Index

A
AIF (see Atomic Industrial Forum)
ANSI (see American National Standards Institute)
AOQ (see Average outgoing quality)
AOQL (see Average outgoing quality limit)
AQL (see Acceptable quality level)
ASME (see American Society of Mechanical Engineers)
ASNT (see American Society for Nondestructive Testing)
ASPR (see Armed Services Procurement Regulations)
ASQC (see American Society for Quality Control)
ASTM (see American Society for Testing and Materials)
AWS (see American Welding Society)
Absolute power of discrimination, 411
Acceptable quality level
Choice, 418
Cost
Considerations in choice, 418–421
Impact, 252
Definition, 251, 410
Accounting
Quality organization costs, 644
Total quality costs, 658–663
Accuracy
Measurement, definition, 317
Versus speed in training for the acquisition of skill, 622
Active repair time, definition, 16
Administration of the quality function, checklist, 312
Advertising precautions regarding product liability, 571
American National Standards Institute, listing of quality documents, 260–262, 270, 274–277, 297
American Society for Nondestructive Testing, listing of quality documents, 263
American Society for Quality Control, listing of quality documents, 263, 297
American Society for Testing and Materials, listing of quality documents, 263, 279–284, 297
American Society of Mechanical Engineers
Authorized nuclear inspector, 490
Boiler and Pressure Vessel Code, safety factors, 155, 161, 556
Listing of quality documents, 262, 263, 278, 279
American Welding Society, listing of quality documents, 284
Anders, William, 350, 365
Arithmetic mean, as a measure of measurement bias, 318
Armed Services Procurement Regulation XIV, correction of defects, 556
Army Materiel Command, Class I change, definition, 403
As-built
Configuration, 401
Measurements in relation to inspection, 479
Assignable cause, 517
Atomic Industrial Forum, 350
Attributes (see also Characteristics)
Sample, continuous, single level, 434, 435-444
Sampling
Continuous, multilevel, 434, 444-450
Definition, 407
Discovery, 427-433
Double, 423
Item-by-item, 426
Life test, 450-478
Life test, sequential, 469-478
Multiple, 424-426
Single, 423
Audit
Checklist, 305, 312-314
Inspection, 611
Performance, 609
Planning, 606, 616
Quality systems, 605
Raw material test reports, 228
Authorized nuclear inspector, 490
Availability
Definition, 12
Demonstration testing, requirement, 223-225
Factor in trade-off analysis, 87
Quantitative requirements, 215
Relationship to system effectiveness, 12-16
Average
Outgoing quality, definition, 416-418
Outgoing quality limit
Cost considerations in choice, 418-421
Definition, 416-418
B
Batch process control, 521
Bathtub curve, explanation, 600
Behavioral standards for inspectors, 448
Bias of measurement, definition, 318
Bonding personnel certification, 509
Brazing personnel certification, 509
Break bundling as a change scheduling technique, 390
Budgeting for quality, 637
C
CASE (see Coordinated Agency for Supplier Evaluation)
Calibration
Control, 317-349
Corrective action, 341
Cost, 324
Cycles, 329
Decals, 329
Definition, 325
Expiration date, 338
Frequency, 329
Hierarchy, 321
Inspector's role, 483
Intervals, 329, 333-335
List of related documents, 273-296
Management system, 326
Multiple
Cost versus protective value, 344
Definition, 344
Relation to corrective action, 341
Policy, 327
Procedures, 328
Ratio (see Calibration multiple)
Recall, 343
Records, 330, 337
Scope, 327
Seals, 339
Standards, 321
Status prior to test, 361
Traceability, 330
Versus cross checking, 325
Call for inspection, 490
Capability
Definition, 12
Factor in trade-off analysis, 87
Relationship to system effectiveness, 12-16
Catastrophic failure, definition, 599
Cause and effects analysis
Annotation on drawings/specifications, 140
Approach, 122
Bounding, 121
Common mode failure condition, 134
Effects/consequence diagram, 135-137
Fault/cause diagram, 123
Objectives, 120
Quantitative evaluation, 127
Relationship to failure mode and effects analysis, 128
Reporting, 137
Requirement, 219
Symbols, 123-125, 135
Certificate (of)
Analysis, requirement, 227-229, 238
Compliance, cost impact, 251
Compliance, definition, 251
Certification
Personnel, 509-511
Versus qualification, 509
Change
Class I, definition, 391-403
Class II, definition, 391
Contract resulting from different standards, 557
Cost, 383, 387
Design phase, quality considerations, 388
Form, fit, or function, 389, 391
Impact, 385-390
Incorporation
In-line accomplishment, 392
Out-of-position accomplishment, 392
Verification, 397-401
Incorporation effectivity, 392
Notice, 391
Part number as a result of design change, 389
Priority, 385
Procured items, 245
Proposal phase, quality considerations, 385-388
Reasons, 382
Release, 394
Scheduling
Authority regarding stop work orders, 388
Long lead items, 387
Techniques, 392-394
Traceability, 396
Characteristic
Call-out in inspection plan, 498
Classification, 140
Complexity, 419
Importance versus tolerance, 140
Product, definition, 140, 410
Check points (see Inspection check points)
Checklist
Actions in case of product liability claim, 572
Calibration environmental controls, 346, 347
Causes of inspection ineffectiveness, 612
Change scheduling, 394
Characteristics of good quality reporting, 582
Choice of sampling plan, 407–409, 418–422, 476
Codes, 260–299
Configuration management, 384
Control of nonconforming items, 314, 558
Cost factors for inspection planning, 494
Design control, 312
Design evaluation, 182–191
Fabrication control, 313
First article configuration inspection, 401
Frequently used quality measures, 581
In-process controls, 504–507
Inspection planning, 231, 492, 497, 504–507, 534–540, 541–544
Inspector's responsibilities, 482
Leak test procedure, 235
Magnetic particle examination procedure, 234
Material review dispositions, 551–558
Material review documentation, 559
Measurement control, 327
Organizations offering failure data, 601
Penetrant examination procedure, 233
Personnel certification, 236
Procurement control, 254, 312–314
Procurement requirements, 208
Product liability prevention records, 571
Product liability preventive actions, 570–572
Qualification test controls, 223, 357

Quality
Administration, 312
Cost accounts, 658–663
Cost data, 645–654, 658–663
Information feedback considerations, 582
Status measurements, 581
Radiographic examination procedure, 232

Requirements
Plant qualification and requalification procedures, 540–544
Requalification data records, 544
Specifications, 260–299
Standards, 260–299
Steps in implementing a quality or performance awareness program, 626–634
Surveys of supplier facilities, 312–314
Techniques for raw materials verifications, 534–540
Ultrasonic examination procedure, 234
Visual examination procedure, 236

Class
Action law suits, 569
I and II design changes, definitions, 391, 403

Classification of characteristics
Annotated on drawings and specification, 148–150
Annotated on inspection plans, 148–150
Associated problems, 144
Conjunction with sampling inspection, 405
Levels, 143
Methods of accomplishing, 148–150
Objectives, 142
Relation to classification of defects, 150
Relation to consequence analyses, 140
Relation to material review, 553-555
Classification of defects
Annotated on inspection plans, 499
Quality reporting, 584
Relation to classification of characteristics, 150
Relation to material review, 553-555
Clean room personnel certification, 509
Closed loop corrective action system, 588
Codes
Comparison to specifications and standards, 61-64
Definition, 61
Listing, 260-299
Coefficient of expansion, impact on measurement, 345
Color coding as a change scheduling technique, 390
Common mode failure, definition, 134
Comparative negligence, 567
Competition, stimulation of through quality reporting, 584
Complete disposition, definition, 552
Complexity of product, adjusting quality reports for, 584
Components
Application, safety factor analysis, 154
Engineering checklist, 184-186
Qualification
Analysis, 365
Definition, 350
Qualified parts list, 364
Similarity, 362
Usage, 363
Qualification test, 350, 355-362
Advantages, 366
Status reporting, 369
Versus assembly qualification test, 377
Qualification testing as a result of design change, 387
Selection in order of precedence, 164
Computer programs
Impact of design change, 390
Maintenance of design baseline, 394
Computerized quality reporting, 581, 585
Concurrency
Definition, 382
Reasons, 382
Types or forms, 75
Conditional release of unqualified components, 371
Configuration
Accounting
Computerized means, 395-396
Definition, 385
As built, 401
As designed, 394-396, 401
Control, definition, 384
Identification
Definition, 384
Inspection plans, 397-401, 493, 531
Inspection, first article, 400
Status reporting, 394-396, 401
Verification, 397-401
Configuration management
Codes, standards, and specifications, 273
Definition, 384
Procured items, 245
Related documents, 273
Relation to qualification test, 357, 366
Consequence
Factors contributing to determination, 419-421
Levels, definitions, 143
Consequence analysis
Annotated
Drawings and specifications, 140-152
Inspection plans, 499
Associated problems, 144
Conjunction with sampling inspection, 405
Methods of accomplishing, 148-150
Objectives, 142
Relationship to cause and effect analysis, 141
Requirement, 220
Constant, definition, 406
Consumer
Deputy Program, 575
Product Safety Act, 572-580
Product Safety Act, impact, 577
Consumer Product Safety Commission
Authority, 574
Comments on qualification test, 356
Creation, 572
Impact, 577
Judgmental effects, 577
Need, 573
Operational philosophy, 576
Organization, 573
Overprotection, 577
Overzealousness, 577
Undue influence, 577
Consumerism, 569, 573
Consumer's risk
Definition, 411
Impact of discovery sampling, 428
Impact of screening, 416-418
Continuous failure, definition, 599
Continuous sampling
Administration, 434, 437, 440, 443, 445-448
Examples
Multilevel, 448-450
Single level, 437-444
Multilevel, 434, 445-450
Single level, 433-444
Continuous variable, definition, 406
Contract
Changes resulting from changing standard, 557
Privy of, in relation to product liability, 564
Contractual aspects of material review, 555-556
Contributory negligence, 567
Control
Batch processess, 521-523
Limits, 514-521
Nonconforming items, 546-563
Quality costs, 644-665
Work in-process (see In-process controls)
Coordinating Agency for Supplier Evaluation, description, 306
Corrective action
Assignable causes, 517
Change analysis, 595
Design change, 361, 383
Error cause identification and removal, 630
Evaluation, 593
Ineffectiveness, reasons, 560-562
Inspector's responsibility, 488
Material review system, 546, 560-562
Out-of-tolerance measuring devices, 341
Part, 588
Process, 588
Quality systems audit, 611
Request, 541, 595-597
Strategy for material review, 560-562
Types, 588
Cost
Account for product liability, 570
Accounting, quality, 658
Acquisition, 17, 383
Analysis for corrective action, 589-591, 593
Attributes versus variables sampling, 407
Budgeting, 637
Calibration interval, 329
Calibration multiple, 344
Classification of characteristics' effects, 143
Component qualification test versus assembly qualification test, 367
Considerations
Batch process control, 522
Choice of acceptable quality level, 418-421
Corrective action, 560, 589-591, 593
Dispositioning nonconformances, 546, 552, 555
Establishing in-process inspection points, 491-495
Scrap disposition, 558
Control, 645-654
Defect
Correction, 659
Detection, 659
Prevention, 658
Design change, 387, 391
Design review's effects, 179-181
Effectiveness analysis as a special type of trade-off analysis, 87-90
Effectiveness, definition, 17-18
Effectiveness, measurement 18-19
Estimating, 637
External quality resultant, 659
Fixed quality, 658
Impact
Acceptable quality level, 252
Belated quality requirements, 197
Certificates of compliance, 251
Component safety factors, 159
Special personnel skills, procedures, and support equipment, 169
Information feedback reports, 582
Inspection, 100 percent versus sampling, 404
Internal quality resultant, 659
Life cycle, 17
Life testing sampling plans, minimizing, 455
Maintenance, 18, 169, 171, 174
Measurement accuracy, 324
Negotiation, 637, 641-644
Nonconformance, accounting, 563
Operation, 17, 382-383
Product liability suits, 567
Qualification effects, 350-352, 366, 368
Quality
Creation, 658
Inference, 659
Reporting, 581-586
Rebates for nonconforming items, 556
Reduction
Application of Pareto Principle, 655
Concurrency, 382
Corrective action, 202
Design change, 382-383
Discovery sampling, 427-433
Establishing calibration frequencies, 329
Fatigue reduction, 624
Inspector's role, 488
Penalty test, 360
Qualification by analysis, 365
Qualification by qualified parts list, 364
Qualification by similarity, 362
Qualification by usage, 363
Quality systems audit, 606
Reduced sampling, 412, 427, 445
Scientific personnel selection, 619
Scientific training, 622
Statistical process control, 514-521
Related to the number of measurement devices in service, 342
Tolerances, 96-98, 100-102
Total ownership
Definition, 17
Reduction, 88, 169, 171, 383
Total quality, optimization, 662
Crib inspection, 513
Cross checking
Measurement devices, definition, 325
Versus calibration, 325
Customer inspection, 205, 231, 252, 253-260, 490

D

DCA (see Defense Communications Agency)
DNA (see Defense Nuclear Agency)
DOC (see Department of Commerce)
DOD (see Department of Defense)
Data
Collection
Inspector’s responsibility, 487
Instructions, 239, 500
Test, 239, 361
Feedback, 487, 581
Historical, use in supplier selection, 307-309
Defective, definition, 410, 599
Defect (s)
Classification, 150
Contributing factors, 595, 634
Contributing factors to consequence, 143
Correction costs, 659
Definition, 410
Detection, 7
Detection costs, 659
Latent, definition, 255-256
Patent, definition, 255
Prevention, 7
Prevention costs, 658
Prevention through in-process controls, 502-527
Prevention through statistical control charts, 514
Probability of occurrence, factor in establishing inspection points, 495
Reporting, as part of a corrective action system, 588
Defense Communications Agency, listing of Quality documents, 272
Defense Nuclear Agency, listing of quality documents, 272
Degradation failure, definition, 599
Demonstration testing for availability, maintainability, qualification, and reliability, 223-225
Department of Commerce, listing of quality documents, 270, 284
Department of Defense
Configuration management, definition, 384
Listing of quality documents, 263-265, 270, 272, 284-288, 297, 298
Dependability
Definition, 12
Factor in trade-off analysis, 87
Relation to system effectiveness, 13
Derating
  Curve, 155
  Electronic components, 155
  Requirements, 218
Design
  Baseline, 394
  Change
    Class I, definition, 391, 403
    Class II, definition, 391
    Cost, 387, 389
  Change impact
    Abilities, 385, 388
    Form, fit, or function, 391
    Maintenance manuals, 390
    Procedures, 390, 398
    Safety, 385
    Spares, 390
    Special personnel skills, 393
    Special tools, 390, 393
    Support documents, 390, 393
    Support equipment, 390, 393
    Work in process, 388
  Change incorporation, 392
    Effectivity, 392
    In-line, 392
    Out-of-position, 392
    Verification, 397–401
  Change notice, 391
  Change phase, 388–391
  Change priority, 385
  Change proposal phase, 385–388
  Change release, 394–397
  Change scheduling, 392–394
  Changes, reasons, 382
  Concepts, analysis, 71
  Consideration for maintenance factors, 166–174, 182–184
  Control checklist, 182–191, 208, 312
  Interfaces, impact of change, 389
  Probabilistic, 161–164
  Process, 72–75
  Quality, 9
  Quality, impact of Consumer
  Product Safety Commission, 577
  Quality, planning, 78–81
  Requirements, analysis, 36, 81–91
  Requirements, in relation to inspection, 479
  Requirements, review, 175
  Review (see Design review)
  Standards for quality, 176
  Traceability, 396
Design review
  Advantages of documentation, 92–94, 182
  Checklists, 182–191
  Conceptual, 72, 176
  Cost consideration, 179
  Design requirements, 175
  Meetings, 181
  Objectives, 175
  Objectivity, 176–178, 182
  Progressive versus after-the-fact, 178–181
  Reports, 181
  Requirement, 222
  Types, 175
Destructive inspection, sampling plans, 413
Developmental test, definition, 350
Discovery sampling, description, 427–433
Discrete variable, definition, 406
Disposition
  Nonconforming materials, 546, 551–555
  Nonconforming materials, alternatives, 551–555
Documentation
  Product liability prevention, 571
Double sampling, description, 423
Downtime
  Definition, 16
  Measurement, 17
Drawing
  Availability, 397
Change, Class I, definition, 391, 403
Change, Class II, definition, 391
Change notice, 391
Interpretation, 482
Number, 389, 391, 394
Recall, 397

E

Early failure, definition, 600
Earned value, 650
Education
Training of inspectors, 482-483
Training prerequisites, 510
Effectiveness
Inspection (see Inspection effectiveness)
System (see System effectiveness)
Effectivity
Design changes, 392
In-line, 392
Out-of-position, 392
Eighty-twenty, 655
Employee
Certification (see Certification of personnel)
Recognition, 631
Energy Research and Development Administration, listing of quality documents, 265, 288-289, 298
Engineering
Change notice, 391
Change order, 391
Environmental
Aspects of component qualification, 350
Conditions of test, specification, 360, 499
Controls for calibration, 345-348
Factors contributing to inspection effectiveness, 484, 488
Interaction, 367
Step stress test, 353
Test equipment, 367, 372-381
Equipment
Qualification (see also Components qualification), 503, 508
Error
Analysis, 618, 634
Cause identification and removal, 630
Measurement, systematic, 317-321, 484
Sources, 418-420, 618
Types I and II, 612, 619
Estimating expenditures for quality, 637
Expected waiting time, in relation to life test sampling plans, 455
Exponential distribution, as an assumption for life test sampling, 450
External resultant quality costs, 659

F

Fabrication cost, as a factor in establishing inspection points, 495
Failed parts analysis
Aftermath of qualification testing, 367
Comparison to testing, 354
Definition, 552, 592
Part of the corrective action system, 592
Failure
Catastrophic, definition, 599
Continuous, definition, 599
Definition, 360, 599
Degradation, definition, 599
Early, definition, 600
Infant mortality, definition, 600
Intermittent, definition, 599
Marginal, definition, 599
Mechanics, determination, 592
Primary, definition, 599
Random, definition, 600
Rate curves, 158-159
Secondary, definition, 599
Wearout, definition, 600
Failure modes and effects analysis
Objectives, 128
Relation to cause and effects analysis, 128
Reporting, 92-94, 137
Requirement, 220
Failure reporting
Maximum utilization, 583
Part of a corrective action system, 588
Requirement, 229
Fatigue reduction, 624
Feedback (see also Reporting)
Suppliers, 595-597
First
Article configuration inspection, 400
Lot inspection, 513
Piece inspection, 513
Fitness for use
Definition, 13
Relation to implied warranty, 564
Fixed quality costs, 658
Flinching, 484
Formal material review, organization, 584
Four-to-ten x rule,
Definition, 344
Rationale, 344
Fraud, in relation to product liability, 564-565
Function, definition, 406

Government
Board of Contract Appeal, 253
Industry Data Exchange Program (GIDEP), 329, 363
Quality documents, 260-299
Source inspection, requirement, 243
Government furnished equipment, impact of design change, 390, 400

H
Handling cost, as a factor in establishing inspection points, 494
Hazards
Analysis, 571
Safety, 573
Hierarchy of measurement standards, 329
Hold harmless clause, 571
Hold points (see Inspection hold points)
Homogeneity
Definition, 405
Lot, 405, 427, 434
Human factors
Aspects
100 percent inspection, 405
Flinching, 59, 484
Inspection effectiveness, 484, 488
Considerations in inspection planning, 500-502
Contributing to error, 618, 634
Engineering checklist, 186-187

I
Identification of nonconforming items, 558
Implied warranty, meaning, 564
Independence
Lots, 405, 428

G
Gaging, narrow-limit, 520
General inspection levels, definitions, 412
Material review organization, 548, 550
Quality audit, 605
Quality organization, 8, 9, 23-31
Test agency, 356
Test evaluation agency, 356, 358
Industrial psychology in quality control, 617
Infant mortality failure, definition, 600
Information feedback (see Reporting)
In-line change incorporation, 392
In-process
Controls, 502-527
Mock-ups, 523
Narrow limit gaging, 520
Statistical, 514-521
Statistical, purposes, 514
Versus inspection, 480
Inspection
Crib, 513
First lot, 513
First piece, 513
Points, establishment, 491-495
Set-up, 513
In-service inspection
Description, 490
Management systems considerations, 524-526
Inspection
Attributes versus variables sampling, 407
Call for, 490
Check points, 491-495
Cost, 491-495
Crib, 513
Current legal trends regarding, 254-260
Customer, 243, 490
Data collection, 487
Data feedback, 487
Data requirement, 239, 487
Definition, 479
Destructive, sampling plans, 413, 450
Education and training, 483
Effectiveness
Audit, 611
Considerations in establishing inspection points, 495
Inspector's role, 481-489
Loss of by flinching, 484
Management's role, 481-489
Measurement, 613
Through integrated planning, 489
Environment, 499
Estimation, 637
First article, 227
First lot, 513
First piece, 513
Flinching, 484
Go-no-go, 407
Government source requirement, 243
Hold points, 495
Ineffectiveness due to rebates, 556
Levels, definition, 412
List of related documents, 273-296
Log, 399
Method, 498
Mock-ups, 523
Narrow-limit gages, 520
Normal, definition, 414
100 percent versus sampling, 404
Planning, 481, 489-527
Contents, 492, 497, 528-533, 540-544
Human factors considerations, 500-502
Requirement, 230-231
Plans, detailed, 497-500
Points, considerations in the establishment, 491-495
Policy, 484
Procedures, requirement, 230-231
INDEX 679

Radiographic, 232
Records, requirement, 245, 500
Reduced, definition, 414
Reduced, in relation to continuous sampling, 445
Reduced, in relation to discovery sampling, 427
Regulatory agency, 243, 490, 575
Role, 481-489
Screening, 416, 554
Sequence, 498
Set-up, 498, 513
Source, requirement, 243
  Standard terms and conditions, 205
  System versus quality system, 207-210
Tightened, definition, 414
Tightened, in relation to continuous sampling, 447
Tools, 333-335, 372-381, 520, 534-540
Verification of changes, 397-401
Inspector
  Authorized nuclear, 490
  Education and training, 482-484
  Effectiveness, contributors, 481-489
  Role, 481-489
  Training, by means of detailed inspection plan, 497
Instructions, detailed inspection
  (see Inspection plans, detailed)
Insurance restrictions regarding product liability, 568, 570
Integrated
  Fabrication and inspection planning, 489
  Fabrication and inspection planning contents, 492
  Inspection points, 491-495
  Maintenance and inspection planning, 490
  Intermittent failure, definition, 599
  Internal resultant quality costs, 659
Interpretation
  Drawings and specifications, 482
  Invariant quality costs, 658
  Item-by-item sampling, 426

J
Juran, Dr. J. M., 13

L
LTPD (see Lot tolerance percent defective)
Ladle analysis, requirement, 227
Latent defect, definition, 256-257
Law
  Product liability, 564-567
  Suits, class action, 569
  Suits, product liability, 567
  Torts, 565
  Violation of, in relation to product liability, 564-565
Learning curve, 647
Legal trends
  Regarding product liability, 564-569
  Regarding warranty and inspection, 253-260
Liability
  Individual, with regard to material review, 546
  Insurance restrictions, 568, 570
Law
  Evolution, 564-567
  Liberalization, 564-567
  Limitations through material review, 548
  Preventive actions, 569-572
  Strict, in tort, 9, 566
  Suits, number and cost, 567
Life
  Test sampling plans
Examples, 452-478
Sequential, 469-478
With and without replacement, 455

Load (see Stress)
Long lead item considerations in design change, 387

Lot
Definition, 405
Independence, 405, 428
Rejected, screening, 416
Size, 411
Tolerance percent defective, definition of, 411

M

MCBF (see Mean cycles between failure)
MCTF (see Mean cycles to failure)
MTBF (see Mean time between failure)
MTR (see Mean time to repair)
MTTF (see Mean time to failure)
MTTR (see Mean time to restore)

Machine qualification, 503, 508
Maintainability
Apportionment, definition, 82
Apportionment, process, 83-85
Definition, 11, 17
Demonstration testing, requirement, 223
Documents relating, 260-271
Engineering checklist, 182-184
Impact of design change, 385
Quantitative requirement, 214
Relation to system effectiveness, 10-17

Maintenance
Corrective, definition, 16, 167
Echelons, 170
Factors to be considered in design, 166-171

Inspection, 490

Manual
Design change impact, 390, 400
Preparation, 171
Requirement, 246
Preventive, definition, 16, 168
Shotgunning, 554
Task analysis, 166-171
Input to cost estimating, 171
Objectives, 92-94, 166
Reporting, 166-168
Requirement, 221

Make or buy
Process capability analysis, 98
Relation to design change, 387

Management
By commitment, 642
Obligations to the inspector, 481-489
Reports, 583
Responsibilities regarding quality reporting, 576, 587

Management system
Approach to quality program implementation, 36-49
Characteristics, 32-36
Considerations
Certifying personnel, 509-511
Design change, 382-403
Design change proposals, 385-388
Design change releases, 394-397
Design change scheduling, 392-394
Design change verification, 397-401
Design quality analyses, 71-105, 120-152, 154-182
Error identification and removal, 630
Establishing in-process controls, 502-527
Establishing inspection points, 491-495
INDEX 681

Estimating and budgeting quality effort, 637-644
First lot inspection, 513
First piece inspection, 513
In-service inspection, 524-526
Inspection effectiveness, 481-489, 495, 497, 500
Inspection, examination and test planning, 489-527
Measurement control, 326-349
Nonconforming material control, 546-563
Plant requalification, 526
Product liability prevention, 569-572
Qualification by analysis, 365
Qualification by qualified parts list, 364
Qualification by similarity, 362
Qualification by usage, 363
Qualification by test, 355-362
Quality audit, 606-611
Quality cost accounting, 658
Quality information feedback, 581-597
Set-up inspection, 513
Tool proofing, 511
Total quality cost accounting, 658-662
Constraints, 32, 34-35
Corrective action, 588-598
Definition, 32
Detail, 42-48
Environment, 32, 34
Feasibility analysis, 38
Growth potential analysis, 36
Hierarchy, 34, 40
Modularization, 44, 47
Noise, 48
Quickening, 48
Requirements analysis, 36
Trade-off analysis, 38-39
Manufacturer’s rating of components, definition, 155
Manufacturing
Control checklist, 313
Engineering checklist, 188-189
Marginal failure, definition, 599
Material review (see also Nonconforming materials, control
Authority for suppliers, 557
Checklist, 314, 558
Contractual implications, 555
Documentation, 559
Inspector’s responsibility, 487
Organization, 548
Purposes, 546
Relation to release of unqualified components, 371
Schedule considerations, 560, 563
Material substitution, 547
Materials engineering checklist, 188
Measurement
Accuracy, definition, 318
Bias, definition, 318
Compensation for environment, 345-348
Control, 326-349
Codes, standards, and specifications, 260-270
Management system, 326-349
Policy, 327
Scope, 327
Device procurement, 342
Devices, transportation and handling, 343
Environmental controls, 345-348
Error, sources, 317, 344, 484-486, 500-502
Hierarchy, 321
Inspection effectiveness, 613
Multiple
Cost versus its protective value, 344
Definition, 344
Relation to corrective action, 341
Pinch, 348
Precision, definition, 317
Ratio (see Measurement multiple)
Traceability, 330
Mission
Completion ratio, definition, 14
Environmental analysis, 81
Quality, 9–13, 16
Success ratio, definition, 15
Mock-up
Advantages, 523
Definition, 523
Motivation, quality (see Quality awareness)
Moving average, use of in information feedback reporting, 584
Multiple sampling, description, 424–426

N
NASA (see National Aeronautics and Space Administration)
NBS (see National Bureau of Standards)
NSA (see National Security Agency)
NRC (see Nuclear Regulatory Commission)
Narrow limit gaging, 520
National Aeronautics and Space Administration, listing of quality documents, 266, 270–273, 290
National Bureau of Standards, measurement traceability, 337
Negligence
Comparative, 567
Contributory, 567
Pure comparative, 567
Relation to product liability, 564–567
Negotiating Quality expenditures, 641–644
Net rating of component, 155
Nonconforming materials
Checklist for control, 314, 558
Control, 546–563
Control, inspector’s role, 487
Dispositioning, 546, 551–555
Dispositions by suppliers, 557
Identification, 558
Management system for control, 546–563
Segregation, 558
Nondestructive examination
Batch processes, 522
Definition, 480
List of documents, 273–296
Personnel certification, 509
Requirements, 232–237
Normal
Inspection, definition, 414
Rating of component, 155
Nuclear Regulatory Commission, listing of quality documents, 267–269, 271, 290–292

O
OC curve (see Operating characteristic curve)
Off-the-shelf items
Categorization, 248
Quality requirements, 248–251
Operating characteristic curve
Definition, 410, 428
Discovery sampling, 428
Organization
Consumer Product Safety Commission, 573
Design quality, 27
Functional, 23
Government’s impact, 9
Line, 24
Material review, 548
Matrix, 25
Product liability prevention, 570
Programmatic, 25
Staff, 24
Out-of-position incorporation of design changes, 392
Overcheck of raw materials test reports, 228

P
Packaging and shipping, requirements, 241, 243
Packaging identification, requirements, 241
Parameter of a product, definition, 140
Parametric estimation of Quality expenditures, 637
Paret, Vilfredo
   Principle, 142, 588, 655
   Principle as applied to Quality cost management, 655
Part
   List, requirement, 241
   Number change resulting from design change, 389
Part corrective action
   Definition, 588
   Relation to material review, 546, 560
Patent defect, definition, 255
Percent
   Defective in relation to probability of acceptance, 410, 428
   Defective, lot tolerance, 411
Percentage sampling, 421
Performance improvement through quality awareness, 626
Personnel
   Certification (see Certification of personnel)
   Selection test, validation, 619
Personnel skills
   Special, cost impact, 169
   Special, impact of change, 387
Physical test reports, requirements, 227-228, 238
Planning
   Detailed inspection, 497-500
   Inspection, examination, and test, 489-527
   Inspection, human factors considerations for, 500
   Inspection points, 491-495
   Integrated, contents, 492
   Integrated, for fabrication and quality, 489
   Quality or performance awareness program, 632
   Quality system audits, 608
Plant requalification, management systems considerations, 526
Policy
   Inspection, 484
   Quality, 40
Power of discrimination, 411
Preaward survey
   Associated problems, 305
   CASE approach, 306
   Checklist, 312-314
   Precision of measurement, definition, 317
Preliminary material review
   Organization, 550, 552
   Organization, limitations, 550-552
Preproduction unit, definition, 53
Prevention of defects (see Defects, prevention)
Preventive maintenance, integrated inspection, 490
Primary
   Failure, definition, 599
   Measurement standards, definition, 323
Priority
   Corrective action, 589-593
   Design changes, 385
   Mandatory, 392
Privy of contract in relation to product liability, 564-566

Probability
- Acceptance, 410, 428
- Acceptance under discovery sampling, 428
- Chance error versus assignable cause, 517
- Defect occurrence, factor in establishing inspection points, 495
- Defectiveness, contributing factors, 418-420
- Definition, 406

Problem definition in corrective action system, 591, 595, 598

Procedures
- Availability from GIDEP, 329
- Calibration, 328
- Handling and shipping, requirements, 241
- Impact of design change, 390, 401
- Inspection, 230-231
- Inspection, detailed, 497-500
- Qualification, 223, 226, 236
- Quality, 43-48
- Quality control, 43-48
- Special processes requirements, 226
- Test, 359-361, 540-544

Process capability
- Analysis as an input to make or buy, 98
- Analysis as part of the receiving inspection of production equipment, 98, 503
- Factor contributing to defectiveness, 418-420

Process controls (see In-process controls)

Process corrective action
- Definition, 588
- Inspector's responsibility, 488
- Relation to material review, 547, 560
- Through design change, 383

Procurement
- Control checklist, 313
- Measurement devices, 342
- Miscellaneous quality requirement, 241-247

Procurement quality
- Approvals, 310
- Objectives, 195
- Requirements
  - Application, 198
  - Design, 212-225
  - Fabrication, 225-241
  - Listing, 260-299
  - Management systems, 195-253
  - Off-the-shelf items, 248-251
  - Timeliness, 197

Producer's risk
- Definition, 411
- Impact of discovery sampling, 428

Product acceptance (see Acceptance, product)

Product liability
- Insurance restrictions, 568, 570
- Law, evolution, 564-567
- Law, liberalization, 564-567
- Limitations through material review, 548
- Preventive actions, 569-572
- Suits, number and cost, 567

Production
- Block point, 400
- Lot, definition, 405, 434
- Process requirements in relation to inspection, 479
- Training by inspectors, 482

Proposals
- Dollarized evaluation, 304
- Quality evaluation, 301
- Quantitative evaluation, 303

Prototype, definition, 53
Qualification
Analysis, 365
Components, definition, 350, 351
Cost as a result of design change, 387
Equipment, 367, 372-381
Existence on a qualified parts list, 364
Facility, 372, 526, 540-544
Manufacturing equipment, 98, 503
Penalty test, definition, 360
Policy, 355
Schedule, 358, 369
Similarity, 362
Status reporting, 369
Testing, requirement, 223-225, 355-362
Usage, 363
Welding procedures, 226
Qualification test
Advantages, 366
Agency’s independence, 356
Articles’s representativeness of production, 361
Components versus of assembly, 367
Data collection, 360
Definition, 351
Equipment, 367, 372-381
Failure, definition, 360
Measurement device calibration, 359
Procedure, cost reduction through use, 366
Qualified parts list
Approach to component qualification, 364
Status report, 369
Quality
Absolute concept, 1-5
Administration checklist, 312
Assurance versus control, 29
Audit (see Audit)
Awareness, 626
Awareness program objectives, 626
Budgeting, 637
Check points (see Inspection check points)
Clauses for procurement, standard, 202-247
Clauses for procurement, standard, listing, 208
Conformance, 7
Control, imposed threats, 609
Correction costs, 659
Cost
Control, 644-665
Optimization, 658
Relationships, 662
Costs, fixed, 658
Creation costs, 658
Data for source selection, 307-309
Design, 9-23, 71-191
Design requirements, 212-225
Estimating, 637
Function, definition, 9-23
Historical development, 1-9
Hold points (see Inspection check points)
Inference costs, 659
Information feedback (see also Reporting)
Management system
Documents, 40-48, 260-270
Requirements for suppliers, 207-212
Management’s obligations to the inspector, 481-489
Marginal, 424
Measurement, 13-21, 82-85, 581-586
Objectivity, 9, 23-29, 176, 182
Organization charter, 40
Organization in relation to product liability, 570
Organization independence, 9, 23–29
Organizational forms, 23–31
Plan, 75–81
Planning
  In-process inspection, 502–527
  Integration, 489
  Requirement, 211, 230, 489
Policy, 484
Relative concept, 1–5
Requirements for supplies, 195–253
Resultant costs, 659
Standards
  Batch processes, 522
  Listing, 260–299
  Relation to inspection, 479
System versus inspection system, 207–210
Systems audit, definition, 605
Systems (see Quality management systems)
Terms and conditions, standard contractual, 201, 202–206
Quality program index
  Advantages, 80
  Definition, 75
Quality program plan
  Advantages, 80
  Definition, 75
  Design, 78–81
  Requirement, 211
Quality requirements
  Codification, 247
  Design, 212–225
  Management systems, 207
  Off-the-shelf items, 248–251
  Procurement, application, 198–200
  Supplies which are not subject to resale, 199
  Timeliness, 196–198
  Types, 201
Quantitative maintainability analysis
  Comparative, 217
  Requirement, 214, 216
Quantitative reliability analysis
  Comparative, 217
  Requirement, 212–213, 215
Quantitative requirements
  Availability, 215
  Maintainability, 214, 216–217
  Reliability, 212–213, 215, 217
Random
  Failure, definition, 600
  Failure versus random sample, discussion, 600
  Sample, 406
  Variable, 406
Randomization
  Sample, 406
  Techniques, use, 162
Rating of components, 155
Ratio
  Calibration, 344
  Mission completion, 14
  Mission success, 15
  Quality to manufacturing costs, 638, 645–655
  Readiness, 14
  System effectiveness, 10–21
  Readiness ratio, definition, 14
Real time, on-line quality reporting, 585
Rebates because of material review dispositions, 556
Recall of measurement devices, 343
Recognition of employee performance, 631
Records
  Automated calibration, 337
  Calibration, 330–339
Control of nonconforming items, 559
Inspection, collection of data, 487, 500
Product liability prevention, 571
Retention, requirement, 245
Reduced inspection
Continuous sampling, 445
Definition, 414
Discovery sampling, 428, 433
Reference measurement standards, definition, 323
Regrade disposition, definition, 555
Regulatory agency inspection, 490
Rejection number, 414, 416
Reliability
Actual, definition, 84-85
Apportionment, definition, 82
Apportionment, process, 83-85
Definition, 11, 450
Degradation curve, definition, 85
Demonstration testing, requirement, 223
Design, definition, 84-85
Impact of design change, 385, 388
Inherent, definition, 84-85
Maturation, 84-85
Observed, definition, 84-85
Quantitative requirements, 212, 213, 215, 217
Related documents, 270-271
Relation to system effectiveness, 11
Test sampling plans, 450-478
Repair
Cost as a factor in establishing inspection points, 495
Customer rebates, 556
Disposition, definition, 553-555
Parts
Definition, 16
Impact of design change, 390, 400
Repairability, definition, 17
Replacement parts
Definition, 16
Impact of design change, 390, 400
Scrap, 562
Reporting
Calibration status, 337, 343
Component qualification status, 369
Configuration status, 394
Failure information, 582-583
Failures, requirement, 224, 229
Inspection results, requirement, 239
Management, 576, 583, 587
Management system considerations, 92-94, 581-588
Meaningfulness, 583
Quality audit results, 609
Quality costs, 645-655, 658-662
Part of the corrective action system, 588, 595-597
Responsibility of managers, 576, 587
Shop quality, 585-586
Stimulate competition, 584
Test results, requirement, 224, 227-229, 238-239
Timeliness, 585
Using computers, 581, 585
Using shop visual displays, 586
Representativeness
Qualification test article(s), 361
Sample, 406
Requalification of plant, management system considerations, 526
Request for proposal, definition, 195
Request for quotation, definition, 195
Rest impact on quality and production, 624
Retrofit as a result of design change, 386, 393
Return on investment for corrective action, 593
Return to supplier disposition, definition, 553
Rework
  Cost as a factor in establishing inspection points, 495
  Disposition, definition, 552
Risk
  Considerations in establishing inspection points, 491
  Consumer's, 411
  Impact of discovery sampling, 428
  Impact of screening, 416–418
  Level, choice, 418–421
  Producer's, 411
Root cause of problem, definition, 592, 595, 598
Route sheet (see Integrated plan)

Safety
  Considerations for material review, 546–548, 550
  Consumer Product Safety Act, 572–580
  Design policy, 570–571
  Impact of Consumer Product Safety Commission, 577–580
  Impact of design change, 385
  Information, source, 575
  Margin, 155–157
  Records of various products, 574
  Standards, 574
Safety factor analysis
  Electronic component applications, 154–160
  Meaning, 154
  Objectives, 154
  Reporting, 160
  Requirement, 218
  Structural part applications, 160
Safety factors
  Calculation, 155–157, 161–164
  Impact on cost, 157–159
Implementation, 159
  Reasons for use, 159
  Relation to probabilistic design, 161
  Standardization, 157–159
Sample
  Definition, 404
  Random, definition, 406
  Replacement, in relation to life test sampling, 452, 455
  Representative, definition, 406
  Size code letter, 413
  Size for in-process inspection, 515
Sampling (see also Statistical sampling)
  Acceptance, definition, 404
  Acceptance number, 414, 416
  Frequency code letter, 435
  Inspection versus 100 percent inspection, 404
  In-process inspection, 515
  Normal, 414
  Percentage, 421
  Plan implementation, training, 484
  Plan's power of discrimination, 411
  Randomness, 406
  Reduced, 414, 427–430, 445
  Rejection number, 414, 416
  Representativeness, 406
  Tightened, 414, 447
Schedule
  Calibration, 329, 333–335
  Component qualification, 358, 369
  Considerations for control of non-conforming items, 560, 563
  Design changes, 392–394
Scientific
  Selection of personnel, 619
  Training for skills, 622
Scrap
  Disposition, definition, 522, 555
Mutilation, 559
Replacement, 562
Screening of rejected lots, 416
Secondary failure, definition, 599
Secondary standard, definition, 323
Segregation of nonconforming items, 558
Sequential life test sampling plans, 469-478
Serial number
   Definition, 389
   Measurement devices, 331
   Requirement, 239
Service as a factor of worth, 10, 19
Set-up inspection, 513
Shelf life, requirement, 240
Shewhart, Dr. Walter A., 7, 514
Shop quality reporting, 585-586
Shop traveler (see Integrated plan)
Similarity as an approach to component qualification, 362
Simpson, Richard O., 574, 576, 578
Single failure analysis
   Relation to cause and effects analysis, 120
Single sampling, example, 423
Skills, training for acquisition, 622
Skip lot sampling, 427-428
Source inspection
   Current legal trends, 253-260
   Government, requirement, 243
   Reasons, 244
   Requirement, 243
Source selection
   Preaward survey, 304
   Product evaluation, 309
   Proposal evaluation, 301
   Quality data, 307
Spare parts
   Definition, 16
   Impact of design change, 390, 400
   Provisioning analysis
      Factors to be considered, 171-174
   Reporting, 172
   Special process(es)
      Certification (see Qualification of equipment and Certification of personnel)
   Engineering checklist, 188
   Personnel certification, 509
   Requirements, 226
Specifications
   Attributes, 57-61
   Classification of characteristics, 60, 140-151
   Clarity, 57
   Compared to codes and standards, 61-64, 67
   Conceptual phase, 50
   Contract definition phase, 53
   Generic, 59
   Interpretation, 482
   Listing, 260-299
   Listing of different types, 55
   Means versus ends, 60
   Outline, 66
   Sources of data, 64-66
   Test, 358
   Tolerances, 58
Specimens, requirements, 237
Standard(s)
   Batch process, 522
   Behavior for inspectors, 488
   Company measurement, definition, 323
   Comparison to codes and specifications, 61-64
   Definition, 62
   Inspection, 501
   International measurement, definition, 323
   Laboratory environment, 345-347
   Listing, 260-299
   Parts, documents relating, 272
   Primary, definition, 323
   Product safety, 574
   Reference, definition, 323
Relation to product liability, 570
Repair manual, 553
Secondary, definition, 323
Transfer, definition, 323
Visual, 521
Working, definition, 323
Workmanship, in relation to inspection, 479
Standard deviation as a measure of measurement precision, 317
Standard quality clauses
Examples, 207-247
Procurement
Definition, 201
Listing, 208
Standard quality terms and conditions
Definition, 201
Examples, 203-206
Inspection, 205
Warranty, 203
Statistical
Confidence of failure data, 364
Control limits, 514
Inference, 409
Process controls (see Statistical control charts)
Significance with regard to establishing production lots, 405
Statistical control charts
Assumptions for use, 517-518
Averages, 514
Averages and ranges in combination, 519
Competitive quality advantages, 514
Defect prevention, 514
Impact on quality development, 7
In-process controls, 514-520
Numbers of defects or defectives, 518
Per cents defective, 518
Purposes, 514
Ranges, 519-520
Sample size, 500
Standard deviations, 518
Variances, 518
Statistical sampling
Attributes
Continuous, multilevel, 434, 445-450
Continuous, single level, 433-444
Discovery, 427-433
Double, 423
Item-by-item, 426
Multiple, 424-426
Single, 423
Skip lot, 427
Versus by variables, 407
Definition, 404
In-process inspection, 514-520
Inspection versus 100 percent inspection, 404
List of related documents, 296-299
Normal, 414
Plan implementation, training, 484
Reduced, 414, 427, 430, 445
Tightened, 414, 447
Variables, 514-520
Statistical tolerancing
Advantages, 100
Cost impact, 100
Definition, 100
Graphic approach, 104-117
Limitations, 102
Statistics, definition, 404
Stop work order
Authority, 388
Related to design change, 388
Stress
Applied, 155-157, 160-164
Comparison, for component qualification by other than test, 362, 364
Element of test, 480
Environmental, 81, 155
Test, 353
Versus strength, 160
Worst case, 156
Strict liability in tort, 566
Subcontractor (see Supplier)
Substitution of materials, 547
Supplier
  Authority for material review, 557
  Corrective action, 595-597
  Evaluation using CASE, 306
  Evaluation using historical data, 307
  Proposals, quality evaluation, 301
  Quality management system requirements, 207-212
  Rating, 307
  Selection from a quality viewpoint, 210, 301-312
  Surveys, 304-307
  Reasons, 304
  Reduction, 306
  Timing, 311
Support equipment
  Impact of design change, 390, 400
  Special, cost impact, 169
System effectiveness
  Definition, 10-13
  Measurement, 13-20
  Special type of trade-off analysis, 87

T

Task
  Analysis, advantages, 639
  Analysis as a method of Quality estimating, 639
  Tattle tale rule, 576
Test
  Acceptance, definition, 351
  Data collection, 360, 500, 540-545
  Definition, 480
  Destructive, sampling plans, 413
  Developmental, definition, 350
  Engineering checklist, 190-191
  Environment, 360, 362-364, 499
  Equipment, 367, 372-381, 498
  Failure definition, 360
  Human factors aspects, 500-502
  Method, 499
  Nondestructive (see Nondestructive examination)
  Penalty, definition, 360
  Planning, 489-527
  Points, establishment (see also Inspection points), 491-495
  Procedure, 359-361, 497-500, 540-544
  Procedures, detailed (see Inspection plans, detailed)
  Qualification, advantages, 366
  Qualification, definition, 350-351
  Sequence, 498
  Set-up, 498
  Specification, 358
  Termination number, 469
  Types, 350-355
Testing
  Accelerated, 353
  Acceptance, in comparison to qualification and developmental testing, 351
  Acceptance, definition, 351
  Agency, independence, 356
  Breadboard, 352
  Definition, 480
  Demonstration, requirement, 223
  Developmental, in comparison to qualification and acceptance testing, 350-351
  Developmental, definition, 350-351
  Environmental, 350-354, 499
  Human factors aspects, 500-502
  In-process (see In-process inspection)
List of related documents,
273-296
Management system controls,
355-362, 367-372
Method, 499
Nondestructive (see Nondestructive examination)
Personnel selection, 619
Raw materials, 227-228
Qualification, cost of as a result of a design change, 387
Qualification, definition, 350-351
Sequence, 498
Set-up, 498
Specimens, requirements, 237
Step stress, 353
Tightened inspection
Continuous sampling, 447
Definition, 414
Timeliness
Corrective action, 594
Quality reporting, 585
Tolerances
Absolute method of establishing, 99
Characteristic importance, 60
Cost, 96-97, 100
Definition, 95
Factor contributing to defectiveness, 419
Factors to be considered in establishment, 95
Functional requirements, 95
Inspection capabilities, 98
Inspectability/testability, 58
Interfacing requirements, 99
Probability of misfit, 99, 100-103, 105-119
Production capability, 58, 98
Statistical method of establishing, 100
Tool
Inspection, 512
Proofing, 511
Tools
Go-no go, 407
Special
Cost impact, 169
Impact of design change, 390, 393
Tort
Definition, 565
Strict liability, 566
Total
Quality cost optimization, 658, 662
Quality function, 9-23
Traceability
Calibration, 323, 330
Design, 394
Inspection data, 239
Materials, requirement, 225
Radiographic film, 233
Trade-off analysis
Application, 72, 85-90
Management systems, 38
Cost effectiveness analysis as a special type, 87-90
Definition, 85
Establishing inspection points, 491-495
Requirement, 216
Steps for accomplishment, 85-87
Supplier proposals, 303
System effectiveness analysis as a special type, 87-90
Training
Inspectors by means of detailed inspection planning, 497
Production workers by inspectors, 482
Skills acquisition, 622
Transfer standard, definition, 323
Transportation cost, factor in establishing inspection points, 494
Truncation of life test sampling plans, 475
Type I and II errors, 612, 619
U
UL (see Underwriters’s Laboratory)
USAF (see United States Air Force)
USA (see United States Army)
USMC (see United States Marine Corps)
USN (see United States Navy)
Underwriter’s Laboratory
  Critique, 356
  Example of testing agency, 356
United States Army, listing of quality documents, 269, 273, 292–293, 298
United States Marine Corps, listing of quality documents, 272
Use As Is
  Disposition, customer rebates, 556
  Disposition, definition, 554–555

V
Validation of personal selection tests, 619
Value
  Definition, 20
  Earned, 650
Variable
  Continuous, definition, 406
  Definition, 406
  Discrete, definition, 406
  Random, definition, 406
Variables sampling, definition, 407, 514
Variance as a measure of measurement precision, 317
Vendor (see Supplier)
  Violation of the law in relation to product liability, 564, 565
  Visual
    Inspection standards, 501
    Quality information feedback, 586
  Vital few and trivial many, 590

W
Waiver disposition, definition, 555
Warranty
  Considerations in dispositioning nonconforming items, 551
  Current legal trends, 253–260
  Disclaimers, 572
  Implied, in relation to product liability, 566
  Standard terms and conditions, 203–205
Wearout failure, definition, 600
Welding
  Machine qualification, 503, 508
  Personnel certification, 509
  Qualification, 226
Work breakdown structure, as a tool for yes-no network analysis, 90
Working instrument, definition, 323
Working standard, definition, 323
Worst case analysis, definition, 156
Worth, definition, 10–20

Y
Yes-no network analysis
  Application, 71–72, 90–91
  Definition, 90

Z
Zero defects (see also Quality awareness)
  Program, 626–634
  Relation to product liability, 569