

Index

- Aerodynamic admittance, 530
Aerodynamic countermeasures, 550, 551–553
Aerodynamic damping, 530, 547, 548, 557
Air-spinning method, 37, 47, 55, 58, 68, 70, 97, 413, 414, 475
Akashi Kaikyo Bridge, 49, 50, 68, 69, 72, 82, 84, 89, 101, 110, 190, 292, 293, 380, 381, 420, 421, 438, 441, 465, 467, 472, 474, 481, 482, 493–495, 542
Alex Fraser Bridge, 52, 53, 58, 59, 84, 312, 313, 384, 386, 504
Alamillo Bridge, 61–62, 70
Albert Bridge, 8, 9
Ammann O.H., 15, 520
Anchor block, 1, 3, 4, 8, 16, 27, 45, 55, 56, 67, 68, 70, 73, 77, 80, 104, 118, 148, 179, 188, 190–195, 199, 200, 236, 239, 257, 260, 261, 291, 341, 346, 348, 350, 351, 413, 452–461, 463, 470–473, 476, 478, 479, 481, 482, 489
Anchor cable, 2–4, 63, 71, 72, 131, 174, 175, 176, 188, 202–208, 211, 213–215, 217–220, 225, 233, 242, 243, 249, 250, 260, 261, 263, 289, 298–301, 340, 341, 360, 361, 363, 365, 381, 388, 399, 426
Askøy Bridge, 60, 61, 95, 198, 473, 500, 501
A-shaped pylon, 6, 28, 29, 51, 60, 369, 370, 389–395, 396
Asymmetric mode, 157–159, 161, 280
- Bar cables, 93, 94
Barrios de Luna Bridge, 50, 84, 512
Benjamin Franklin Bridge, 84, 456
Bisan Seto Bridges, 55, 56, 88, 100, 196, 197, 239, 257, 335, 336, 380, 436, 437, 451, 457, 465
Bosporus Bridge, 41, 42, 47, 58, 70, 100, 189, 198, 321, 322, 408–409, 465, 466, 481
Bratislava Bridge, 210, 211
Bronx–Whitestone Bridge, 19, 20, 23, 456, 518
Brooklyn Bridge, 10–12, 15, 23, 24, 84, 103, 190, 191, 235–238
Brotonne Bridge, 44, 52, 316, 317, 428, 556, 557
Buffeting, 526–531, 544, 550, 557
- Cable band, 95, 97, 152, 153, 439, 490
Cable net system, 222
Cable saddle, 97, 149, 155–157, 382, 446, 448–451, 484
Cable steel, 8, 66, 85, 86, 110, 111, 118, 139, 141, 148, 165–167, 169–172, 181–185, 188, 193, 206–210, 217–219, 221, 229, 231, 236, 247–249, 258, 260, 263, 264, 346–348, 366
Cable vibrations, 343, 544–546, 548, 551, 557
Carmody Board, 520
Catenary, 127, 135–137, 139, 143–146, 289
Catwalk, 261, 467, 472–475, 479–482, 485, 492, 496
Central clamp, 152, 153, 162, 163, 193–197, 236, 247, 283, 284, 293, 498
Centring device, 195, 236, 295
Chain bridge, 22, 49
Chao Phraya Bridge, 54–55
Cincinnati–Covington Bridge, 10
Clairborne Pell Bridge (Newport Bridge), 37–38
Clark Bridge, 63, 64
Clifton Suspension Bridge, 8
Construction, 4, 8, 10, 11, 15, 17, 21–24, 30, 34, 35, 37, 38, 40, 41, 45, 48, 49, 51, 52, 55, 58, 60, 61, 65–67, 70, 73, 75, 77–79, 81, 83, 85, 88, 97, 100, 104, 106, 109, 185, 200–202, 216, 235, 239, 244, 255, 260, 261, 272–275, 300, 310, 327, 349, 353, 357, 358, 363, 373, 386, 396, 405, 409, 452, 463, 465, 466, 468–470, 473, 474, 488–491, 494, 495, 497, 502, 503, 505, 507–509, 511–513, 517, 519, 531, 536–538, 541, 557, 569, 571, 573
Corrosion protection, 7, 44, 46, 87, 89, 93, 97, 102–109, 139, 209, 316, 421, 461
Coupled flutter, 520, 524, 526
Cross-ties, 221, 222, 557, 558
- Danube Canal Bridge, 37
Davenport wind spectrum, 528, 529
Dehumidification, 40, 69, 97, 104, 449, 458, 461
Dischinger F., 24, 239

- Divergence speed, 523, 524
 Drag instability, 547
 Dry galloping, 544–546, 548
 Dryburgh Abbey Bridge, 517, 518
 Duisburg–Neuenkamp Bridge, 84
 Duisburg–Ruhrort Bridge, 26–27
 Düsseldorf–Neuss Bridge, 46
 Dynamic behaviour, 22, 157, 158, 161, 324–327, 519, 538

 Earthquake intensity, 569
 Emmerich Bridge, 200, 333, 334
 End link, 292, 293, 298, 300
 Equivalent modulus of elasticity, 139–141, 221, 222, 261
 Erasmus Bridge, 66
 Erskine Bridge, 40, 95, 315, 316

 Fan system, 2, 3, 25, 27, 66, 165, 167–172, 174–176, 201, 202, 204, 209, 210, 214, 216–218, 221, 223, 225–227, 229, 231, 233, 237–239, 249, 257, 269, 284, 364, 369, 370, 376, 384, 394, 399, 403, 442, 443, 501, 535
 Farø Bridge, 51, 52, 107, 219, 220, 296, 297, 316, 317, 394, 395, 424, 445, 466, 470, 508–510
 Fatigue strength, 44, 111, 420, 445
 Fatih Sultan Mehmet Bridge, 58, 100, 189
 Firth of Forth Road Bridge, 31, 33, 34, 380, 458, 475, 493, 538
 Flehe Bridge, 46
 Flutter derivatives, 524, 526, 527
 Flutter velocity, 520, 524, 537
 Forth Rail Bridge, 31–34, 82, 380, 458, 475, 482, 493, 538
 Frandsen A.G., 520, 524
 Fred Hartman Bridge, 63–65, 395
 Freyssinet anchor, 421, 422
 Friedrich Ebert Bridge, 35–37, 315
 Fyksesund Bridge, 520, 521

 George Washington Bridge, 15–19, 29, 31, 37, 190, 282
 Gibraltar Strait Bridge, 246
 Golden Gate Bridge, 16–20, 23, 30, 31, 84, 98, 192, 193, 310, 380, 382, 434, 435, 482, 518
 Grand Pont Suspendu, 8, 84
 Grant A, 45

 Harp system, 2, 3, 38, 59, 165, 168–171, 176, 177, 222–234, 242, 285, 288, 289, 357, 365–367, 370, 377, 385, 403, 507
 Helical Bridge Strands, 39, 85
 HiAm socket, 41, 415, 417, 420
 Higashi Kobe Bridge, 62, 234, 235, 333–335, 385, 387, 553
 Hitsuishijima Bridge, 56, 57, 109, 509
 Höga Kusten Bridge, 67, 77, 449, 450, 490, 491
 Homberg H., 35, 54
 Hukacho Bridge, 575
 Humber Bridge, 46, 47, 58, 70, 77, 84, 190, 198, 321, 322, 377, 379, 384, 461, 465, 468, 474, 478, 483, 537, 538
 Hysteresis of Helical strands, 35, 113–115, 198

 Inclined hangers, 35, 47, 58, 113, 114, 198, 199, 201, 436, 474
 Inclined pylon, 210, 211, 391, 396, 398
 Indiano Bridge, 45
 Innoshima Bridge, 49–51, 484
 Intermediate supports, 3, 38, 55, 63, 68, 73, 79, 161, 176, 177, 219, 226, 227, 231, 232, 234, 309, 506–508
 Irvine H.M., 158, 554
 Iwagurojima Bridge, 56, 57, 74, 109

 Jiangdong Bridge, 79, 80
 Jiangyin Bridge, 71, 72
 Joint acceptance function, 530

 Kanmonkyo Bridge, 89
 Kap Shui Mun Bridge, 68, 69, 74, 338, 546
 Katsushika Harp Bridge, 53, 54, 540
 Knie Bridge, 38, 39, 84, 232, 312, 313, 372, 373
 Köhlbrand Bridge, 41–43, 52, 63, 105, 106, 299, 300, 318, 396, 397
 Konaruto Bridge, 257
 Konohana Bridge, 200–202
 Kurushima Kaikyo Bridge, 73, 104
 Kvarnsund Bridge, 60, 61, 84, 319, 320

 Leonhardt F., 45, 46, 199, 200, 566
 Leverkusen Bridge, 32, 33, 38, 95, 231, 232
 Lillebælt Bridge, 39, 40, 86, 95–97, 193, 196, 283, 284, 294, 322, 323, 382, 383, 410, 411, 448, 449, 460, 461, 470, 471, 497–499, 544
 Local oscillations, 284, 285, 535, 556
 Locked-coil strands, 32, 35, 42, 54, 60, 87, 88, 95, 96, 98, 101, 102, 105, 106, 421, 445
 London Millennium Bridge, 75, 76, 190, 559, 568
 Ludwigshafen Bridge, 41, 178, 513, 514

 Mackinac Bridge, 23, 24, 31, 37, 49, 496
 Manhattan Bridge, 13, 15
 Mannheim–Ludwigshafen Bridge, 41
 Maracaibo Bridge, 29, 30, 106, 250, 254, 318, 319, 428, 429
 Mariánský Bridge, 70, 71
 Mechanical damping, 553
 Meiko Nishi Bridge, 51, 391, 393, 545
 Menai Bridge, 7, 84
 Messina Strait Bridge, 22, 23, 83, 110, 325, 326
 Millau Viaduct, 78, 252, 253, 399, 401, 513, 515
 Miranda F. de, 46
 Modified fan system, 364, 370, 377, 391
 Mono-strand cable, 43, 88, 106, 218, 421, 423, 429, 444, 487
 Moisseif L.S., 13, 16, 18, 519
 Morandi R., 29, 30, 37
 Multi-cable system, 4, 24, 35, 36, 40, 41, 44, 45, 88, 112, 169, 170, 218, 219, 268, 284, 288, 289, 294, 295, 303, 307, 427, 430, 433, 442, 444, 504
 Multi-span bridges, 244, 246, 399
 Multi-strand cable, 4, 94, 95

- Nanpu Bridge, 60, 63
 Napoleon Bonaparte Broward Bridge (Dames Point Bridge), 59, 233, 314, 403, 404
 Navier, C.L., 24, 25
 Neuweid Bridge, 400
 New PWS cables, 90, 91, 101, 102, 106
 Niagara Bridge, 9
 Nordereibe Bridge, 30–32, 98, 106, 368
 Normandy Bridge, 65, 66, 72, 76, 84, 93, 275, 298, 299, 324, 325, 371, 396, 403, 422, 425, 426, 445, 447, 487, 488, 508, 509, 510, 552, 558
 Novi Sad Bridge, 486

 Oberkasseler Bridge, 176, 177, 298, 316
 Ohmishima Bridge, 57, 198, 322, 323
 Ohnaruto Bridge, 50, 51, 55, 89
 Ohshima Bridge, 57, 198, 322, 323
 Øresund Bridge, 73, 74, 113, 114, 234, 235, 339, 340, 373–374, 411, 431, 445, 446, 468, 488, 503, 534, 544, 552, 553, 555, 573–575
 Ostenfeld C., 39

 Papineau Bridge, 38, 39
 Parallel-strand cable, 91–93, 101, 108, 112, 420, 425, 426, 487
 Parallel-wire strand, 37, 38, 46, 87–90, 97, 100, 106–108, 114, 415, 419, 424, 445, 481, 485
 Partially earth anchored systems, 339–351
 Pasco–Kennewick Bridge, 45, 59, 108, 320, 321, 376, 442, 443, 510, 511
 Pedestrian-induced vibrations, 559
 Pipeline bridge at Barbara, 272, 273
 Pylon, 1–4, 6, 8, 11, 15, 19, 23–33, 35, 40–42, 45–48, 50–53, 55, 57–63, 65–68, 70–74, 76, 77, 79, 81, 82, 84, 97, 104, 118, 124, 125, 148, 154, 161, 171–176, 178–180, 182, 184, 185–190, 192–194, 199, 200, 202–219, 221–225, 227–231, 233, 234, 236, 238, 239, 241–265, 268–271, 274, 277–280, 282–285, 287, 289, 291–299, 302, 310, 316, 326–328, 340–351, 353–411, 434, 442–449, 451, 463–474, 480–482, 486–490, 492–494, 496, 497, 499, 502–506, 508–510, 513–515, 519, 520, 533, 538, 540–544, 550, 551, 569–572, 574, 577, 578

 Rainbow Bridge, 463, 464, 542
 Rain-wind-induced vibrations, 545, 546, 550, 552, 553
 Rama VIII Bridge, 88, 396, 398
 Rama IX Bridge, 54, 63
 Record spans, 84
 Reduced velocity, 526, 532, 541, 548, 550
 Rees Bridge, 36
 Rein chord system, 26, 27
 Reynolds number, 534, 540, 546–548, 551, 552, 557
 Rion Antirion Bridge, 77, 403, 570–572
 Roberts G., 34
 Roebing J.A., 8
 Rokko Bridge, 43, 44, 333, 334, 377, 378, 502
 Runyang Suspension Bridge, 78, 322

 Saale River Bridge, 517
 St Nazaire Bridge, 42, 84
 San Francisco–Oakland Bridge, 16, 55, 56, 239–241, 260, 331, 377
 Save Bridge, 463, 519
 Scaling, 533, 536, 537
 Scanlan R.H., 524
 Scruton number, 549, 550
 Secant modulus, 131, 138–140
 Second Bosphorus Bridge, 58, 70, 100, 189, 198, 481
 Second Nanjing Bridge, 76
 Second Severn Bridge, 108, 314
 Second Tacoma Bridge, 21, 23, 24, 31, 49
 Seismic design, 568, 569
 Selberg A., 22, 518, 520, 524
 Self-anchored system, 4, 5
 Seven-wire strand, 44, 85, 86, 91–93, 102, 109, 420–422, 444, 486–488
 Severins Bridge, 28–30, 38, 84, 95, 389–390, 506, 507
 Severn Bridge, 34, 35, 39, 41, 47, 58, 97, 99, 108, 113–115, 198, 199, 314, 321, 322, 408, 436, 440, 452, 454, 497–500, 542, 575, 576
 Shantou Bridge, 66, 67
 Shimotsui Seto Bridge, 55, 100, 481
 Snow and ice removal and prevention, 575
 Socket, 18, 41, 87, 100, 101, 105, 109, 150, 301, 413, 416–421, 423, 429, 438, 439, 444, 452, 454, 461, 481, 487
 Speyer Bridge, 370
 Spinning wheel, 38, 475, 477–482
 Splay chamber, 452, 457–461
 Stability of cable system, 173–179
 Steinman D.B., 12, 22, 23
 Stonecutters Bridge, 79–81, 127, 326, 328, 369, 388, 425, 510, 511, 540, 542, 543, 552, 553, 570
 Storebælt Bridge, 336, 476, 477, 497, 525, 531–533, 538, 539, 542, 544, 545, 553, 554, 575, 577
 Strand shoe, 148, 413–415, 449, 452–454, 475, 477, 480, 481
 Strömsund Bridge, 25–27, 37, 84, 94, 97, 218, 343, 358, 359
 Structural health monitoring, 573
 Sunshine Skyway Bridge, 52, 53, 59, 557
 Sutong Bridge, 79, 81, 84, 343, 396, 505, 570
 Symmetric mode, 157–161, 280, 282, 283, 285
 Synchronous lateral excitation, 75, 559

 Tacoma Narrows Bridge, 18, 20, 517–520, 533, 542, 543
 Tancarville Bridge, 27, 28, 31, 39, 95, 96, 194, 331, 332, 439, 441, 485
 Tangent modulus, 101, 130, 131, 138–140, 261, 278
 Tatara Bridge, 72, 73, 76, 84, 324, 325
 Tay Bridge, 517, 518
 Tempozan Bridge, 394, 396
 Theodor Heuss Bridge, 27, 29, 30, 84, 95, 365, 372, 510
 Ting Kau Bridge, 71, 242, 243
 Tjörn Bridge, 48, 49, 430, 510
 Torsional divergence, 520
 Torsional oscillation, 19, 35, 280, 281, 285, 524
 Train loads, 70, 113, 114, 295, 335, 339

- Triangular pylon, 30, 246, 250–257, 262, 263, 399–401, 403
Tsing Lung Bridge project, 326, 327
Tsing Ma Bridge, 67, 68, 101, 192, 337, 338, 384–385, 465, 473, 479, 490, 497
Tsurumi Tsubasa Bridge, 62, 63
Tuned mass damper, 19, 468, 508, 509, 553, 555, 567
20th April Bridge (Tagus River Bridge), 33, 34, 50, 190, 191, 196, 436, 482

Verrazano Narrows Bridge, 30–32, 46, 332, 333, 405–407, 415, 436, 437, 454, 457, 463, 464, 475, 482, 496
Vertical oscillation, 35, 280, 283, 285, 520
Vibration control, 541, 542, 567
Vibration serviceability limit state, 531, 562, 565, 574
Vortex-shedding, 321, 526, 531, 538, 540, 541, 544, 546, 549–551
V-shaped pylon, 365–367

Wake galloping, 550, 551
Wheeling Bridge, 8, 11, 84
Williamsburg Bridge, 12, 13, 15, 18, 24, 84, 338, 339
Wind-tunnel testing, 523
Wöhler curve, 111–113

Xihoumen Bridge, 68, 81, 82, 192, 327, 436, 438

Yangpu Bridge, 63, 64, 84, 313, 321
Yokohama Bay Bridge, 58, 59, 62, 385, 387
Youngjong Bridge, 74

Zakim Bunker Hill Bridge, 575
Zarate-Brazo Largo Bridges (Parana Bridges), 46, 89, 90, 106, 107, 284, 319, 320
Z-shaped wrapping wire, 104