896, 900, 901, 925
detached breakwater 92, 93, 95, 96, 98, 142, 180, 194, 416, 424, 589, 674, 973, 974, 975
detached pier 151, 676, 847, 848, 849
detailed design 643
diffracted wave 91, 92, 133, 142, 589
diffraction 83, 88, 89, 90, 91, 92, 93, 94, 95, 96, 98, 142, 146, 148, 159, 163, 164, 173, 305
diffraction coefficient 91, 92, 93, 95
diffraction diagram 91, 92, 94, 95
diffraction force 305
diffraction theory 146, 148, 159, 305
dike 20, 114, 116, 165, 167, 168, 197, 424, 498, 669, 671, 672, 797, 940, 973
dilatancy 223, 544
directional spreading 81, 82, 84, 89, 92, 96, 416
directional spreading function 81, 84
directional spreading parameter 81, 82
directional wave spectrum 81, 84, 86, 88, 117
directivity 237, 242, 264, 267
discontinuous part 139
discrete method 600, 700
displacement of the stabilized body 516, 517
displacement stroke 679
displacement tonnage 293
distribution function 28, 29, 152, 153, 154, 644
divergent wave 124, 125, 127, 128
DOL criterion 154
dolphin 17, 18, 20, 122, 148, 156, 298, 581, 676, 844, 845, 846, 856, 875, 878
dolphin mooring 156
domestic gross tonnage 290, 293, 687, 689
dominating actions 4, 6, 7, 10, 11, 19, 374, 404, 411, 656, 682, 683, 684, 685, 691, 851, 853, 871, 886
Donnelly 418, 424
double-buoy mooring 579
double exponential distribution 60, 153
downdrift 651, 652, 657
DP model 86, 87
drag coefficient 145, 146, 147, 158, 159, 196, 197, 305, 306, 857
drag force 144, 145, 147, 148, 157, 158, 161, 196, 422, 857
drag force by currents 157, 158, 161
drainage 114, 120, 200, 218, 220, 223, 224, 227, 228, 232, 493, 494, 495, 550, 659, 886, 910, 911, 930, 932, 948
drainage distance 220, 494, 495
drainage facilities 114, 200, 886, 932, 948
dredged soil 19, 350, 351, 352, 518, 544, 551
dry container 954
drying shrinkage 435
dry unit weight 214
dry work method 932
DT 298, 837, 922
dual anchoring 579

dual lumped mass system 945
dual main truss 65
DWT 124, 290, 291, 293, 294, 295, 296, 298, 300, 301, 560, 687, 688, 689, 804
dynamic analysis 15, 16, 17, 18, 244, 247, 431, 499, 520, 595, 608, 609, 612, 692, 701, 716, 717, 723, 742, 745, 749, 752, 756, 762, 770, 772, 790, 796, 803, 818, 820, 835, 847, 849, 860, 945
dynamic modulus of deformation 230
dynamic penetration resistance 471
dynamic response 138, 146, 147, 168, 643
dynamic water pressure 271, 280, 394, 504, 505, 506, 509, 526, 527, 597, 612, 665, 702, 708, 723, 725, 731, 794, 845
dynamic water pressure during an earthquake 280, 845
DYNEQ 256, 257, 268

E

earth pressure calculation formula 524
earth pressure of filling 401, 792
earth pressure reduction effect 523, 701, 728
earthquake fault model 176
earthquake ground motion 4, 5, 7, 10, 14, 15, 16, 17, 18, 25, 235, 238, 240, 243, 245, 246, 255, 264, 265, 266, 267, 269, 271, 364, 365, 372, 373, 374, 375, 378, 379, 380, 382, 384, 391, 392, 407, 431, 440, 455, 484, 489, 499, 500, 504, 508, 510, 512, 513, 515, 516, 537, 585, 586, 587, 592, 593, 594, 595, 598, 607, 608, 609, 610, 611, 612, 624, 635, 654, 655, 656, 657, 659, 660, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 691, 692, 693, 694, 697, 698, 701, 702, 703, 704, 707, 708, 709, 711, 712, 713, 714, 715, 716, 719, 720, 722, 723, 725, 731, 732, 734, 736, 737, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 752, 753, 755, 756, 757, 758, 759, 760, 762, 763, 767, 768, 769, 770, 772, 774, 775, 779, 787, 789, 790, 794, 795, 796, 797, 798, 810, 811, 812, 813, 814, 815, 817, 818, 823, 824, 826, 827, 829, 833, 834, 837, 838, 840, 841, 842, 843, 846, 848, 851, 852, 865, 870, 903, 904, 905, 906, 907, 913, 914, 915, 927, 928, 935, 941, 942, 943, 944, 945, 948, 949, 964, 965, 966, 967, 969, 978, 979
earthquake motion 7, 176, 240, 245, 266, 267, 268, 545, 797, 798
earthquake-resistance container crane 944
earthquake-resistance crane 944, 945
earthquake-resistance mechanism 946
earth-retaining section 817, 818, 819, 824, 825, 826, 835, 837, 840, 845, 847, 848
earth-retaining structure 819
ebb tide 179, 181, 188
ebb tide shoreline 181
eccentric and inclined load 488, 597, 598, 600, 613, 620
eccentric distance 438
eccentricity factor 289, 297, 298, 937
economical design 413
eddy viscosity 70, 87
edge wave 174
effective confining pressure 259, 523, 709
effective diameter 495, 496, 497
effective diameter of drain 495, 496, 497
effective fetch 85
effective fetch length 85
effective grain size 217
effective harbor entrance width 588
effective length 456, 457, 460, 663, 748
effective overburden pressure 220, 226, 227, 229, 230, 258, 259, 444, 456, 476, 477, 511, 525, 530, 532
effective stress 220, 223, 225, 226, 227, 244, 247, 256, 257, 275, 504, 537, 550, 600, 602, 698, 700, 703, 704, 719, 797, 798, 847, 849
effective stress analysis 244, 256, 257, 275, 504, 537, 698, 700, 719, 798, 847, 849
effective surcharge pressure 432, 532, 696
effective weight 430, 486, 487, 488, 512, 514, 538, 543, 602, 612
elastic beam analysis method 718, 723, 726
elastic constant 218, 232
elastic deformation 160, 219, 472, 679, 945, 946
elastic deformation of ground 472
elastic deformation of pile 472
elastic solution 475
elastic wave velocity 232, 266
elasto-plastic model 478
electrical cone test 228
e-log p curve method 219
embankment 212, 224, 225, 226, 353, 356, 482, 485, 490, 492, 493, 503, 540, 547, 797
embedded length ratio 447, 448, 770, 776, 777
embedment length 434, 711, 712, 723, 725, 726, 728, 729, 734, 758, 759, 782, 835, 909
embedment length of sheet pile 725, 734
emergency equipment 661
emergency supply transport 676, 678, 679, 680, 681, 682, 683, 684, 685, 811, 812
emergency telephone 930
empirical Green function method 264, 265
empty container 917
encounter probability 55
end bearing area 446
end bearing capacity 446, 453, 455
end loading test 442
end protection work 899
end resistance of a pile 443, 445
energy balance equation 88, 89, 90, 93
energy loss 73, 74, 90, 174, 175, 302
Enforcement Regulations for Road Structures 885, 915, 924
engineering bedrock 258
environmental action 6, 10, 19, 20, 55, 311, 338, 368
environmental monitoring 201
equivalent beam method 717, 725, 728, 730, 731, 751
equivalent coefficient of permeability 667
equivalent crown height coefficient 114, 115
equivalent deepwater wave height 93, 98, 99, 104, 117, 119, 136, 144, 184, 412, 414
equivalent linear analysis 255, 257
equivalent linear model 230
equivalent N-value 229
equivalent relative velocity 305
equivalent static analysis 244, 245, 246
equivalent-thickness method 477
equivalent wall height 778, 779, 786, 791, 792, 793
equivalent wall width 770, 774, 775, 778, 790, 791, 792, 846
error function 369
estimated tide level 172, 173
estuarine hydraulics 19, 178
estuary 55, 179
exceedance probability 152, 153, 154, 162
expanded void theory 446
expected number of damage occurrence 23
expected total cost 24, 25, 592, 603, 623, 643, 644, 704, 734, 797, 798, 829, 847, 849
expected value 23, 24, 161, 162, 211, 592, 603, 623, 734, 829
extended Goda's formula 139, 141
extended Tanimoto's formula 420
external stability 36, 38, 78, 378, 499, 503, 505, 511, 643, 645
extremely soft subsoil 494, 544
extrusion 384, 389, 390, 391, 392, 401, 407, 500, 506, 515, 516
extrusion failure 401

F

facilities for wave control 975
facilities prepared for accidental incident 586, 587
facilities subject to the technical standard 39, 40, 41, 47, 48, 49, 50, 178, 271
factor for effective cross-sectional area 500, 501, 512, 513
failure mode 6, 7, 24, 36, 37, 38, 445, 547
failure of bearing capacity 510
failure probability 6, 7, 14, 21, 23, 24, 27, 28, 29, 30, 31, 33, 34, 36, 37, 506, 507, 510, 512, 513, 514, 516, 592, 593, 594, 603, 604, 605, 623, 624, 626, 627, 630, 631, 633, 634, 691, 704, 706, 712, 713, 714, 715, 734, 759, 768, 788, 814, 829, 830, 831, 833, 834
fast Fourier transform (FFT) 609, 693
fatigue failure 79, 367, 409, 410, 813, 815, 826
fatigue limit 5, 365, 367, 373, 374, 375, 391, 399, 403, 815, 895
fatigue limit state 5, 365, 367, 373, 374, 375, 391, 399, 403, 815, 895
fatigue strength 374, 375, 403, 410, 813, 815
FDEL 256, 257
fender 156, 160, 297, 298, 302, 303, 304, 307, 519, 709, 723, 742, 743, 753, 764, 821, 822, 830, 831, 837, 842, 844, 845, 846, 848, 856, 857, 860, 875, 876, 877, 878, 879, 880, 910, 911, 937, 938, 947
fender equipment 875, 877
fender reaction force 723, 742, 753, 764, 830, 831, 837, 854, 857, 860, 880
fender system 297, 298, 302, 304, 875, 876, 877, 878, 880
ferry 126, 294, 299, 919, 934
fetch 84, 85, 86, 87, 163
fetch length 84, 85, 86, 87
filler 342, 343, 344, 898
filling 222, 278, 280, 350, 355, 368, 377, 385, 386, 388, 390, 399, 400, 401, 410, 474, 490, 491, 519, 520, 523, 597, 599, 614, 615, 699, 707, 708, 757, 773, 774, 775, 776, 777
filling sand 342, 410, 599, 604, 613, 621, 623, 627, 631, 634, 649, 665, 667, 702, 706, 707, 708
final consolidation settlement 475, 476
fines content 491, 494, 521, 524, 529, 531, 532, 533, 534, 544, 550
finite amplitude standing wave theory 135
finite amplitude wave theory 133, 135, 145
finite difference method 93, 265, 477
First-Order Multinormal approach 38
First-Order Reliability Method 21, 30
fixed passenger boarding facilities 964, 965
FLAC 797
flexibility 86, 246, 289, 297, 298, 304, 343, 421, 726, 728, 878, 932, 937
flexibility factor 289, 297, 298, 304, 937
flexibility number 726, 728
FLIP 256, 257, 669, 797, 849
floating body 17, 156, 157, 158, 159, 160, 161, 162, 163, 304, 373, 376, 641, 642, 643, 645, 801, 802, 803, 804, 805, 806, 807, 849, 851, 852, 854, 858, 859
floating breakwater 156, 160, 641, 642, 643
floating bridge 156
floating disaster-prevention base 156
floating dock 124, 384
floating mooring facilities 851
floating pier 4, 5, 156, 577, 578, 643, 676, 851, 852, 853, 854, 855, 856, 857, 858
floating structure 129, 156, 157, 160, 853, 862, 880
floating type 516
flocculation 178
floodgate 659, 660
flood tide 179, 188
floor slab 150, 343, 367, 847, 849, 859
fluctuating drift force 159
fluctuating wind 161, 306
fluorescent sand tracers 185, 186
FLUSH 256, 257, 268, 797
fly ash 338, 549
foam treated soil 518
FOMN 38
footing 15, 20, 133, 134, 373, 374, 378, 389, 391, 392, 396, 403, 407, 409, 479, 597, 598, 599, 600, 601, 603, 606, 608, 615, 640, 645, 649, 704
foot protection block 339, 351, 615, 616
forced replacement 490
foreshore 181, 182, 188, 973, 974, 975
FORM 21, 29, 30, 31, 33, 37, 38, 167
foundation for cargo handling equipment 908, 909
foundation ground 15, 16, 17, 25, 140, 230, 233, 244, 245, 352, 426, 429, 430, 432, 488, 498, 504, 506, 534, 537, 587, 592, 594, 597, 598, 600, 601, 603, 604, 607, 609, 612, 613, 620, 623, 626, 627, 630, 631, 633, 634, 648, 649, 650, 665, 668, 691, 693, 699, 701, 702, 703, 704, 706, 707, 714, 768, 796, 797, 846, 927, 928
foundation replacement by excavation 490
Fourier spectrum 235, 250, 252, 263
four principal tidal constituents 68, 69
frame structure 751, 931
freeboard 801, 807, 849, 851, 852, 854, 856, 858
free earth support method 717, 725
frequency domain analysis method 709
frequency filter 826
frequency spectrum 71, 80, 81, 89, 120, 133, 306
frequency spectrum of wind velocity 306
frictional resistance 127, 307, 358, 426, 434, 505, 526, 527, 614, 708
friction coefficient 20, 244, 306, 347, 358, 359, 506, 507, 508, 598, 599, 606, 607, 612, 648, 793, 873
friction drag 157
friction enhancement mat 342, 358, 599, 611
friction pile 440, 441, 470, 471, 832, 833, 834, 839
front toe reaction force 793
front wall slit 403, 404
fueling facilities 5, 886
full load draft 290, 302, 581
fully plastic state moment 684, 685
fumigation 950

G

galvanic anodes method 334
gate 15, 660, 662, 663, 929, 953
general cargo ship 124, 298, 299, 300, 301
generated electricity flux 334
geometrical moment of inertia 724, 726, 728, 732, 858
geophysical exploration 207, 210
geostrophic wind 59
geosynthetic 353
geotechnical condition 207, 553, 694, 695
Global Positioning System 176
global warming 78, 201
Goda's formula 129, 130, 131, 132, 133, 134, 137, 139, 140, 141, 142, 144, 605
GPS buoy system 176, 203
gradient wind 58, 59
grain size 180, 184, 187, 196, 210, 213, 216, 217, 229, 271, 343, 344, 491, 494, 521, 524, 532, 533, 535, 727, 973, 974, 975
granulated blast furnace slag 350, 352, 521, 550
gravity type breakwater 591, 643, 644
gravity type quaywall 245, 797

gravity type special breakwater 15, 20
gravity type structure 76, 342
Green function 92, 238, 253, 261, 262, 264, 265
Green's law 174
green space 50, 963, 978, 979
Gringorten 152, 169
groin 6, 15, 20, 180, 181, 189, 194, 333, 338, 579, 651, 652, 653, 658, 672
gross tonnage 289, 290, 291, 292, 293, 294, 298, 308, 309, 577, 687, 689, 865, 866, 884, 887, 962
ground bearing capacity 390
ground chain 17, 800, 801, 802, 804, 805, 806, 807
ground contact area 891
ground slots 954, 955
ground stress 426
ground subsidence 288
ground water level 75, 258, 450
group velocity 84, 86, 90, 128, 186, 195
grouting method 355, 357, 544
Gumbel distribution 152, 153, 154
gust factor 61
Gutenberg-Richter equation 252

H

hammer driving method 443
hanger 869
Hansen 862
harbor calmness 15, 79, 80, 93, 122, 123, 154, 155, 204, 577, 581, 583, 585, 586, 588, 590, 642, 795
harbor entrance 72, 73, 92, 93, 122, 588, 590, 650, 651, 652
harbor paradox 73
harbor resonance 71, 73, 74, 83, 84, 121, 122
hardener 337, 351, 352, 547
hazard curve 253
hazardous cargo 4, 7, 376, 595, 636, 642, 678, 950, 959
hazardous cargo handling facilities 376
hazardous materials storage facilities 959
headed stud 409
head loss 76, 217, 494, 496
heaving 160, 556, 557, 690, 902
heavy tamping method 548
height of embankment 493, 540
high cube container 924
high-density blocks 416
high earthquake-resistance facilities 365, 375, 376, 398, 540, 676, 678, 679, 680, 681, 682, 683, 685, 686, 704, 716, 734, 736, 737, 745, 746, 749, 752, 756, 762, 768, 772, 790, 796, 810, 811, 812, 814, 817, 818, 829, 830, 831, 833, 834, 903, 904, 907, 915, 935, 942, 948
highest high water level 69, 599, 604, 613, 621, 623, 627, 631, 635, 649, 936, 937
highest one-tenth wave 116
highest water level 68, 69, 172, 173, 174, 590, 596, 597, 599, 619, 653, 689, 786, 795
highest wave 83, 102, 104, 129, 131, 132, 133, 134, 135, 137, 139, 143, 145, 149, 588
highest wave height 83, 102, 104, 131, 132, 134, 135, 137, 139, 143, 145, 149
high-fluidity concrete 932
high replacement ratio 533, 536, 541
high-speed ferry 126
high-strength concrete 340
high water level 68, 69, 331, 599, 604, 613, 621, 623, 625, 626, 627, 628, 631, 632, 635, 649, 650, 666, 719, 936, 937
Highway Bridge Specifications and Commentary 64, 316, 330
Hiley's equation 471
Hiroi's formula 133
horizontal coefficient of consolidation 477
horizontal-plate type permeable breakwater 117
horizontal seismic coefficient 437, 819
horizontal shear modulus 780, 784, 785
horizontal slit 404, 628
H-shaped steel 327, 407, 446, 447, 452
Hudson's formula 411, 412, 413, 416, 417, 418
HWL 68, 69, 332, 333, 653, 786
HWOST 69
hybrid caisson 407, 408, 409, 410, 597, 614
hybrid structure 409, 424
hydraulic gradient 76, 217
hydraulic model experiment 193, 194, 404, 405, 412, 418, 419, 420, 421
Hyogoken Nambu Earthquake 256, 261
hyperbolic model 230
hypocenter 235, 240, 250, 251, 656, 678
hypocenter parameter 240
hysteresis 230

I

IHO 936
immediate settlement 288, 475, 478
immersed tunnel 246, 341, 927, 928, 929, 930, 931, 932
immersed tunnel element 341, 927, 928, 929, 930, 931, 932
immersed tunnel method 929
IMO 166, 167, 168, 169, 176, 177, 199, 205, 206, 643, 645, 650, 799
impact load 322
importance sampling 29
improved subsoil 498, 499, 500, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 515, 516, 517, 518, 533, 535, 536, 537, 538, 539, 540, 542, 544
improved subsoil system 503, 504, 506, 509
improvement ratio 529, 544
impulsive breaking wave force 129, 132, 135, 136, 137, 138, 139, 142, 143, 147, 420, 597, 622, 628
impulsive breaking wave force coefficient 132, 138, 420
impulsive pressure 405
impulsive uplift 148, 151, 405
impulsive wave force 135, 136, 147, 148
impulsive wave pressure 129, 344
incident wave height 91, 93, 143, 150, 159, 174
incident waves 70, 91, 92, 94, 95, 96, 107, 131, 133, 138, 143, 144, 145, 159, 161, 165, 179, 192, 256, 304, 305, 412, 416, 589, 650, 973
increase rate of strength 493
inertia coefficient 145, 146, 148
inertia force 144, 145, 147, 230, 244, 245, 503, 504, 505, 506, 509, 515, 526, 527, 698, 702, 708, 774, 821, 835
initial construction cost 4, 5, 23, 24, 592, 603, 623, 704, 734
initial investment cost 55, 56
initial shoreline configuration 975
initial tangent elastic modulus 218
inland active fault 678, 679
inner bar 182
inshore 181, 975
in-situ permeability test 217, 228
in-situ test 14, 226, 232, 461, 480, 500
in-situ vane shear test 227
inspection and diagnosis plan 45, 47
installation depth 143, 599, 601, 606, 607, 612
intensity of wave pressure 130, 134, 136, 597
Intergovernmental Panel on Climate Change 74
intermediate buoy 156, 856
intermediate soil 223, 225, 228
intermediate weight 156

internal earth pressure 373, 375, 378, 379, 380, 382, 385, 386, 389, 391, 392, 399, 400, 401, 407
internal stability 500, 503, 511, 512
internal water pressure 378, 385, 386, 389, 401, 407
international gross tonnage 290, 294, 687
International Hydrographic Organization 936
International Navigation Association 880
International Organization for Standardization 247, 268, 316
international ship container 924
intertidal zone 331, 332, 333, 336, 973
inverse fast Fourier transform 609, 693
IPCC 74, 78
Iribarren-Hudson's formula 413
Isbash's constant 421, 422
ISO 11, 21, 29, 39, 244, 247, 268, 314, 316

J

jacket 18, 20, 841, 842, 843
jacket type pier 817
Japanese Industrial Standards 19
Japanese Unified Soil Classification System 216, 217
Japan Society of Civil Engineers 170, 310
jetty 15, 657, 658, 659, 908, 974
joint 16, 27, 31, 58, 60, 76, 77, 79, 88, 147, 154, 155, 156, 157, 326, 327, 328, 340, 353, 354, 389, 390, 410, 449, 454, 456, 473, 614, 615, 665, 667, 668, 699, 719, 732, 747, 757, 764, 768, 776, 778, 779, 787, 815, 835, 857, 860, 861, 890, 898, 899, 908, 927, 928, 929, 930, 931, 932, 970
joint board 353
joint distribution 147
joint frequency distribution 58, 79, 154, 155
joint probability density function 27
joint structure 473, 899, 930
JSCE 11, 27, 36, 48, 66, 67, 77, 78, 163, 164, 165, 166, 167, 168, 169, 170, 171, 177, 198, 199, 200, 204, 205, 206, 247, 268, 269, 278, 309, 326, 337, 341, 344, 345, 352, 356, 358, 359, 423, 424, 425, 480, 481, 482, 548, 550, 551, 587, 643, 644, 645, 648, 650, 659, 669, 671, 796, 797, 798, 799, 847, 849, 850, 862, 911, 926, 938, 956, 960, 976
judgment of liquefaction 229

K

Kana 165, 198, 269, 547, 548, 797
Karman 149
KD value 413, 415, 417
keel clearance 299, 304, 377, 554, 578, 580, 662, 686
Kelvin 125, 128
Keulegan-Carpenter number 145
key element method 932
KiK-net 238, 250, 268
kinematic viscosity of water 127
K-NET 238, 250, 251
Kuroshio 74

L

laboratory mixing test 500, 525
laboratory permeability test 217
landfill material 19, 350, 351, 523, 761, 890
landscape 49, 50, 176, 931, 937, 974, 975, 976
large isolated structure 148
large-scale triaxial compression test 345, 431
lateral bearing capacity 435, 458, 466, 480, 481, 482, 738
lateral displacement 288, 467, 478, 516, 520, 718
lateral flow 717
lateral loading test 458, 464, 820
lateral resistance of pile 459, 747, 748, 820
Latin hypercube sampling method 29
least squares method 212
length between perpendiculars 302, 303, 304, 306, 555, 556, 575
length overall 307, 554, 560, 575, 578, 579, 580, 844, 845, 867
length overall of design ship 554, 560, 579, 580
Lesser 196, 199
levee 4, 109, 665
Level 1 earthquake ground motion 5, 7, 10, 14, 25, 235, 238, 243, 245, 255, 372, 373, 374, 375, 378, 379, 380, 382, 384, 391, 392, 407, 431, 440, 455, 484, 489, 499, 500, 504, 508, 510, 512, 513, 515, 516, 537, 585, 592, 593, 595, 598, 607, 608, 609, 610, 611, 612, 635, 654, 655, 659, 660, 676, 677, 680, 691, 692, 693, 694, 697, 698, 701, 702, 703, 704, 707, 711, 713, 714, 715, 719, 720, 722, 723, 725, 731, 732, 734, 736, 737, 739, 740, 741, 743, 744, 745, 746, 747, 748, 749, 750, 752, 753, 755, 756, 757, 758, 762, 763, 767, 769, 770, 772, 774, 775, 779, 787, 789, 790, 794, 795, 796, 810, 811, 812, 818, 823, 824, 826, 829, 833, 834, 837, 838, 840, 841, 842, 846, 848, 851, 852, 865, 903, 904, 914, 927, 935, 942, 945, 964, 966
Level 2 earthquake ground motion 4, 5, 10, 14, 15, 235, 238, 240, 245, 246, 264, 265, 266, 267, 364, 365, 499, 500, 585, 586, 587, 598, 612, 624, 654, 655, 656, 657, 659, 660, 676, 677, 678, 679, 680, 681, 682, 698, 708, 709, 716, 723, 742, 745, 749, 752, 757, 763, 772, 790, 796, 810, 817, 818, 826, 827, 829, 870, 903, 904, 906, 907, 914, 915, 927, 935, 942, 944, 945, 948, 969, 978
level crossing 924
life cycle cost 12, 19, 23, 36
lifetime 4, 5, 7, 152, 155, 415
lift coefficient 196, 197
lift force 169, 196, 197, 598, 600, 601, 606, 615, 648, 815
lighting facilities 869, 881, 883, 948, 950, 957
light-weight treated soil 548
limiting breaking height 103
limiting wave height 103
limit state 5, 6, 7, 21, 27, 29, 30, 31, 32, 33, 38, 79, 152, 155, 365, 366, 367, 369, 370, 371, 372, 373, 374, 375, 376, 378, 380, 381, 382, 383, 384, 391, 398, 399, 403, 404, 407, 453, 484, 485, 487, 506, 684, 685, 712, 713, 760, 769, 808, 813, 815, 836, 895, 905
limit state design 365
limit state design method 365
limit state function 6, 21, 27, 29, 30, 31, 32, 33, 38
line load 315, 475
liquefaction 15, 16, 17, 18, 19, 55, 207, 229, 233, 245, 255, 257, 268, 351, 426, 441, 455, 490, 491, 505, 522, 523, 524, 525, 526, 527, 529, 543, 544, 545, 548, 550, 551, 593, 595, 636, 692, 698, 716, 745, 749, 752, 756, 762, 772, 790, 796, 797, 818, 845, 847, 907, 931
liquefaction countermeasure works 490, 543, 544
liquid limit 222, 351, 518
littoral drift 19, 55, 144, 179, 180, 181, 182, 183, 194, 195, 588, 589, 641, 651, 652, 657, 660, 662, 672, 674, 974
littoral drift phenomena 180
live load 65, 66, 312, 314, 323, 719, 845, 849, 857, 859
L load 316
LNG carrier 294, 298
load factor 377, 378, 379, 381, 382, 383, 390, 396, 401
loading arms 947
loading test 348, 439, 440, 441, 442, 443, 446, 447, 448, 449, 454, 455, 457, 458, 459, 460, 464, 465, 467, 471, 479, 480, 481, 482, 820, 847, 849, 894
load-pile head displacement curve 458
load-settlement curve 442
local buckling 407, 474, 482

lock 661, 662, 663
logarithmic normal distribution 22
log loader 317
longitudinal construction joint 898
longitudinal gradient 931
long-period wave 71, 73, 120, 121, 122, 123, 124, 165, 166, 170, 204, 205, 206, 582
long pile 456, 459, 460, 461, 738, 742
longshore bar 181, 189, 191, 192, 198
longshore currents 165
longshore sediment transport 180, 181, 183, 185, 186, 195, 196, 651, 652, 657, 672
longshore sediment transport rate 180, 181, 185, 186, 195
long-term consolidation 475, 477
Longuet-Higgins 117, 165
long wave 98, 164, 172, 173, 175, 176
low crested upright wall 133
low water level 68, 331, 333, 519, 596, 602
LPG carrier 294, 298
L-shaped block type quaywall 691
L-shaped member 197
L-type scouring 192
luni-solar diurnal component of tides 69
LWL 68, 331, 332, 333, 537, 699, 704, 719, 773, 786, 866
LWOST 69

M

Mach-stem wave 588, 652
Mackenzie 862
Magnitude 236, 237, 243, 252, 253, 269
maintenanceability 9, 10
maintenance cost 55, 876, 906, 907
maintenance dredging 43, 674, 931
maintenance level 44, 45
maintenance planning document 42
maintenance program 41, 42, 43, 44, 45, 47
maintenance shop 952, 955
maintenance work 5, 42, 43, 44, 45, 337, 861, 939
Manning's roughness coefficient 176
manoeuverability index of turning 575
marina 120, 122, 194, 881, 915, 916, 919
Markov Chain Monte Carlo 29
marshaling area 951, 952, 954, 955, 956
Marshall stability 901, 902
mass concrete block type upright breakwater 625
mastic asphalt 342, 343, 344, 652
material factor 365, 368, 369
mattress work 617
Mavis 145, 168
maximum allowable vehicle traffic volume 914
maximum draft 553, 554, 578, 579, 580, 581, 686
maximum instantaneous wind speed 61
maximum moment model 252
maximum scouring depth 190, 191
maximum wave 98, 105, 126, 127, 130, 131, 132, 135, 136, 137, 147, 151, 152, 417, 558
mean adhesion 435, 444, 455
meandering damage 142
mean low water level 331, 333, 596
mean monthly-highest water level 68, 590, 596, 597, 599, 619, 653, 689, 795
mean monthly-lowest water level 68, 596, 699, 719, 866
mean period 106, 155
mean sea level 68, 69, 74, 75
mean uneven settlement ratio 478
mean water level 57, 69, 70, 104, 105, 117, 119, 201, 596, 597
mean wave height 83, 116
median diameter 184, 185
member factor 365, 370, 371, 836, 837
metacenter 377, 558
meteorological tide 68, 69
method with cross-sectional division 859
microtremor 238, 248, 251, 252, 266
mild-slope equation 88, 93
minimization of expected total cost 24, 25
Ministry of Land, Infrastructure, Transport and Tourism 21, 40, 43
MIR criterion 154
mixing blades 501
MLIT 926
mobile crane 61, 63, 914, 915, 925
model test 13, 14, 91, 92, 96, 103, 104, 105, 107, 109, 116, 122, 128, 129, 134, 135, 136, 138, 139, 140, 141, 143, 144, 145, 148, 150, 151, 156, 157, 160, 161, 162, 163, 165, 169, 259, 275, 302, 411, 460, 544, 620, 622, 625, 628, 629, 632, 636, 637, 642, 648, 726, 727, 770, 773, 775, 776, 793, 795, 879
model vibration test 700
moderate heat portland cement 338
modified Fellenius method 429, 430, 486, 487, 488, 537, 600
modified seismic coefficient method 246
modified virtual slope method 106
modulus of elasticity 458, 474, 475, 909, 910
modulus of subgrade reaction 717, 718, 724, 726, 727, 728, 731, 779, 780
modulus of volume 257
moment of inertia 303, 378, 468, 724, 726, 728, 732, 858, 909
monitoring 50, 179, 201, 205, 482, 486, 661, 887, 888, 930, 931, 932
mooring anchor 17, 156, 578, 579, 641, 643, 801, 802, 804, 805, 851, 853, 854, 858, 860, 861, 862
mooring buoy 5, 157, 159, 676, 800, 801, 802, 803, 804, 805, 807, 849, 851
mooring chains 854, 857, 858, 859
mooring dolphin 844
mooring equipment 156, 160, 161, 163, 297, 852, 853, 880, 936
mooring facilities 6, 15, 18, 24, 38, 43, 50, 83, 84, 122, 245, 279, 289, 297, 298, 299, 303, 304, 308, 309, 314, 324, 363, 577, 578, 584, 662, 676, 678, 679, 686, 749, 755, 844, 851, 853, 857, 870, 871, 872, 875, 877, 878, 879, 880, 881, 882, 884, 886, 887, 888, 889, 892, 893, 898, 900, 907, 909, 934, 942, 944, 945, 947
mooring force 156, 157, 160, 161, 162, 857
mooring line 121, 156, 157, 160, 641, 642, 643, 686, 870, 871, 872
mooring pile 5, 20, 577, 578, 676, 808
mooring post 297, 304, 308, 309, 709, 844, 846, 870, 871, 872, 873, 874, 884, 910, 911, 953
mooring ring 18, 870, 871, 872, 873, 874
mooring rod 156
mooring rope 120, 163, 204, 307, 308, 309, 853
mooring system 121, 156, 157, 160, 204, 289, 304, 307, 579, 642, 850, 852, 858, 861
Morihira's formula 139
motions of floating body 643
movable bed 193, 194
movable bridge 885, 964, 965
movable passenger boarding facilities 963, 964, 965, 966
MRI 86, 87, 163
MSL 68
Muller's equation 859
multi directional random waves 81, 88, 104, 147
multi-layered ground 268
multiple integrals 21, 27, 28
multiple lanes 922, 923

multiple reflection theory 248, 696
multiple-wing type permeable breakwater 117
multi-purpose wharf 950
Munk 84, 163
mv method 219, 476
Myers' formula 59

N

National Institute for Land and Infrastructure Management 48, 78, 248, 269, 296, 423, 553, 576, 643, 797, 798, 799, 911, 926, 938, 956
natural beach 180, 188, 189, 973
natural frequency 71, 72, 120, 146, 173, 695, 696
natural frequency of ground 695, 696
natural frequency period 71, 72, 120, 146, 173
natural period 73, 121, 124, 204, 246, 696, 721, 818, 820, 822, 823, 824, 826, 827, 837, 842, 843, 857, 944, 945
natural period of ground 696
nautical chart 68
navigation channel 7, 122, 178, 194, 553, 554, 555, 556, 558, 559, 560, 571, 574, 575, 588, 652, 931
nearshore currents 178, 179, 186, 196
nearshore zone 198
negative friction 451
negative skin friction 435, 441, 442, 451, 452, 453, 474, 503
negative wave force 134, 135
negative wave pressure 134, 135
neutral axis ratio 366
NHHWL 69
nominal diameter 366, 413, 414, 415
non-breaking 128, 139, 174, 412, 413, 415, 417
non-dominating actions 11, 19, 404
non-exceedance probability 152, 153, 154
nonlinear analysis 255, 256, 257, 260
nonlinear dynamic analysis 835
nonlinear interaction 86, 87, 88
nonlinearity 33, 98, 147, 148, 151, 156, 218, 219, 230, 304, 650
nonlinear seismic response analysis 14, 30, 500, 818
nonlinear wave transformation model 96
non-reinforced concrete 338, 339, 365, 599, 604, 613, 621, 623, 627, 631, 634, 649, 702, 706, 707, 897
normal consolidation 218, 219, 222, 476
normal distribution 22, 23, 28, 161, 162, 211, 233, 502
normal random variable 28, 30, 31
normal stress 223, 224, 225, 501, 537
NOWPHAS 155, 170, 205, 206
NS value 412
N-type scouring 192
number of containers handled 916, 917, 954
number of lanes 914, 915, 921, 922, 923
numerical computation 92, 129, 178, 195
numerical simulation 108, 161, 164, 174, 175, 176, 177, 193, 194, 201, 304, 648, 858
N-value 207, 211, 225, 229, 232, 432, 433, 443, 444, 445, 452, 453, 455, 459, 460, 464, 465, 491, 496, 525, 529, 530, 531, 532, 534, 542, 543, 727, 728, 741, 742, 820, 830, 831, 832, 833, 834

O

oblique berthing 880
oblique compression characteristics 880
obliquely incident wave 91, 92
occupancy ratio of large vehicle 917
occurrence frequency 83, 155
occurrence probability 69
occurrence probability distribution 69
ocean currents 172, 178
offshore 41, 67, 70, 80, 82, 83, 84, 87, 90, 117, 122, 130, 132, 135, 143, 144, 155, 156, 157, 168, 170, 180, 181, 183, 188, 189, 194, 195, 196, 202, 203, 204, 205, 297, 299, 301, 341, 344, 490, 502, 581, 589, 616, 645, 652, 686, 807, 969, 974
offshore berth 297, 299, 301, 581
offshore petroleum stockpiling base 156
offshore waves 80, 82, 83, 84, 144, 155
offshore wind 67, 87
oil handling equipment 942
oil storage facilities 7, 959
one-dimensional seismic response analysis 609, 822
one-line theory 194
open ended pile 446, 474, 480
open storage yard 7, 314, 890, 958, 959
open-type quaywall with sheet pile wall anchored by forward batter piles 752
open-type wharf 339, 369, 371, 719, 818, 819, 820, 821, 835, 836, 837, 903
open-type wharf on vertical piles 818, 820, 835, 836
open-type wharves on coupled raking piles 817, 837, 838, 839
optimization problem 31, 38
ore carrier 297
original sea bottom depth 690
overburden pressure 213, 219, 220, 226, 227, 229, 230, 258, 259, 429, 444, 456, 476, 477, 511, 525, 530, 532
overconsolidation ratio 213, 228
overturning 14, 15, 16, 36, 38, 74, 141, 245, 373, 376, 458, 504, 506, 508, 509, 536, 537, 586, 587, 592, 593, 594, 599, 603, 606, 608, 609, 612, 620, 623, 626, 630, 633, 648, 649, 654, 655, 691, 693, 699, 701, 703, 704, 707, 708, 758, 759, 767, 770, 773, 789, 792, 793, 846, 871, 872, 873, 874, 944
overturning resistance coefficient 792

P

packed drain 494
parallel system 7, 36
parapet 6, 15, 20, 109, 116, 136, 165, 167, 339, 598, 614, 654, 655, 674
parking lots 6, 678, 933
partial factor 4, 13, 14, 15, 16, 17, 18, 19, 21, 22, 24, 25, 36, 129, 210, 212, 213, 215, 315, 368, 370, 390, 391, 411, 426, 427, 428, 429, 430, 431, 434, 436, 437, 440, 441, 450, 452, 453, 454, 455, 472, 485, 486, 487, 488, 489, 491, 493, 500, 505, 506, 508, 509, 510, 511, 512, 513, 514, 515, 516, 525, 526, 527, 528, 538, 590, 598, 599, 600, 601, 602, 603, 605, 606, 607, 612, 613, 620, 623, 624, 626, 630, 633, 648, 649, 701, 703, 704, 705, 706, 707, 708, 725, 731, 733, 734, 736, 737, 738, 739, 740, 743, 747, 748, 764, 778, 779, 785, 786, 787, 788, 791, 792, 793, 794, 804, 827, 828, 829, 839, 857, 860, 861, 862, 874, 876, 879, 892, 893, 901
partial factor method 14, 15, 16, 17, 18, 21, 22
particle density 209, 210, 214, 350, 524
particle size distribution 49, 445
partition wall 139, 373, 374, 375, 377, 384, 385, 387, 389, 390, 391, 392, 400, 401, 402, 403, 406, 407, 409, 410, 708, 757, 859
passenger boarding facilities 43, 869, 887, 963, 964, 965, 966
passenger ship 50, 309, 552, 678, 884, 887
passive earth pressure 272, 273, 277, 435, 436, 437, 469, 470, 503, 507, 508, 510, 515, 516, 709, 717, 719, 725, 732, 737, 738, 739, 740, 742, 743, 746, 763, 764, 766, 775, 777, 780, 781, 785, 798
PC 38, 74, 78, 155, 292, 294, 298, 326, 327, 328, 340, 341, 550, 576, 688, 733, 897, 933
peak cut effect 586
peak frequency 81, 121
peak hourly traffic 919, 921

peak wave height 132, 152
Peck 450, 480, 548, 798
penetration depth 434, 435, 437, 447, 456, 930
perforated wall 404, 645
perforated-wall caisson 136, 142, 628
performance-based design 8, 911
performance criteria 4, 6, 7, 8, 12, 13, 19, 58, 79, 289, 365, 372, 373, 374, 375, 376, 391, 392, 398, 403, 404, 407, 411, 544, 553, 577, 582, 585, 586, 587, 592, 593, 594, 635, 640, 641, 651, 654, 655, 657, 659, 660, 661, 664, 669, 672, 674, 681, 682, 683, 685, 686, 691, 711, 712, 713, 714, 744, 755, 758, 759, 767, 770, 789, 800, 801, 808, 810, 811, 812, 813, 814, 815, 816, 835, 841, 842, 847, 851, 852, 853, 864, 865, 870, 871, 875, 884, 885, 886, 887, 888, 889, 903, 904, 905, 913, 914, 927, 928, 929, 933, 935, 936, 942, 943, 948, 949, 957, 958, 959, 961, 964, 966, 968, 972, 978
performance requirements 4, 5, 8, 9, 10, 12, 19, 39, 40, 42, 43, 44, 45, 79, 364, 365, 409, 410, 499, 500, 516, 517, 518, 520, 552, 553, 577, 582, 583, 584, 585, 586, 622, 625, 651, 654, 655, 657, 659, 660, 661, 664, 669, 671, 672, 674, 676, 678, 680, 682, 808, 810, 811, 812, 827, 836, 849, 851, 864, 865, 870, 913, 914, 927, 933, 935, 940, 941, 942, 944, 948, 958, 961, 963, 968, 972, 978
performance verification 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 21, 22, 24, 36, 39, 55, 57, 58, 60, 61, 68, 70, 71, 75, 79, 80, 81, 82, 84, 93, 105, 109, 114, 119, 121, 132, 134, 135, 141, 142, 143, 146, 152, 154, 156, 173, 176, 178, 200, 201, 207, 208, 210, 212, 213, 221, 224, 225, 226, 227, 228, 230, 239, 244, 245, 247, 248, 255, 264, 271, 279, 280, 289, 294, 297, 304, 309, 312, 314, 317, 325, 328, 333, 337, 338, 339, 340, 341, 343, 358, 372, 373, 374, 375, 376, 378, 379, 381, 382, 383, 384, 385, 387, 389, 391, 392, 394, 395, 396, 397, 398, 399, 400, 401, 403, 404, 405, 408, 409, 410, 411, 412, 415, 418, 419, 424, 426, 432, 439, 441, 442, 458, 470, 473, 475, 477, 478, 485, 490, 492, 493, 494, 496, 498, 499, 500, 501, 503, 505, 506, 518, 519, 521, 523, 525, 529, 533, 536, 537, 540, 542, 543, 544, 545, 553, 554, 555, 578, 579, 581, 583, 586, 587, 590, 593, 595, 596, 597, 598, 600, 605, 606, 607, 608, 609, 611, 612, 613, 614, 618, 619, 622, 624, 625, 628, 629, 632, 636, 641, 642, 643, 647, 648, 650, 651, 655, 656, 657, 660, 661, 664, 665, 672, 676, 684, 686, 691, 693, 697, 698, 700, 702, 703, 708, 709, 715, 717, 719, 720, 722, 723, 725, 731, 734, 737, 740, 742, 744, 745, 746, 749, 750, 751, 753, 754, 755, 757, 760, 761, 762, 763, 770, 771, 773, 775, 789, 790, 791, 792, 793, 795, 797, 801, 802, 803, 817, 818, 821, 822, 824, 826, 836, 837, 838, 839, 840, 841, 842, 843, 844, 846, 847, 848, 849, 852, 853, 854, 855, 857, 864, 865, 866, 871, 875, 876, 877, 878, 880, 881, 890, 891, 892, 893, 894, 900, 907, 908, 909, 915, 916, 928, 929, 931, 933, 937, 941, 945, 951, 952, 965, 970, 975
performance verification method 8, 13, 14, 15, 16, 17, 18, 19, 21, 22, 210, 213, 226, 230, 415, 490, 498, 518, 590, 605, 691, 717, 744, 751, 757, 770, 789, 791, 852, 854
performance verification of seismic-resistant 230, 255, 595, 607, 608, 719, 818, 822, 824, 945
permanent action 4, 6, 7, 9, 372, 373, 392, 592, 659, 691, 711, 744, 755, 758, 767, 927, 932, 942, 964, 969
permanent situation 24, 272, 314, 372, 373, 432, 486, 489, 592, 594, 601, 603, 623, 626, 630, 643, 691, 701, 702, 703, 704, 712, 713, 714, 715, 725, 728, 733, 734, 738, 741, 743, 747, 759, 768, 769, 773, 775, 779, 787, 789, 793, 864
permeability test 217, 228
permeable detached breakwater 194
permeable rubble-mound breakwater 73
permeable type 117, 404, 589, 638
permeation coefficient 76
phase lag function method 161
phase velocity 87, 128, 251, 266, 267
PHC 340
Phillips 87
PHRI method 458, 459, 461, 747, 748
physically handicapped person 929
PIANC 309, 880, 910, 911
pier 4, 5, 17, 18, 20, 36, 148, 150, 151, 156, 169, 196, 203, 297, 312, 315, 339, 367, 577, 578, 579, 643, 676, 751, 753, 754, 810, 811, 812, 815, 816, 817, 818, 820, 821, 822, 823, 824, 826, 827, 828, 829, 835, 836, 837, 838, 840, 841, 842, 843, 847, 848, 849, 851, 852, 853, 854, 855, 856, 857, 858, 870, 875, 878, 894, 895, 897, 898, 903, 907, 908, 935, 936, 937, 944, 945
Pierson-Moskowitz 87
piled pier 18, 20, 148, 150, 151, 297, 315, 751, 753, 754, 810, 811, 812, 815, 816, 817, 818, 820, 821, 822, 823, 824, 826, 827, 828, 829, 835, 836, 837, 838, 840, 841, 842, 843, 878, 894, 895, 897, 898, 903, 907, 908
pile driving test 472
pile foundation 426, 434, 439, 449, 469, 470, 479, 480, 482, 640, 849, 850, 907, 908
pile group 439, 450, 452, 453, 454, 456, 466, 470, 480, 482, 838, 839, 847, 849
pile head displacement 457, 458, 470
pile joint 76, 454, 665, 667, 668, 719, 776, 778, 835
pile-supported section 818, 821
pile type breakwater 20
pile type dolphin 18, 20, 844, 846
pile type fender 875, 878
pipeline 168, 196, 246, 882
pipe type permeable breakwater 117
piping 353, 732
piping phenomenon 732
pitching 160, 556, 557, 690
placement-type cellular-bulkhead 485, 789, 795
placement-type cellular-bulkhead quaywall 485, 789, 795
plastering block 801
plastic board drain 543
plastic deformation 219
plastic flow 343, 426, 475
plasticity index 228, 232, 259
plate loading test 894
platform 17, 20, 157, 384, 685, 686, 726, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 845, 878
plaza 5, 963, 978
pneumatic caisson 434
pneumatic fender 875
pneumatic flow mixing method 544, 548, 551
pneumatic unloader 322, 323
pocket dredging 674
point mass model 709
Poisson's ratio 218, 232, 328, 474, 475, 520, 938
pontoon 353, 641, 854, 856, 857, 858, 859, 860, 861
porous wall 628
portal bridge crane 848
Port and Airport Research Institute 48, 93, 164, 370
Port and Harbour Law 3
Port and Harbour Research Institute 170, 171, 309, 310, 738
port area 49, 50, 343, 351, 428, 477, 478, 488, 914, 926
port steel structure 334, 335, 336
Poulos 482
Prakash 481
pre-consolidation pressure 223
premixing method 523, 524, 525, 545
premixing-type stabilization method 550
pressure coefficient 61, 63, 64, 137, 139, 158, 307, 786, 788, 793
pressure gradient 58

pressure moment coefficient 305
pressure type wave gauge 202
primary consolidation 221, 477
principal dimensions of ship 293
principal direction 89, 147
probabilistic variable 828
probability density 21, 27, 31, 161, 301
probability density function 21, 27, 301
probability of action 9
Product of Conditional Marginals 38
progressive waves 125, 133, 136, 143, 149, 151, 305
projected area 62, 64, 65, 66, 157, 158, 196, 305, 306, 307
propagation path effects 235, 238, 249, 250, 251, 253, 261, 262, 263, 264
protective facilities for harbor 43, 363, 583, 969
protective potential 335
PS logging method 232
Public Notice of Ministry of Land, Infrastructure, Transport and Tourism 40, 43
pulling resistance of pile 454, 455, 456, 821
pulling test 455, 750
punching shear 167, 392, 429, 836
punching shear failure 167, 392, 429
punching shear force 836
pure car carrier 300

Q

quaywall 4, 5, 16, 17, 19, 20, 25, 43, 71, 93, 120, 122, 224, 244, 245, 247, 259, 280, 297, 298, 303, 305, 308, 309, 312, 315, 334, 339, 345, 351, 353, 381, 383, 389, 391, 393, 401, 404, 410, 430, 431, 478, 485, 498, 499, 500, 505, 506, 519, 521, 523, 533, 537, 538, 540, 542, 543, 577, 578, 610, 611, 612, 624, 665, 667, 676, 680, 682, 683, 684, 685, 686, 689, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 707, 708, 711, 712, 713, 714, 715, 716, 717, 719, 720, 722, 723, 728, 732, 734, 735, 737, 738, 741, 742, 743, 745, 746, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 765, 766, 767, 768, 770, 771, 773, 774, 775, 778, 779, 781, 785, 786, 789, 790, 791, 792, 795, 797, 816, 824, 825, 826, 844, 846, 866, 874, 876, 877, 878, 880, 887, 889, 890, 892, 893, 894, 898, 900, 907, 909, 944, 953
qu method 225, 227, 228

R

radiation coefficient 262, 265
radiation stress 117
radioactive glass sand 180, 183
radius of gyration 303
rail mounted cargo handling equipment 317
rail span 679, 683, 908, 944, 945, 946, 952, 953
rail-type traveling cargo handling equipment 906
Ramberg-Osgood model 230
random variable 6, 27, 28, 30, 31, 32
random waves 80, 81, 82, 83, 88, 89, 90, 91, 93, 95, 96, 98, 99, 104, 105, 106, 109, 129, 131, 136, 147, 151, 159, 161, 164, 165, 167, 173, 412, 417, 418, 419, 420, 424, 803
rapid load test 442
ratio of reinforcement to concrete sections 366, 837
Rayleigh distribution 83, 147, 155, 161, 162, 163
Rayleigh wave 251, 266, 267
RC 340, 604, 613, 621, 623, 627, 631, 634, 649, 706, 707
rebound coefficient 472
REC criterion 154
reclamation revetment 664, 665, 667, 668
recompression 226
recreation 973, 976
recyclable material 350
recycled asphalt 356
recycled rubber 355
reduction coefficient 139, 503, 504, 536, 537, 540, 542
reduction of earth pressure 525, 526
reefer container 954
reflected wave 93, 94, 95, 156, 174, 305, 583, 588, 590, 614, 628, 637, 645, 652, 653, 795
reflection 73, 83, 93, 95, 96, 97, 122, 142, 143, 148, 159, 189, 192, 237, 248, 250, 257, 583, 625, 628, 629, 635, 637, 638, 696, 709, 795, 799
reflection coefficient 95, 96, 97, 122, 143, 159, 189, 625, 628, 629, 637, 638, 795, 799
refraction 71, 80, 83, 88, 89, 90, 91, 93, 94, 95, 96, 98, 128, 163, 164, 173, 174, 179, 186, 202, 203, 588
refraction coefficient 71, 88, 89, 90, 93, 96, 186
region segmentation method 160
regular waves 73, 80, 88, 96, 99, 103, 105, 106, 108, 114, 128, 129, 136, 137, 143, 159, 165, 173, 304, 305, 412, 417, 558
reinforced concrete 313, 327, 328, 338, 339, 340, 341, 365, 372, 373, 376, 391, 392, 398, 403, 407, 409, 410, 473, 599, 604, 613, 621, 623, 627, 631, 634, 649, 702, 706, 707, 708, 753, 760, 821, 854, 856, 897, 907, 909, 910, 930
reinforced concrete pavement 897
reinforced concrete pile 340, 473
reinforcement 280, 326, 338, 339, 340, 342, 344, 369, 408, 409, 410, 482, 644, 650, 754, 836, 837, 898, 908
reinforcing bar 43, 339, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 392, 395, 397, 614, 709, 740, 898
relative density 215, 216, 229, 529, 532, 727
relative roughness 197
reliability analysis 33, 74, 378, 516, 737
reliability-based design method 7, 13, 14, 19, 21, 22, 23, 27, 29, 38, 605, 643
reliability index 21, 22, 25, 29, 30, 31, 32, 33, 36, 500, 502, 506, 507, 510, 512, 513, 514, 516, 539, 540, 603, 604, 605, 623, 624, 627, 631, 634, 704, 706, 734, 735, 788, 829, 830, 831, 833, 834
reliability theory 506, 603, 623, 829
replacement method 215, 490
replacement rate 533, 534, 550, 694, 705, 706
Residual Water Level 275
residual water pressure 271, 279, 397, 399, 400, 401, 406, 504, 506, 509, 519, 701, 702, 704, 708, 717, 718, 719, 724, 725, 730, 731, 746, 747, 750, 754, 763, 764, 775, 791, 792
resistance coefficient 77, 127, 741, 791, 792
resistance moment of filling soil 775
resistance wire type wave gauge 203
resistant moment 431, 537, 707, 708
response spectrum 20, 246, 720, 818, 822, 824, 826, 827, 837
responsible engineer 473, 620, 624
restorability 9, 655, 656, 680, 681, 682, 683, 684, 685, 811, 812, 914, 928, 935, 943, 978
restoration cost 734, 829
restoring force 157, 160, 246, 256, 297, 304, 307
retarder 338
return period 4, 5, 10, 14, 19, 23, 55, 58, 79, 123, 152, 154, 155, 156, 593, 607
return wave height 152, 153
revetment 4, 6, 15, 16, 17, 20, 105, 114, 115, 122, 124, 189, 336, 342, 398, 401, 407, 410, 485, 498, 503, 505, 519, 521, 523, 533, 540, 664, 665, 666, 667, 668, 669, 819, 881, 969, 971
RI 215
rigid frame structure 751, 931
river flow 156, 178
river mouth 128, 170, 178, 179, 199, 583, 657, 936, 975

river mouth terrace 179
rocking 606
rod compaction method 542
rolling 21, 49, 160, 301, 302, 327, 338, 343, 556, 557, 558, 583, 672, 690, 968, 969, 976
roll-on roll-off ship 298
root mean square amplitude 119
rope bitt 845
rough terrain crane 891, 892, 894, 902
Rowe's method 718, 723, 724, 728, 730
rubber fender 821, 875, 877, 879, 938
rubber mat 353, 359
rubble 20, 73, 76, 106, 117, 135, 138, 192, 259, 312, 313, 314, 336, 343, 344, 345, 353, 358, 378, 411, 412, 416, 417, 418, 421, 422, 423, 424, 430, 431, 432, 481, 491, 509, 512, 597, 598, 599, 600, 606, 607, 612, 613, 615, 616, 617, 619, 620, 622, 643, 644, 650, 652, 696, 700, 703, 704, 825, 826, 847, 849, 908, 909, 910
rubble mound 76, 135, 192, 259, 336, 343, 353, 358, 378, 418, 423, 424, 430, 512, 597, 598, 599, 600, 612, 615, 616, 617, 619, 620, 622, 643, 644, 650, 825, 826
rubble mound breakwater 424
rubble mound foundation 76, 418, 424, 598, 615, 616
rubble stone 76, 345, 411, 412, 416, 417, 421, 422, 491, 606, 616, 652, 696, 820
running-up waves 181, 653
RWL 506, 537, 539, 702, 704, 706, 707, 731, 735, 736, 786, 788

S

safety 4, 5, 6, 7, 9, 14, 19, 23, 24, 25, 28, 29, 36, 40, 41, 42, 43, 48, 74, 75, 114, 145, 157, 166, 176, 177, 189, 212, 238, 331, 365, 367, 368, 369, 411, 418, 421, 434, 436, 439, 440, 449, 453, 454, 469, 473, 475, 486, 488, 493, 503, 506, 516, 533, 536, 544, 552, 560, 578, 583, 584, 585, 586, 588, 590, 592, 593, 594, 603, 623, 643, 646, 655, 664, 669, 678, 704, 728, 734, 757, 764, 787, 788, 792, 797, 829, 851, 853, 857, 870, 880, 884, 885, 887, 888, 924, 930, 931, 935, 936, 937, 940, 944, 947, 950, 964, 965, 968, 969, 972, 974, 976, 978
safety factor 19, 23, 24, 368, 411, 418, 421, 475, 493, 594
safety index 29, 74
salt concentration 215
salt injury 836, 937
sand bar 181, 182, 674
Sand Compaction Pile 481, 485, 529, 533, 534, 541, 548, 550, 551, 706
sand compaction pile method 350, 521, 529, 530, 531, 533, 536, 537, 538, 541, 542, 550, 551, 603, 605, 624, 705
sand drain method 494, 543
sand invasion prevention cloth 353
sand invasion prevention sheet 543, 700
sand mastic 342, 343, 344, 345, 644, 652
sand mastic asphalt 342, 343, 344, 652
sand mat 350, 493, 494, 533
sand replacement method 215
sand ripples 182
sand spit 179
sand supply rate 529, 530, 531, 532
sand wave 674
sandy beach 181, 199, 583, 588, 973
sandy ground 216, 225, 426, 430, 432, 434, 441, 443, 444, 450, 453, 459, 461, 475, 486, 487, 488, 510, 511, 533, 550, 600, 602, 703, 704, 849
Sarpkaya 168, 169
saturated copper sulfate electrode 335
Savage 186, 198
Saville 106, 165
Sawaguchi's method 758
scouring 42, 124, 175, 178, 189, 190, 191, 192, 342, 343, 353, 354, 365, 421, 423, 598, 614, 615, 616, 638, 641, 651, 653, 659, 690, 691, 866, 927, 928, 930, 973
scouring prevention mat 342, 343
scouring prevention works 189
scour prevention 617, 650, 690
SCP 19, 20, 352, 358, 485, 533, 539, 540, 550, 551, 603, 605, 624, 694, 705, 706
seabed slope 102, 103, 135, 144, 412
sea bottom ground 635, 718, 805
sea bottom slope 99, 102, 105, 117, 974, 975
sea bottom topography 70, 82, 105, 106, 109, 114
seal plate 353
seawall 4, 6, 15, 20, 93, 105, 106, 107, 108, 109, 114, 115, 165, 176, 224, 351, 478, 654, 655, 656, 789, 795, 797, 963, 968, 969, 970
seawater immersion ratio 334
secondary consolidation 221, 477, 478
Second-Order Reliability Method 33
section modulus 732, 734, 827
sedimentation 42, 178, 198, 222, 344, 352, 597, 651, 657, 668
sediment control groin 6, 15, 20, 333, 651, 652, 653, 672
sediment grain size 180, 184, 187, 974
sediment sorting action 180
sediment transport 180, 181, 183, 185, 186, 189, 195, 196, 198, 199, 651, 652, 657, 672, 674, 975
seepage 75, 76, 217, 355, 356, 654, 655, 660, 665, 667, 668, 669, 931, 968, 969, 970, 976
seepage control work 968, 969
seepage flow 217, 667
seepage flow analysis 667
seiche 71, 77, 120, 122, 172
seismic bedrock 5, 7, 235, 236, 238, 248, 250, 251, 253, 262, 263, 264, 265, 608, 609, 610, 696, 822, 826, 944
seismic coefficient 19, 20, 230, 233, 244, 245, 246, 247, 268, 271, 274, 275, 277, 278, 280, 437, 499, 500, 503, 504, 506, 509, 515, 526, 527, 536, 537, 545, 546, 609, 610, 611, 612, 693, 694, 697, 698, 700, 701, 702, 719, 720, 722, 723, 725, 731, 746, 750, 753, 757, 763, 773, 774, 789, 795, 819, 821, 822, 823, 824, 825, 826, 827, 837, 838, 840, 841, 842, 846, 848, 944
seismic coefficient for verification 20, 245, 504, 506, 509, 515, 526, 527, 536, 537, 609, 610, 611, 612, 693, 694, 697, 698, 700, 702, 720, 722, 723, 725, 731, 746, 750, 753, 757, 763, 773, 774, 789, 795, 819, 821, 822, 823, 824, 825, 826, 827, 837, 838, 840, 841, 842, 846, 848
seismic coefficient method 19, 230, 233, 244, 245, 246, 271, 499, 500, 545, 609, 698, 700, 701, 719, 723, 822, 824, 944
seismic deformation method 246
seismic force 230, 358, 430, 432, 484, 698, 765, 847, 849, 947
seismic inertia force 774
seismic moment 236, 240, 241, 242, 243, 262, 263, 265
seismic observation 238, 248, 256, 259
seismic-resistant performance 676, 929, 944
seismic response analysis 14, 30, 230, 239, 240, 245, 247, 255, 256, 257, 258, 264, 268, 500, 609, 610, 611, 679, 693, 694, 695, 696, 698, 700, 709, 720, 722, 783, 818, 820, 821, 822, 835, 944
self weight 6, 15, 16, 17, 55, 150, 222, 312, 317, 372, 373, 378, 379, 384, 385, 386, 391, 392, 394, 404, 430, 437, 438, 455, 476, 484, 486, 519, 585, 592, 594, 601, 654, 659, 680, 691, 704, 711, 712, 713, 714, 715, 719, 753, 758, 759, 767, 768, 810, 821, 823, 843, 845, 848, 851, 864, 865, 870, 913, 914, 927, 935, 941, 942, 947, 964, 966
semi-infinite breakwater 95, 97
semi-infinite elastic body 475

semi-submerged type 141
semi-trailer truck 924, 925
sensitivity factor 21, 22, 32, 36, 38, 603, 604, 605, 613, 621, 623, 624, 627, 631, 634, 649, 706, 707, 736, 737
series system 7, 36
serviceability 5, 9, 14, 79, 155, 365, 366, 367, 372, 373, 374, 375, 376, 378, 398, 403, 404, 423, 441, 453, 641, 679, 680, 681, 682, 683, 684, 712, 713, 714, 760, 767, 769, 808, 811, 812, 813, 850, 852, 864, 870, 871, 878, 884, 886, 889, 923, 928, 935, 943, 949, 966, 972
serviceability limit 5, 155, 365, 366, 372, 373, 374, 375, 376, 378, 398, 403, 441, 453, 713, 760, 769, 813
serviceability limit state 5, 155, 365, 366, 372, 373, 374, 375, 376, 378, 398, 403, 453, 713, 760, 769, 813
service conditions 367
settlement of mound 377
settlement of pile 454, 472
settlement reduction ratio 540, 541
setup 68, 70, 71, 77, 103, 117, 176
shaft 127, 439, 440, 441, 442, 444, 471, 480, 501, 502, 560, 563, 570, 572, 573, 576, 927, 928, 929, 931
shaft resistance 439, 440, 441, 442, 444
shaft resistance of pile 440
SHAKE 256, 257, 268
shaking table test 500, 709, 773, 797
shallow spread foundation 426, 444
shallow water area 86, 174, 553
shallow water waves 126, 132
shape factor of foundation 427, 428
shear characteristic 207
shear connector 407, 409, 410, 930
shear deformation 475, 478, 669, 711, 715, 755, 757, 767, 768, 773, 775, 787, 789, 791, 877
shear deformation of a wall body 715
shear failure 167, 391, 392, 427, 429, 475, 506, 513, 514, 775, 815
shearing force 409, 410, 484, 486, 487, 488, 643, 877, 880, 931
shearing stress 454, 512, 544
shear modulus 230, 231, 232, 236, 238, 255, 256, 257, 258, 259, 260, 328, 520, 780, 784, 785, 788
shear strength 210, 212, 213, 218, 223, 224, 225, 226, 227, 228, 230, 340, 345, 347, 428, 429, 430, 441, 443, 444, 450, 452, 484, 486, 487, 500, 501, 503, 505, 506, 515, 516, 520, 522, 523, 533, 535, 536, 537, 538, 600, 602, 703, 704, 815
shear wave velocity 208, 210, 696
sheet flow 182
sheet pile anchorage 20, 684, 685, 722, 723, 738, 742, 757
sheet pile quaywall 19, 245, 315, 334, 485, 542, 665, 683, 685, 686, 711, 712, 713, 714, 715, 717, 720, 722, 723, 728, 734, 738, 741, 742, 745, 746, 749, 750, 751, 755, 756, 757, 759, 878, 908, 909
shellfish gathering 973, 976
ship berthing force 7, 845
ship dimensions 127, 296, 308, 576
ship fender 875
ship hull structure 880
ship motions 122, 289, 297, 304, 308, 553
ship motion simulation 861
ship navigation 124, 200, 552, 553, 554, 583, 588, 606, 676
shipping company 950
ship squatting 554
ship storage facilities 5, 961
ship storage yard 866
ship turning 575, 577, 578
shoaling coefficient 93, 98, 99, 102
shoaling effect 126, 159
shoreline 70, 82, 99, 117, 119, 132, 143, 144, 181, 183, 187, 188, 194, 195, 651, 652, 653, 673, 974, 975
shoreline change model 194
Shore Protection Manual 168, 198, 417, 424
short-period stability problem 224, 484
short pile 457, 458, 460
side resistance 426, 434, 435
side roller 317
significant wave 70, 80, 82, 83, 84, 85, 86, 92, 94, 103, 104, 106, 108, 116, 120, 121, 124, 130, 131, 132, 133, 136, 139, 143, 145, 151, 152, 155, 190, 204, 412, 413, 417, 418, 419, 558, 590, 597, 598, 625, 626, 632, 653, 795
significant wave height 70, 80, 82, 83, 92, 94, 103, 104, 106, 116, 120, 121, 124, 130, 131, 132, 139, 143, 151, 155, 190, 204, 412, 413, 417, 418, 419, 558, 590, 597, 598, 625, 626, 632, 653, 795
significant wave method 84, 85
significant wave period 80, 83, 84, 94, 131, 132, 133, 136, 145, 413, 419
signs 290, 593, 616, 669, 885, 888, 936, 937, 950, 957
silica fume 370
siltation 43, 178, 179, 196, 198, 552, 651, 674, 866
similarity law 163, 709
similarity number 726, 728
simplified Bishop method 429, 430, 431, 486, 487, 488, 598, 600
simultaneous occurrence 11, 13, 19, 156, 242
single anchoring 579
single pile 36, 439, 440, 441, 450, 451, 453, 454, 455, 456, 457, 458, 467, 847, 849, 878
single pile structure 878
sinker 17, 156, 641, 643, 801, 802, 803, 804, 805, 806, 807, 851, 853
sinker chain 17, 800, 801, 804, 805, 806, 807
sinker type 802, 803
site amplification factors 235, 238, 243, 248, 250, 251, 253, 261, 263
site effects 235, 237, 238, 248, 249, 261, 263, 264, 824
Skempton 222, 479
skin friction 435, 439, 441, 442, 444, 446, 450, 451, 452, 453, 455, 456, 471, 474, 503, 757, 765
slag 19, 338, 345, 346, 350, 351, 352, 521, 522, 536, 545, 550, 614, 901
slenderness ratio 449
sliding 14, 26, 36, 38, 74, 137, 138, 141, 142, 182, 244, 245, 271, 331, 342, 358, 431, 484, 488, 504, 506, 516, 523, 525, 526, 527, 528, 536, 537, 587, 592, 593, 594, 598, 600, 603, 605, 606, 608, 609, 612, 615, 620, 623, 626, 630, 633, 643, 644, 648, 649, 654, 655, 691, 693, 699, 701, 702, 704, 708, 711, 714, 715, 755, 757, 758, 759, 767, 768, 785, 787, 792, 846, 867, 871, 872, 873, 874, 903, 904, 905, 909, 931
sliding resistance 342, 525, 598, 606
sliding stability 605
sliding surface 271, 484, 488, 600, 606
slip failure 15, 16, 17, 24, 25, 34, 312, 429, 430, 431, 432, 484, 485, 486, 487, 488, 489, 490, 491, 493, 505, 506, 516, 523, 525, 528, 533, 536, 537, 538, 539, 540, 544, 551, 592, 594, 596, 597, 600, 601, 603, 605, 607, 613, 614, 620, 623, 624, 626, 630, 633, 665, 691, 701, 703, 704, 705, 706, 711, 714, 715, 734, 736, 758, 759, 766, 767, 768, 769, 785, 819, 836, 969
slipway 5, 20, 384, 801, 866, 867, 868, 869
slit 114, 115, 117, 122, 141, 142, 391, 403, 404, 405, 406, 628, 637, 795
slit caisson 122, 142, 391, 405, 628
slit wall partition 406
slope failure 488
slope gradient 135, 136, 189, 345, 413, 598, 619, 620, 632, 633
slope stability analysis 484, 486, 487, 489
sloping breakwater 20, 74, 116, 117, 139, 140, 358, 411, 412,

413, 415, 416, 418, 593, 619, 620, 621
sloping-top caisson 136, 140, 141, 167, 590, 594, 632, 633
sloping-top caisson breakwater 140, 141, 167, 590, 594, 632, 633
slow drift 159
slow drift oscillations 159
small amplitude wave theory 98, 145, 147
small cargo ship 298, 687
small craft basin 7, 122, 552, 579, 581, 582
SMB method 85
smear 495, 496
soft cohesive soil ground 224, 475
soil improvement
215, 218, 227, 228, 350, 351, 356, 426, 485, 490, 492, 493, 498, 503, 506, 523, 536, 537, 538, 544, 548, 549, 550, 551, 597, 601, 640, 668, 669, 694, 696, 705, 706, 717
soil improvement method 227, 351, 548, 549, 550
soil test 207, 210, 211, 212, 213, 222, 225, 258, 269, 272, 274, 356, 524, 549
solidified geotechnical material 545, 547
solitary wave 104, 128
sorting pond 950
sounding 207, 208, 216, 556
soundness 18, 852, 853, 871, 929, 943, 945, 965, 967
source effects 235, 236, 238, 249, 250, 251, 253, 261, 263
spatial autocorrelation 33
spatially-distributed load 475, 538
spectrum energy 86, 87
splash zone 331, 336, 367
spreading method 92
spring line 308, 309
spring rise 69
squeezed-out failure 429
SRC 407, 410
stability against overturning 508
stability against sliding 26, 523, 525, 526, 527, 648, 649, 701, 757, 785, 846
stability analysis 212, 225, 484, 486, 487, 488, 489
stability number 411, 412, 413, 415, 416, 418, 419, 420
stability of slope 484, 485, 486, 529, 819
stabilized body 355, 498, 499, 500, 501, 503, 505, 506, 509, 510, 511, 512, 513, 514, 516, 517, 526
stabilized soil 346, 498, 499, 500, 501, 502, 544, 549
standard design strength 340, 500, 502, 512, 514, 520, 521, 523, 528
standard deviation 6, 21, 30, 32, 38, 154, 162, 212, 213, 233, 293, 298, 301, 502, 666
standard initial natural frequency of ground 695
standard intensity of illumination 881, 882
standard penetration test 207, 210, 225, 228, 229, 230, 443, 459
Standard Specifications of Concrete 43
standing wave domain 192
standing wave force 129, 133
standing wave height 97, 143
standing wave pressure 139
standing waves 96, 98, 132, 133, 135, 138, 148, 149, 151, 168, 174, 192
static bearing capacity formula 441, 454, 455
static friction coefficient 244, 347, 358, 506
static load 150, 151, 246, 312, 314, 315, 343, 439, 442, 475, 821, 823, 856, 859
static maximum lateral resistance 456, 458, 470
static maximum pulling resistance 454, 455, 456
static performance verification method 230
stationary jib crane 323
stationary pneumatic unloader 323
steel beam 64, 66
steel manufacture slag 352
steel material 326, 328, 330, 332, 333, 334, 340, 410, 732, 736, 737, 743, 787, 878
steel pile 327, 329, 359, 446, 447, 449, 452, 456, 464, 471, 472, 473, 474, 475, 479, 480, 481, 482, 799, 911
steel pipe sheet pile 329, 330, 331
steel sheet pile
326, 327, 330, 331, 333, 334, 336, 338, 667, 669, 670, 715, 717, 719, 728, 732, 751, 757, 768, 775, 780, 781, 790, 798, 970
steel sheet pile quaywall 334, 715, 728
steel sheet pile revetment 336
steel shell type 930
Steel Ship Regulations 309
steep slope 137, 167, 174, 416, 424, 588, 890
Stelson 145, 168
step-resistance type wave gauge 202
Sternberg 186, 198
stern line 686, 872
Stewart 117, 165
stiffening member 811, 812, 815, 841, 842
Stokes' third order wave 150
storage facilities 5, 7, 363, 958, 959, 961
storm surge 57, 58, 59,
68, 69, 70, 74, 75, 77, 144, 156, 176, 203, 583, 585, 586, 590, 596, 647, 650, 654, 659, 665, 865, 931, 957, 968, 973, 976
storm surge height 156
storm surge protection breakwater 586, 647
straddle carrier 317, 891, 953, 955
straight sliding surface 484, 488
strain dependency 520
strain energy 231
strain level 218, 256, 260, 265, 475, 520
stress concentration 536, 703
stress concentration coefficient 536
stress distribution method 537
stress reduction coefficient 536, 540, 542
stress sharing ratio 536, 541, 542
strip method 160, 305
structural analysis factor 365, 506, 509, 511, 512, 514, 515, 516, 528, 600, 606, 612, 648, 649, 702, 703, 704, 708, 732, 733, 734, 738, 739, 743, 747, 748, 775, 785, 792, 861, 873, 874
structural robustness 39, 829
structure factor 365, 368, 369, 370, 371
structure with steel plates 407
strutted frame type pier 840, 841
strut type pier 18
S-type ground 459
subgrade reaction 435, 436, 437, 438, 458, 459, 461, 463, 464, 465, 468, 477, 481, 503, 505, 512, 513, 550, 717, 718, 723, 724, 726, 727, 728, 731, 779, 780, 781, 782, 783, 784, 785, 820, 828, 829, 830, 831, 832, 833, 834, 838, 847, 849
subgrade reaction of sheet pile 726
submerged breakwater 117, 176, 192, 194, 196, 199, 413, 422, 425
submerged member 128, 147
subsurface structure 246, 251, 252, 261, 265, 498
suction dredger 490, 491, 665
superstructure 15,
36, 139, 140, 151, 203, 333, 339, 367, 369, 371, 392, 393, 397, 399, 412, 428, 434, 439, 454, 456, 469, 470, 491, 498, 503, 504, 505, 506, 509, 512, 520, 523, 537, 594, 597, 598, 620, 622, 635, 684, 685, 709, 710, 711, 713, 714, 723, 732, 741, 742, 751, 753, 754, 755, 757, 767, 769, 770, 793, 808, 810, 811, 812, 813, 819, 821, 826, 835, 836, 840, 841, 842, 848, 851, 871, 872, 873, 874, 894, 895, 898, 907, 937, 945
superstructure of piled pier 148
supervision of construction work 473
surcharge 7, 10,

14, 55, 200, 272, 273, 277, 278, 288, 312, 314, 346, 373, 374, 379, 386, 387, 388, 389, 390, 400, 407, 429, 432, 484, 486, 491, 492, 493, 494, 495, 503, 504, 506, 509, 520, 532, 537, 546, 600, 601, 604, 624, 628, 632, 635, 682, 683, 684, 685, 691, 696, 700, 702, 703, 704, 706, 712, 713, 714, 715, 725, 731, 739, 742, 759, 760, 763, 764, 765, 768, 769, 770, 773, 775, 778, 786, 791, 792, 812, 813, 814, 815, 819, 826, 830, 831, 832, 850, 852, 853, 858, 865, 890, 891, 905, 906, 909, 928, 936, 943, 949, 965, 967, 979
surcharge method 492, 494, 495
surface layer sediment movement 180, 184
surface roughness 145, 412, 423
surface wave exploration 207
surface wave profile 202, 203
surf beat 119, 144, 165
surf similarity parameter 105, 413
surf zone 70, 139, 181, 183, 186, 189, 190, 191, 198, 651, 652
surging 120, 124, 160, 413
surging breaker 413
suspended sediment 182, 186, 198, 653
Sverdrup 84, 163
swash zone 181, 183, 187
S wave 177, 206, 232, 236, 237, 242, 250, 251, 255, 258, 259, 262, 263, 264, 266, 267, 268, 269
swaying 160
swell 85, 86, 96, 122, 163, 164, 223, 224, 228, 554, 556, 581, 858
system failure probability 37, 507, 510, 512, 513, 514, 516, 593, 594, 603, 604, 623, 627, 631, 634, 704, 706, 788
system reliability 37, 38, 506, 604, 623, 627, 631, 634, 704, 705, 706, 734, 735
system reliability index 506, 604, 623, 627, 631, 634, 704, 706, 734, 735

T

Tanimoto's formula 418, 419, 420
tanker 159, 297, 298, 299, 301, 304, 686, 846
target reliability index 22, 25, 36, 506, 623
target safety level 23, 24, 36
taut mooring 156
Technical Manual for Floating Structures 170, 310
Technical Manual for Immersed Tunnel 929
Technical Manual for Maintenance of Port Facilities 47
Technical Manual for the Deep Mixing Method in Marine Construction Works 499
Technical Manual of New Type Breakwaters 628
Technical Standards of Rail Truck Laying 908
temporary structure 154, 333, 798, 799
tensile strength 325, 326, 330, 340, 456, 500, 501, 733, 768, 787, 878, 938
tensile stress 329, 330, 392, 410, 733, 768, 781, 788, 827
tensile yield strength 805
tension leg platform 157
Terzaghi's consolidation theory 476, 477
the first limit resistance 441, 442, 454
thermal characteristics 877, 880
the second limit resistance 440, 442, 443, 454
threshold depth of sediment movement 180, 182, 183, 184, 195
threshold rate of wave overtopping for inducing of damage 114
thruster 578
Tickell-Elwany 147
tidal constituent 68, 69
tidal current force 860
tidal flats 179, 973, 975, 976
tidal waves 976
tides in river 178
tie 16, 25, 542, 684, 685, 713, 715, 717, 718, 723, 725, 726, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 755, 764, 897, 898, 909
tie bar 898, 899
tie installation point 726, 728, 731, 732, 734, 764
tie rod 16, 25, 542, 684, 685, 715, 718, 723, 725, 726, 728, 733, 734, 764
tie wire 733
timber handling facilities 552
timber sorting pond 950
time-dependent mild-slope equation 93
time factor 220, 221, 476, 495, 496
time-series seismic wave profile 821
Timoshenko 912
tire-mounted multi-purpose jib crane 317
T load 316
toe pressure 506, 510, 511, 513
total trip 920
towing 127, 377
TP 69, 168
tracer 183, 185, 186, 198
tractive force 7, 297, 304, 308, 309, 641, 650, 723, 733, 734, 742, 743, 764, 801, 803, 804, 805, 806, 807, 821, 830, 831, 837, 843, 845, 848, 853, 857, 860, 872, 873, 874, 907, 908
tractor crane 317
traffic load 898
training jetty 15, 657, 658, 659
train load 312, 314, 316
transfer crane 317, 955
transmission characteristic 625, 630
transmitted wave height 116, 585, 586, 619, 632
transmitted waves 116, 117, 589, 619, 622, 625, 628, 630, 637, 641, 795
transport of wave energy 86, 87, 88
transverse construction joint 898
transverse wave 124, 125, 126, 128, 232
transverse wave velocity 232
trapezoidal caisson 133
traveling of cargo handling equipment 904, 906
treated soil 351, 352, 498, 500, 501, 503, 504, 505, 506, 507, 509, 510, 511, 512, 515, 516, 518, 519, 520, 523, 524, 525, 528, 545, 548, 549
trench type earthquake 679
triaxial compression test 218, 227, 228, 345, 431, 432, 444, 524, 525
trigger level 248
trim 544, 553
trip generation and attraction 916, 917, 920
trough 80, 134, 135, 149, 172, 189, 265, 380, 381, 383, 386, 401, 606, 700, 975
Tschbotarioff method 487
T-shaped sheet piles 787
tsunami 4, 10, 14, 55, 68, 74, 75, 77, 169, 172, 173, 174, 175, 176, 177, 197, 203, 204, 205, 240, 364, 365, 422, 583, 585, 586, 587, 598, 612, 613, 648, 649, 650, 654, 655, 656, 659, 660, 800, 849, 851, 853, 968, 973, 976
tsunami arrival time 173
tsunami height 172, 174, 176
tsunami period 173
tsunami protection breakwater 197, 422, 586, 587, 648, 649, 650
tsunami record 172, 176
tsunami reduction effect 176, 650
tsunami run-up 177
tsunami wave force 176
tsunami wave height 172, 173, 174
turning basin 578, 662
turning of bow 578
type of breakwaters 167, 644, 645

typhoon 42, 59, 60, 69, 70, 74, 85, 163, 166, 590

U

Ueda's formulae 643
ultimate bearing capacity 427, 435, 449, 467, 479
ultimate equilibrium 484
ultimate limit
5, 152, 365, 370, 371, 373, 374, 375, 378, 403, 404, 407, 684, 685, 712, 713, 760, 769, 808, 811, 813, 815, 836, 905
ultimate limit state
5, 152, 365, 370, 371, 373, 374, 375, 378, 403, 404, 407, 684, 685, 712, 713, 760, 769, 808, 813, 815, 836, 905
ultimate load 458
ultrasonic current meter type directional wave recorder 203
ultrasonic type wave gauge 202, 203
unconfined compressive strength
225, 227, 232, 258, 274, 345, 352, 432, 448, 452, 502, 519, 520, 524, 525, 534, 535, 544, 545
unconsolidated undrained condition 223
underwater tunnel 927, 928
underwater welding 334
undisturbed sample 214, 215, 216, 225, 227, 232, 475
undrained shear strength
212, 213, 218, 223, 224, 225, 226, 227, 230, 428, 429, 430, 443, 444, 450, 486, 487, 503, 520, 535, 600, 602, 703, 704
unevenly distributed load 315
uneven settlement 288, 391, 441, 478, 615, 662, 818, 835, 907, 908, 932
uni-directional random waves 80
uniformity coefficient 216, 217, 431, 521
uniformly distributed load 430, 475, 734, 858
universal joint 157
unmooring basin 578, 580
uplift pressure 131, 139, 140, 174, 383, 387, 388, 390, 405, 421, 848
upper beam 404, 406
upright breakwater 20, 96, 117, 593, 618, 619, 622, 625, 632
upright wall 96, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 143, 144, 147, 174, 192, 415, 418, 570
upright wave-absorbing caisson 141, 403, 404, 405, 406
upright wave-absorbing type quaywall 795
upright wave-dissipating block 485, 594
upward displacement of piles by pulling 467
usability 8, 10, 14, 200, 215, 238, 553, 554, 577, 578, 579, 586, 661, 664, 672, 850, 852, 864, 888, 889, 927
UU 223, 224

V

vacuum consolidation method 494, 495
Van der Meer 106, 165, 413, 415, 424
Van der Meer's formula 415
vane shear test 227, 234
variable action 6, 7, 9, 11, 80, 84, 123, 367, 372, 373, 392, 403, 411, 592, 635, 641, 654, 659, 660, 691, 711, 744, 755, 758, 767, 789, 808, 810, 811, 841, 842, 851, 865, 875, 884, 886, 888, 889, 904, 927, 942, 948, 964, 966, 972
variable load 519
variable situation 11, 13, 14, 19, 374, 411, 416, 484, 489, 499, 500, 504, 537, 592, 593, 594, 603, 608, 609, 611, 613, 620, 623, 626, 630, 649, 693, 701, 702, 703, 704, 713, 714, 715, 720, 723, 725, 731, 733, 734, 739, 741, 743, 746, 748, 750, 753, 757, 763, 769, 770, 774, 775, 779, 787, 789, 794, 795, 807, 812, 814, 818, 823, 824, 829, 837, 838, 840, 841, 842, 846, 848, 852, 864, 904, 905, 945
Variance Reduction Techniques 21, 29
V-block method 932
vegetation 975, 976, 979
vehicle load 312, 314, 316, 885
vehicle loading facilities 885
vehicle ramp 853, 885
velocity potential 148, 159, 160
velocity pressure 61, 62, 63, 64
ventilation equipment 930
vertical bearing capacity 434, 436, 437, 480, 757, 785
vertical coefficient of consolidation 477
vertical drain method 227, 228, 492, 493, 494, 496, 548, 549
vertical joint 354, 615
vertical loading test 441, 446
vertical-pile anchorage 19
vertical slit-wall caisson 628
very large crude oil carrier 294
very large floating structure 156, 160
very large ship 581
very soft clay 227
vibratory pile driving method 446
vibro-flotation method 542, 543
virtual fixed point 754, 820, 828
virtual ground surface 763, 819, 820, 822, 825, 826, 828, 829, 835
virtual mass factor 289, 297, 298, 302, 937
VLCC 560, 563, 570, 572, 573, 576
void ratio 96, 150, 195, 214, 216, 218, 219, 223, 225, 232, 271, 476, 484, 521, 540
VRT 21, 29

W

Wagner 150
waiting room 678
waling 16, 711, 713, 714, 733, 734, 743
wall type improvement 498
WAM model 87, 164
warehouse 7, 61, 312, 314, 315, 773, 882, 958
waste disposal seawall 963
waste disposal site 351, 518, 968
water-cement ratio 43
water content 179, 209, 210, 214, 271, 347, 348, 349, 351, 356, 524
waterfront area 937
water gate 4, 6, 20, 660
water hydrant 961
water particle acceleration 145
water particle velocity 144, 145, 168
waterproofness 342
water purification function 974
water quality test 962
water supply volume 962
water-tightness 367, 660
waterway 6, 43, 124, 179, 294, 363, 552, 553, 554, 555, 558, 560, 561, 566, 567, 568, 570, 575, 578, 580, 588, 590, 651, 658, 674, 675, 929, 932, 936, 937, 950
waterways and basins 6, 179, 363, 552, 588, 590, 651
wave-absorbing caisson 141, 403, 404, 405, 406, 628, 629, 630, 795
wave-absorbing caisson type breakwater 628, 629, 630
wave-absorbing performance 625, 628, 629, 630, 795
wave action 22, 88, 94, 128, 129, 130, 139, 140, 167, 189, 412, 415, 645, 658, 674, 854, 857, 859, 877
wave breaking 68, 70, 93, 99, 102, 103, 104, 106, 117, 119, 127, 131, 132, 136, 139, 179, 186, 195, 415, 419, 420, 973
wave breaking point 99, 106, 119, 136, 186, 195
wave crest 107, 124, 128, 135, 145, 149, 169, 195, 204, 380, 383, 386
wave diffraction 95, 98, 159

wave direction 81, 82, 84, 85, 87, 88, 89, 92, 94, 95, 96, 98, 121, 127, 129, 130, 133, 136, 137, 138, 154, 155, 169, 183, 202, 203, 204, 416, 418, 419, 558, 597, 651, 844
wave-dissipating block 20, 36, 96, 107, 138, 139, 140, 385, 389, 415, 416, 417, 421, 485, 590, 593, 594, 605, 607, 622, 623, 624, 632, 633, 637
wave-dissipating type seawall 109, 114
wave-dissipating work 97, 114, 135, 138, 139, 589, 603, 605, 622, 624, 632, 706
wave drift force 159
wave drift force coefficient 159
wave energy balance equation 88
wave energy flux 185, 186, 188, 195
wave-exciting force 157, 159, 160, 161, 304
wave group 83, 94, 132, 133, 151, 412
wave hindcasting 84, 86, 87, 88, 93, 152, 154, 156, 597
wavelength 73, 80, 83, 92, 94, 95, 96, 97, 98, 117, 119, 124, 125, 126, 130, 131, 132, 134, 136, 137, 139, 140, 144, 145, 148, 149, 159, 172, 175, 184, 186, 187, 192, 413, 419, 597
wave-making resistance 157, 160, 304, 305
wave-making resistance force 160, 304, 305
wave observation 77, 154, 155, 169, 177, 186, 202, 203, 204, 205, 206
wave overtopping 70, 74, 93, 105, 108, 109, 114, 115, 119, 124, 133, 156, 165, 421, 586, 590, 619, 625, 628, 630, 638, 646, 648, 654, 664, 666, 667, 669, 940, 973
wave overtopping quantity 109, 114, 115, 666
wave overtopping rate 70, 109, 114, 115, 165, 666, 667, 973
wave profile 119, 128, 167, 202, 203, 204, 232, 235, 241, 255, 263, 264, 821
wave ray 87, 88, 173
wave reflection 73, 93, 95, 96, 142, 148, 189, 192, 583, 625, 635, 638
wave refraction 88, 89, 93, 96, 174, 588
wave refraction coefficient 88, 89, 96
wave run-up 165
waves entering into river mouth 178
wave setup 68, 70, 77, 103, 117
wave shoaling 83, 173, 179
wave spectrum 81, 84, 86, 88, 117, 147, 161, 164, 166, 412
wave steepness 109, 117, 119, 124, 127, 133, 135, 136, 144, 189, 413
wave transformation 88, 93, 95, 96, 109, 136, 650, 651
wave transmission 116, 117, 586, 628, 632, 638, 642
wave transmission coefficient 638, 642
Weibull distribution 152, 153, 154, 301
welded joint 410, 473
welded part 410
well point method 543
wharf 5, 18, 20, 25, 50, 148, 267, 339, 369, 371, 550, 676, 680, 686, 687, 690, 719, 751, 753, 754, 755, 797, 798, 818, 819, 820, 821, 828, 835, 836, 837, 838, 847, 849, 882, 902, 903, 906, 911, 934, 950
width of embankment 492
width of navigation channel 554, 555, 560, 574, 575
width of sediment movement zone 195
wind blown sand 674
wind drag force 157, 158, 161
wind-driven current 74, 178
wind duration 84, 85
wind field 84, 85, 86
wind load 61, 63, 305, 322, 846, 848, 849
wind pressure 57, 58, 61, 62, 63, 64, 65, 66, 157, 158, 297, 304, 305, 308, 309, 315, 597, 846, 947
wind pressure coefficient 61, 63, 64, 158
wind setup 70, 71
wind tunnel test 61, 63, 64, 158, 306, 565
wind waves 85, 86, 87, 122, 163, 164, 173
workability 338, 342, 470, 473, 932
woven cloth 353
WTO 560, 574

Y

yawing 160, 302, 561, 566
yield load 458
yield stress 213, 219, 221, 222, 227, 329, 374, 375, 392, 453, 474, 477, 520, 635, 641, 684, 711, 712, 713, 732, 733, 734, 736, 737, 743, 748, 758, 760, 767, 768, 769, 786, 788, 801, 808, 809, 810, 814, 815, 818, 827, 841, 842, 853, 904, 938

Z

zoning 251, 252

TECHNICAL STANDARDS AND COMMENTARIES FOR PORT AND HARBOUR FACILITIES IN JAPAN

THE OVERSEAS COASTAL AREA DEVELOPMENT INSTITUTE OF JAPAN