

Index

- activity schedules, 36, 77, 82–5, 87–94, 96, 293, 364, 370–372, 374–5, 487, 507, 509, 514, 519
- adjustment item
 - tender, 293–5, 514
 - Director's, 171, 179–80, 198, 539–40, 542
 - drainage, 435–436,
- admeasurement, 68, 265, 291, 293, 299, 304–6, 308–9, 314, 324, 346, 372, 385, 403, 424–7, 431, 439, 445, 489–92, 494, 507–9
- appendix, to contract/tender, 271, 293, 378, 387, 391, 458, 467, 510

- barrier to trade, 332, 397–398, 401, 404–5, 407
- bills of quantities
 - decline in use of, 15, 39, 43, 63–4, 66, 166
 - formal, 5, 15–16, 18, 36, 39, 43–4, 63, 66, 68, 79, 81, 90
 - informal, 5, 15–16, 18, 40, 64, 66, 78–9, 487
 - operational, 36, 63, 77–8
- BIM *see* building information modelling
- budget, 25, 98, 109, 113, 118, 132–3, 142, 196, 521
- builders' quantities, 16, 19, 24, 51, 78–82, 137, 139, 141, 565, 567–9
 - risk 16
- building information modelling (BIM)
 - Bew-Richards Maturity Wedge, 28, 33
 - 3D BIM, 9, 30
 - 4D BIM, 31
 - 5D BIM, 31, 35–6, 61
 - design/design liability, 6, 28–9, 31, 244
 - extra over, 60
 - government strategy, 9, 21, 29
 - IFC, 30–31, 58, 60
 - implementation, 6, 9, 14, 29
 - information, 3, 7–8, 9
 - measurement/quantities, 6, 9, 14, 18, 26–7, 31–6, 46, 57–61, 80
 - RIBA plan of work, 23
 - uniclass, 13
- CAWS *see* Work Sections (Coordinated Arrangement of)
- CESMM *see* civil engineering standard method of measurement
- civil engineering standard method of measurement (CESMM)
 - CESMM4, 16
 - characteristics, 14
 - CIRIA report, 13
 - item coverage, 272, 303, 312, 324, 344, 350, 355
 - origin, 13
- cloud, 29, 31, 52, 55, 59
- commercial opportunity, 99, 190, 196, 306, 441
- communication
 - information, 6, 8
 - Tavistock Report, 8–9
- conditions of contract,
 - BIM 9
- construction industry
 - business models, 8
 - constructing excellence, 8
 - medieval builders, 8, 22
 - reports, 8, 499
 - structure, 9–10

- contract data, 229, 271, 282, 293, 301, 374–5, 378, 387, 391, 458, 514, 521
- contract neutral, 16, 265, 283–4, 291, 297, 304, 365, 377, 400
- contractor design, 24, 51, 190–192, 211, 283, 286, 364, 368, 370, 376, 396–401, 404–6, 475, 516, 552–3
- contracts, forms of *see also* FIDIC, ICC, ICE, JCT, NEC
 - term contracts, 75, 168, 286, 316, 396
- contracts in use
 - RICS survey, 15
- contracts, types of
 - lump sum, 87–8, 90, 95, 101, 162, 190–191, 291, 370–371, 453, 490–494, 497, 501–3, 505, 507–9, 511, 513–14, 540
 - measure and value, 17, 64, 66, 68, 80, 95, 101, 162, 190, 299, 370–372, 425, 490–494, 499, 501, 503, 507–9, 511, 516–18
 - reimbursement, 66, 73, 97, 101, 461, 492, 518, 520, 527
 - target cost, 63–4, 75, 82, 90, 101, 111, 156, 211, 213, 265, 364, 370, 372
- contract sum analysis, 96, 487
- contribution proceedings, 166
- cost control, 25, 109–11, 113, 142, 179, 181, 202
- cost management, 10, 21, 105, 110, 135, 161, 179, 211
 - Biblical references, 21, 25
- cost planning, 32, 35, 48, 58, 81, 106, 108–13, 116, 119, 132–6, 138–41, 145, 148–9, 152, 156, 165, 202, 213, 239
- cost-value reconciliation, 17, 487, 489, 495
- daywork, 17, 66, 97–101, 169, 179, 182, 199–200, 267, 281, 283–5, 302, 307, 379, 445–6, 456–7, 492, 495, 513–15, 518–19, 550, 552
- defined cost, 90, 100–101, 182, 297, 507, 516, 519–23
- design
 - CAD, 24, 26, 28, 31, 33–4, 46, 51, 53–7, 59–60, 80, 146
 - cost control, 25, 109–11, 113
 - intent, 23–5, 201
 - process, 13, 23–4, 26, 28, 110, 112, 116, 134, 145, 156, 167, 211, 498
- designated outline, 332, 381–2, 386, 401–5, 407–8, 412–13, 417, 446, 549–51
- documents, priority of, 504
- dredging, 313, 319, 450, 452, 467, 470–472
- earthworks balance, 412, 420, 433, 469
- earthworks outline, 382, 409, 413–15, 417–19, 427, 430–431, 435–7, 440, 443–4
- earthwork support, 11, 32, 44, 489, 565, 568, 570
 - CESMM4, 272, 310, 318, 341, 344, 347, 356
 - NRM1, 139
 - NRM2, 209, 236, 243, 246–9, 253, 261, 535, 537–8
 - POM(I), 454, 463, 467–8, 558, 560, 563
- Edexcel, 39
- extra over, 60, 246–7, 249–50, 252, 259, 262, 311, 339, 346, 385, 389, 420–421, 425, 437, 441, 467, 473, 475, 480, 481, 516, 535–8
- FIDIC
 - dredging contract, 319, 471
 - Red Book (1999), 19, 66, 266, 276, 290, 293, 297, 304, 319, 372, 450, 455, 457–8, 471, 504–5, 509, 512–13, 516
- final account, 111, 113, 171, 198, 200, 288, 488–90, 492–4, 508, 511–23, 539–40, 542
- framework agreement, 142, 168, 271, 286, 369, 504, 527
- Government construction strategy, 9, 21, 29
- hard material, 523
 - CESMM4, 308–10, 314–17
 - MMHW, 382, 385–6, 389, 413, 420–427, 438–42
 - NRM2, 247, 262
 - POM(I), 471
- ICC conditions
 - design and construct version, 96,
 - ground investigation version, 307
 - measurement version, 191, 265–6, 276, 287, 290, 292–4, 297, 299, 307, 372, 387, 391, 400, 413, 419, 445–6, 454–8, 545–8, 490, 494, 502–5, 508, 512–13
- ICE conditions, 96, 100, 265–6, 283, 287, 292–3, 295, 297, 300, 304, 307, 318, 364–365, 372, 374, 378, 490, 509
- inflation, 110, 120–121, 123, 130–132, 140, 144, 159
 - construction, 124, 130–131, 140, 146–7
 - diagram, 146
 - indices, 113, 146
 - risk, 123–4
 - tender, 124, 130–131, 140, 145–7
- JCT contracts, 146, 170–171, 457–9, 490, 493–4, 503, 540
 - with approximate quantities, 13, 163
- design and build contract, 80, 96
- NRM2 update, 13, 163

- with quantities, 67, 82, 89–91, 162, 175–6, 182, 184, 202–3, 228, 266–7, 293, 297, 453, 457–8, 502, 505–6, 512–13, 515, 538
 - without quantities, 13, 75, 163
- liquidated and ascertained damages, 239, 438, 501
- mass haul diagram, 412
- measure and value
 - system of, 10
- measurement
 - computerised, see software
 - paper-based methods 7
 - physical, 5, 19, 42, 495–6
 - RIBA plan of work 2013 18
 - risk 17–18, 19, 66, 81, 372, 489
 - site, 318, 435, 437, 495, 497
 - standardisation of, 10–11
 - uses 5, 16–17
- measuring
 - cut and shuffle, 39, 43–4, 237–8
 - digitiser, 6
 - dimension sheet, 35, 40–41
 - direct billing, 44
 - from drawings, 6
 - from images, 40, 53–4
 - on-screen, 5, 6
- method of measurement for highway works (MMHW), 11, 19, 26, 47, 191, 238, 254, 333, 372, 374, 375, 378, 379, 380–395, 409–12, 419–21, 426–9, 431–2, 434–5, 437–8, 555
- designated outline, 332, 381–2, 386, 401–5, 407–8, 412–13, 417, 446, 549–51
- item coverage, 15, 365, 381–2, 385, 387–91, 394–6, 407–11, 417, 420–421, 428–9, 433–4, 437–9, 441–2, 444, 456, 464–5, 468, 505, 537, 549–50, 556
- origins, 14
- road and bridge works, 14–15
- method-related charge, 14, 78, 176–7, 223, 238–9, 243–4, 272, 276, 293, 295–301, 303, 305–7, 324, 331, 351, 384–5, 389, 409, 442, 444, 468, 472, 491, 495, 560
- methods of measurement,
 - BIM, 9
 - item coverage, 17, 51, 65
 - non-UK, 11–12
 - UK, 10–11, 12
- MMHW *see* method of measurement for highway works
- models,
 - 3D, 7
 - delaying, 7
- NEC3 contracts
 - ECC, 19, 22, 82–3, 89–97, 101, 182, 202, 229, 249, 297, 300, 304, 307, 318, 364, 370–372, 374–5, 387, 391, 401, 413, 419, 445–6, 453–4, 457–8, 494, 505, 507, 512–13, 516, 519–23
 - short form, 364, 370, 374
- negligence, 13, 107–8, 165–6
- new rules of measurement
 - JCT update, 13
 - publication, 16
 - RICS, 6, 13
- new rules of measurement (NRM1)
 - item coverage, 81
 - status, 106–8, 113, 122, 133, 221
- new rules of measurement (NRM2)
 - item coverage, 167, 209, 236, 252–4, 260, 262–3
 - status, 165–6, 179, 221
- OGC gateway process, 23, 108, 112, 133–4, 167, 183
- overbreak, 347, 357, 413, 434, 438, 440–441, 476, 537–8, 565
- over-measure, 196, 492, 495, 506
- Pareto principle, 15, 65, 79, 93
- payment, 9, 421–2, 471, 475, 491–2, 494, 497, 501, 508, 512
 - additional, 68, 229, 412, 421–2, 500, 538
 - applications, 17–18, 83, 95–6, 406, 488, 518–19
 - interim, 22, 89–94, 97, 235, 293–4, 296, 411–12, 479, 495, 513
 - line, 315–16, 325, 357, 468, 497
 - methods, 75, 96–8, 300
 - preferences, 83–5, 93, 371
 - terms, 22, 93, 170, 283–4, 300, 375, 381, 386, 492
- payment line, 315–16, 325, 357, 468, 497
- P C sum, 67, 174–5, 234, 288–9, 354, 446, 455–7, 489, 494
- performance bond, 303
- physical measurement, 5, 19, 42, 495–6
- pre-action protocol for construction and engineering disputes, 107–8, 166
- preliminaries, 75, 91, 93, 193–6, 199, 491–2, 500–501, 513, 520, 527, 534
- CESMM4, 273, 294, 301, 303
- defined work, 188
- main contract, 110, 118, 120, 127, 140–141, 163, 170, 172–3, 177, 179, 184–6, 189, 205, 215, 222–3, 236, 239–43, 491
- MMHW, 376, 379–81, 395, 409–11, 457–9, 491–2, 500–501, 513, 520, 527, 534

- preliminaries (*cont'd*)
 - NRM1, 110, 118, 120–121, 127–31, 149, 156, 159, 213
 - NRM2, 165, 169–70, 174–6, 178–9, 183–6, 190, 195, 205, 214–15, 222, 224, 233, 238–9
 - POM(I), 457–9
 - subcontract, 120, 127, 140–141, 163, 172–3, 176, 178, 180, 184–6, 212, 215, 222–3, 236, 239–41
- price list, 75, 82, 95, 370–371, 519
- principles of measurement (international)
 - item coverage, 81
 - Pareto principle 15
 - use 15
- procurement, types of
 - BIM, 9
 - DBFO, 370, 396, 400
 - design and build, 5, 15, 17, 24, 39, 63, 96, 120, 134, 163, 166, 190, 211, 271, 369, 516, 527, 565
 - design and construct, 39, 79
 - drawings and specification, 5, 39, 43, 63–4, 75, 79–82, 166, 211, 267, 276, 395, 396, 450, 453, 509, 561
 - traditional, 39, 63, 66, 79, 101, 110, 112, 156, 167, 190–191, 211, 259, 270, 286, 372, 425, 447
 - two-stage, 23–4, 142, 156, 211
- professional competence, 13, 106–7, 165
- programme, 23, 28, 31, 75, 82–3, 86, 89–97, 101, 188, 191, 239, 241, 285, 296, 384, 411
 - accepted, 372, 504, 516, 519
 - construction, 5, 17
 - 4D, 36
 - procurement, 147
 - tender, 17, 64, 87, 294
- provisional quantities, 67, 88, 169, 175–6, 181–4, 194, 203, 235, 291, 382, 445–6, 456, 489, 493, 506, 514–18
- provisional sum, 174, 193, 199, 270, 281, 284, 445, 455, 489, 515, 519
 - defined, 164, 170, 175–6, 187–8, 291, 301, 318, 493, 506
 - undefined, 98, 175–7, 187–8, 493
- QS conventions
 - anding-on, 40, 43, 48
 - dotting-on, 40, 42
 - timesing, 40–42
- quantity surveying
 - origins, 3
- remeasurement, 64, 81, 95, 182, 235, 364, 437, 489–92, 494, 503
- RIBA plan of work, 18, 22–4, 110, 112, 133–4, 148, 167, 183, 527
- risk, balance of, 11, 17, 51, 89–90, 368, 370
- rock, 11, 516, 523
 - CESMM4, 268–70, 282–3, 292, 308–10, 313–16, 319–20, 344, 346, 357–58, 543–4
 - MMHW, 385, 420–421, 423–6, 440
 - NRM2, 247, 262
 - POM(I), 467–8, 471–3, 475–6, 516
- schedule of cost components, 101, 519–21
- schedules of rates, 18, 66, 68–72, 77, 161, 165, 168, 178
 - item coverage, 70
- schedules of works, 18, 75–7, 164, 167–8, 178
- shorter schedule of Cost components, 101, 519–21
- site measurement, 318, 435, 437, 495, 497
- SMM7
 - item coverage, 248, 261
- software, project management
 - Asta Powerproject, 31, 36, 78, 93
 - Project Commander, 78, 93
 - Microsoft Project, 78, 93
- software, QS
 - Buildsoft Cubit, 34–5, 47–51, 53, 55, 57–60, 80, 450–451, 529, 565, 567, 569–70
 - CATO, 34–6, 40, 47–8, 53, 55, 58, 123, 134, 156, 207–8, 230–231, 241, 367, 450–451, 459, 461, 468, 529, 560–561, 569–71
 - Exactal CostX, 50, 53, 58
 - Microsoft Excel, 34–5, 43, 50–52, 58, 80, 100, 123, 134, 450, 569
 - QSPro, 36, 40, 43, 47–9, 51–2, 154, 156, 208, 230–231, 240–241, 367, 393
 - Snap Vector, 47, 53
- standard phraseology, 12, 45, 61, 162, 393
- taking-off *see* measurement
- uncertainty, 4, 67, 117, 145, 195, 412, 423, 488–9, 491, 556
- under-measure, 196, 347, 491, 495, 506
- value added tax (VAT), 131–2, 147, 179, 200
- variations, 45, 51, 64, 66–7, 88–90, 100–101, 171, 195–6, 235, 253, 272, 282, 284, 291, 294, 305–6, 336, 386, 403, 449, 491–2, 500, 509, 514, 518
 - to the contract, 5, 75, 80–81, 90, 96–7, 232, 276, 297–8, 375, 488–9, 494, 496, 503, 514, 551
 - to the design, 32, 511
- design and build contracts, 17
- in pile depths, 498
- JCT contracts, 182, 202, 228, 493, 511, 515

- schedules of works, 77
- valuation of, 5, 19, 64, 75, 81, 90, 171, 196, 202, 272, 276, 282, 284, 294, 324, 386, 406, 411, 457, 460, 493–4, 511, 516
- work-in-progress, 5, 19, 64, 80–82, 89, 92–3, 166, 235, 253, 271–2, 294, 298, 300, 495, 520, 551
- Work Sections
 - Coordinated Arrangement of 12–13
- working space, 11, 44, 565, 568
 - CESMM4, 272, 318, 347
 - MMHW, 413
 - NRM2, 175, 243, 246
 - POM(I), 458, 558, 560, 563
- written short, 69, 390, 395, 409, 421, 433–4, 438–40, 442
- Z clause, 93, 364, 372, 374, 504